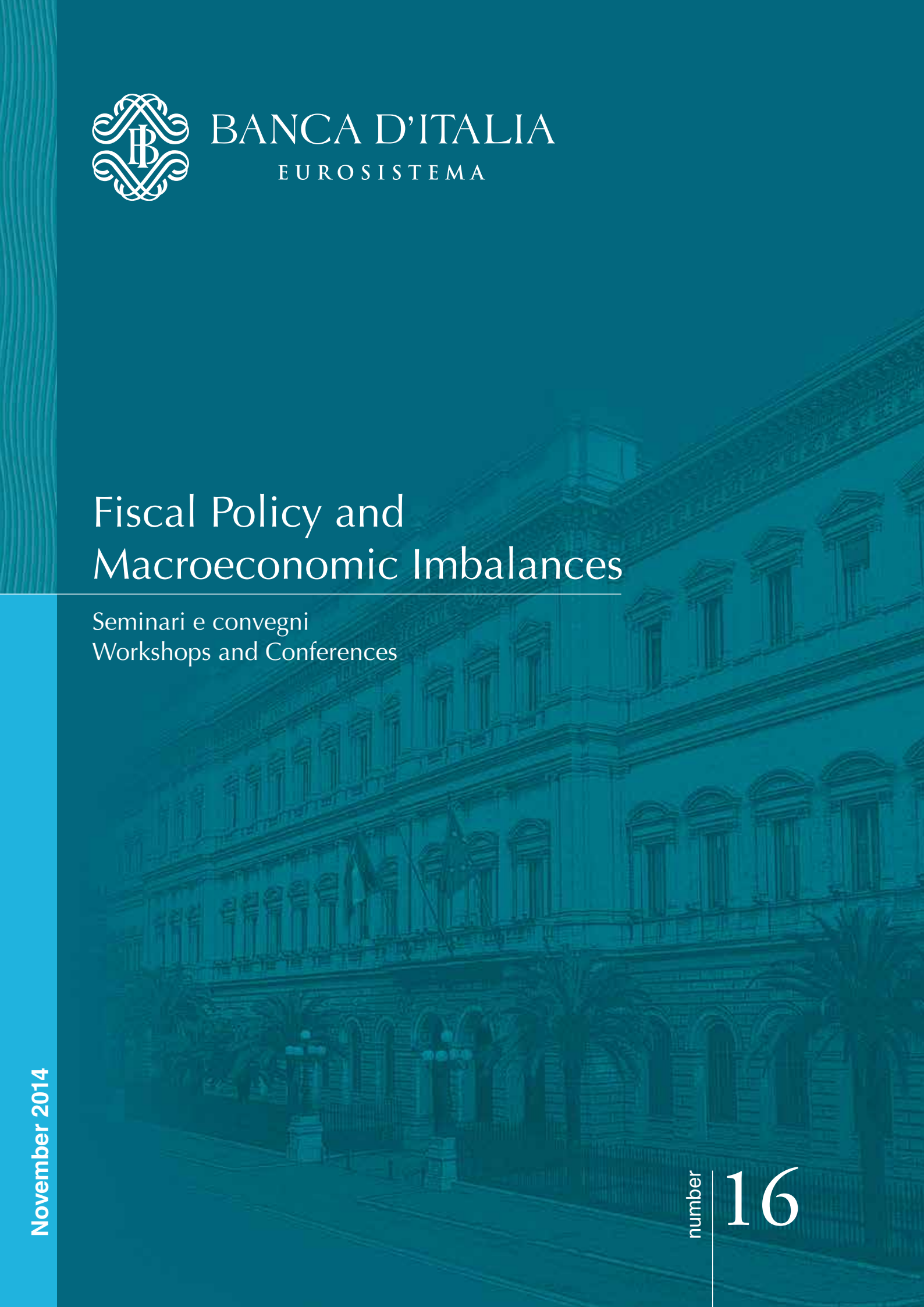
BANCA D'ITALIA
EUROSISTEMA

Fiscal Policy and Macroeconomic Imbalances

Seminari e convegni
Workshops and Conferences



November 2014

number 16

Earlier versions of the papers in this volume were presented at the Banca d'Italia workshop on "Fiscal Policy and Macroeconomic Imbalances" held in Perugia, S.A.Di.Ba., on 4-6 April, 2013. We wish to thank the staff of S.A.Di.Ba. for their assistance in all aspects of the organization of the workshop.

Previous Public Finance workshops have addressed the following topics:

"Indicators of Structural Budget Balances" (1998)

"Fiscal Sustainability" (2000)

"Fiscal Rules" (2001)

"The Impact of Fiscal Policy" (2002)

"Tax Policy" (2003)

"Public Debt" (2004)

"Public Expenditure" (2005)

"Fiscal Indicators" (2006)

"Fiscal Policy: Current Issues and Challenges" (2007)

"Fiscal Sustainability: Analytical Developments and Emerging Policy Issues" (2008)

"Pension Reform, Fiscal Policy and Economic Performance" (2009)

"Fiscal Policy: Lessons from the Crisis" (2010)

"Rules and Institutions for Sound Fiscal Policy after the Crisis" (2011)

"Fiscal Policy and Growth" (2012)

The proceedings may be requested from:

Banca d'Italia
Biblioteca
Via Nazionale, 91
00184 Roma
Italy

They are also available at the Banca d'Italia website:

http://www.bancaditalia.it/

ISSN 2281-4337 (stampa)
ISSN 2281-4345 (online)

The contents of this book do not commit Banca d'Italia.
Responsibility for the ideas and opinions expressed rests with the authors of the papers.
Printed by the Printing and Publishing Division of Banca d'Italia, Rome, November 2014.

CONTENTS

Contributors

Luca Agnello (Università di Palermo, Italy)
Ana María Aguilar (Banco de México)
Fabio Balboni (HM Treasury)
Emanuele Baldacci (ISTAT)
Sebastian Barnes (OECD)
Antonio Bassanetti (Banca d'Italia)
Cláudia Rodrigues Braz (Banco de Portugal)
Adi Brender (Central Bank of Israel)
Anne-Marie Brook (New Zealand Treasury)
Sascha Bützer (Ludwig-Maximilians-Universität München)
Matteo Bugamelli (Banca d'Italia)
Panagiotis Chronis (Bank of Greece)
Carlos Cuerpo (European Commission)
Jorge Cunha (Banco de Portugal)
Roberta De Stefani (European Central Bank)
Elena Deryugina (Bank of Russia)
Francesco Di Comite (European Commission)
Inês Drumond (European Commission)
Gilles Dufrenot (Banque de France)
Kazuhiko Ejima (Ministry of Finance, Japan)
Jonas Fischer (European Commission)
Daniele Franco (Banca d'Italia)
Niels Gilbert (De Nederlandsche Bank)
Raffaela Giordano (Banca d'Italia)
Gabriele Giudice (European Commission)
Rauf Gönenç (OECD)
Andrés González (Central Bank of Colombia)
Sanjeev Gupta (IMF)
Fuad Hasanov (IMF)
Sebastian Hauptmeier (Ministry of Finance, Germany)
David Heald (University of Aberdeen)
Pablo Hernández de Cos (Banco de España)
Carlos Herrero García (Ministerio de Economía y Competitividad, Spain)
Jeroen Hessel (De Nederlandsche Bank)
Ida Hjortsø (Bank of England and European University Institute)
Pedro Hinojo Gonzáles (Ministerio de Economía y Competitividad, Spain)
Alexandr Hobza (European Commission)
Ana Teresa Holanda de Albuquerque (Banco Central do Brasil)
Juan Francisco Jimeno Serrano (Banco de España)
Christina Jordan (European Commission)
Christophe Kamps (European Central Bank)

Ramazan Karaşahin (OECD)
Christian Kastrop (Ministry of Finance, Germany)
Alexander Klemm (European Central Bank)
Vincent Koen (OECD)
Walpurga Köhler-Töglhofer (Österreichische Nationalbank)
Radoslav Krastev (European Commission)
Geert Langenus (National Bank of Belgium)
Nadine Leiner-Killinger (European Central Bank)
Julia Lendvai (European Commission)
Jean J. Le Pavec (Directorate-General of the Treasury, France)
Mirko Licchetta (HM Treasury)
Ignacio Lozano (Central Bank of Colombia)
Ranjana Madhusudhan (National Tax Association, USA)
Pilar Mas Rodríguez (Ministerio de Economía y Competitividad, Spain)
Sandro Momigliano (Banca d'Italia))
Daniel Monteiro (European Commission)
Marialuz Moreno Badia (IMF)
Laurent Moulin (European Commission)
Atri Mukherjee (Reserve Bank of India)
Carlos Mulas-Granados (IMF)
George Palaiodimos (Bank of Greece)
Lucio Pench (European Commission)
Marcello Pericoli (Banca d'Italia)
Peter Pontuch (European Commission)
Rafal Raciborski (European Commission)
Claudia Ramírez Bulos (Banco de México)
Ernesto Rezk (Universidad de Córdoba, Argentina)
Oliver Röhn (OECD)
Rasmus Rüffer (European Central Bank)
Roberto Sabbatini (Banca d'Italia)
Johannes Scheubeand (Ministry of Finance, Germany)
Alex Segura-Ubiergo (IMF)
David Sondermann (European Central Bank)
Ricardo M. Sousa (Universidade do Minho, Portugal and London School of Economics)
Karsten Staehr (Eesti Pank)
Livio Stracca (European Central Bank)
Teresa Ter-Minassian (Inter-American Development Bank)
Pietro Tommasino (Banca d'Italia)
Alessandro Turrini (European Commission)
Hernando Vargas (Central Bank of Colombia)
Sergey Vlasov (Bank of Russia)
Francesco Zollino (Banca d'Italia)

FOREWORD

Daniele Franco[*] *and Sandro Momigliano*[**]

This volume brings together the papers presented at the Banca d'Italia workshop held in Perugia from 4 to 6 April 2013.

The workshop focused on the links between fiscal and macroeconomic imbalances. Assets price cycles, commodities price cycles, and construction and investment booms may temporarily improve fiscal balances and then lead to sudden economic downturns and pressures on fiscal policy. Gradual losses of competitiveness and worsening external positions can abruptly be perceived as threats to macroeconomic stability and sustainability of public debt. In turn, widening fiscal imbalances leave countries more exposed to financial shocks with further negative feedbacks on the real economy, sometimes in nonlinear ways. The deleveraging process which follows is often painful, although necessary.

The experience of recent years emphasizes how important these links are. In the euro area, insufficient attention to macroeconomic developments has lead – together with lax fiscal policies – to acute financial tensions and serious risks of a break-up of the Monetary Union. To address these shortcomings, a new surveillance tool to monitor and correct imbalances other than fiscal ones was introduced and fiscal rules and institutions were strengthened. In emerging countries, sustainable growth has remained a crucial issue, shaping their monetary and fiscal policies.

The workshop provided an overview of the recent theoretical and empirical work on a number of topics related to fiscal and macroeconomic imbalances.

In Section 1 four papers focused on current account imbalances (two studies), public debts and private sector indebtedness levels, discussing, *inter alia*, measurement issues and strategies for adjustment limiting the negative impact on growth. Other two papers examined, respectively, the strategic interaction between national fiscal policy makers – pointing out the welfare improvements associated to policy cooperation – and the measurement of fiscal policy taking into account asset prices cycles; finally, two works analyzed, respectively, the factors affecting a country's vulnerability to a fiscal crisis – including the level and allocation of credit flows – and the characteristics of the financial contagion which contributed to the sovereign debt crisis.

Session 2 dealt specifically with the euro area. Four studies focused on individual countries – Greece, Italy, Spain and Portugal – addressing issues of wider relevance and drawing lessons for the rebalancing process. The paper on Greece tested the twin-deficit hypothesis; the others discussed the main factors explaining the build-up of macroeconomic and fiscal imbalances before the crisis in each country and discussed the available policy options and, in particular, the role to be assigned to fiscal policy in the current context. The three remaining papers tackled, from different points of view, the issue of the adequacy of the new EU governance arrangements. Overall, they tend to conclude that strengthening fiscal rules and broadening EU surveillance to cover macroeconomic imbalances can contribute to better economic outcomes.

In Session 3 the studies focused on the analysis of the effects of fiscal policy in transition, emerging, and resource-rich countries; in particular, many papers dealt with the issue of the consequences of different policies for the external position of these countries. The first paper was the only one devoted to the analysis of an European country, Latvia, while the four following studies dealt with the role of public finance in different emerging economies (respectively Turkey,

---

[*] Italian Treasury; formerly Banca d'Italia.

[**] Banca d'Italia, Economic Research and International Relations Area.

Brazil, India, and Colombia). The last paper of this session was the only one to adopt a cross-country approach, using data for 28 emerging markets to study the likely effects of fiscal policies on real exchange rates appreciations.

Finally, Session 4 was devoted to the analysis of past experiences and potential prescriptions about the use of fiscal policy in addressing macroeconomic issues. While the first paper was a cross-country investigation into the relation between civic capital and the accumulation of macroeconomic imbalances – with some implications for the evaluation of the new structure of the European governance – the other papers presented in this session were focused on individual countries. Through different statistical, econometric, and modeling techniques, the authors of these works tackled respectively the issues of the usefulness of fiscal consolidations and structural reforms in Spain, the role played by the structure of revenues and expenditures in explaining the recent macroeconomic performance of New Zealand, and the best fiscal rule to cope with the consequences of oil price shocks on government revenues in Mexico.

Banca d'Italia is grateful to the institutions that contributed to the success of the initiative, to the experts who provided research papers and to all who came to Perugia to take part in the discussion.

This volume extends the analysis of fiscal policy issues carried out in the previous workshops, which were devoted to *Indicators of Structural Budget Balances* (1998), *Fiscal Sustainability* (2000), *Fiscal Rules* (2001), *The Impact of Fiscal Policy* (2002), *Tax Policy* (2003), *Public Debt* (2004), *Public Expenditure* (2005), *Fiscal Indicators* (2006), *Fiscal Policy: Current Issues and Challenges* (2007), *Fiscal Sustainability: Analytical Developments and Emerging Policy Issues* (2008), *Pension Reform, Fiscal Policy and Economic Performance* (2009), *Fiscal Policy: Lessons from the Crisis* (2010), *Rules and Institutions for Sound Fiscal Policy after the Crisis* (2011) and *Fiscal Policy and Growth* (2012).

Session 1

THE INTERACTION OF FISCAL POLICY AND MACROECONOMIC IMBALANCES

INDEBTEDNESS, DELEVERAGING DYNAMICS AND MACROECONOMIC ADJUSTMENT

Carlos Cuerpo[*], *Inês Drumond*[*], *Julia Lendvai*[*], *Peter Pontuch*[*] *and Rafal Raciborski*[*]

The current crisis revealed the unsustainability of private sector indebtedness levels, fuelled, in the recent past, by a prolonged period of rapid credit expansion in some EU Member States. The deleveraging process that is now taking place, although necessary, stands as a source of concern in terms of its implications for economic activity. Against this background, this paper aims to (i) identify the EU Member States that are currently facing deleveraging pressures in the non-financial private sector, making use of the informational content of various indebtedness indicators; (ii) assess quantitatively those pressures, using both a threshold approach, which compares the current level of households and non-financial corporations' debt with a static benchmark, and a stationarity approach, which goes a step further by taking into account valuation effects and the possibility of a time-varying "sustainable" level of indebtedness; (iii) refine the link between the identified deleveraging pressures and the actual adjustment of indebtedness through an analysis of the credit supply and demand conditions in each Member State; (iv) simulate the impact of a households' sector deleveraging shock using a dynamic stochastic general equilibrium model and assess the transmission mechanism through which such a shock influences the economic activity. Some policy implications are also discussed in the concluding section.

1 Introduction

The financial crisis has highlighted the dire implications of excessively high debt stocks and rapid credit expansion on financial stability and economic growth, in line with a wide body of economic literature (*e.g.*, Jordà *et al*., 2010, and Gourinchas and Obstfeld, 2012), which identifies quickly expanding credit flows as one of the best predictors of financial or banking crises.

The prolonged period of rapid credit expansion prior to the crisis led to high levels of debt in the private sector of many EU Member States (as can be seen in Figures 1 and 2, for households and non-financial corporations). **These were matched, until the outburst of the crisis, by an increase in net worth.**

The significant increase of private sector indebtedness was driven, at least in part, by the low levels of interest rates observed before the crisis, especially in the euro area Member States. In fact, Table 1, which reports data on the households' sector, shows that **even highly indebted countries benefitted, before the crisis, from a low level of interest burden**, and that, with the exception of Greece, Cyprus and Romania, this burden decreased in 2011 (in some Member States significantly), when compared to 2008, even in the so called vulnerable countries.

However, the crisis revealed the unsustainability of the level of debt with respect to income prospects and assets in several Member States, where a deleveraging process in the non-financial private sector, with consequences on demand, is now taking place (see Crowe *et al*., 2011, and Ruscher and Wolff, 2012, as examples on household and non-financial corporations deleveraging, respectively). The pace and extent of the adjustment varies across

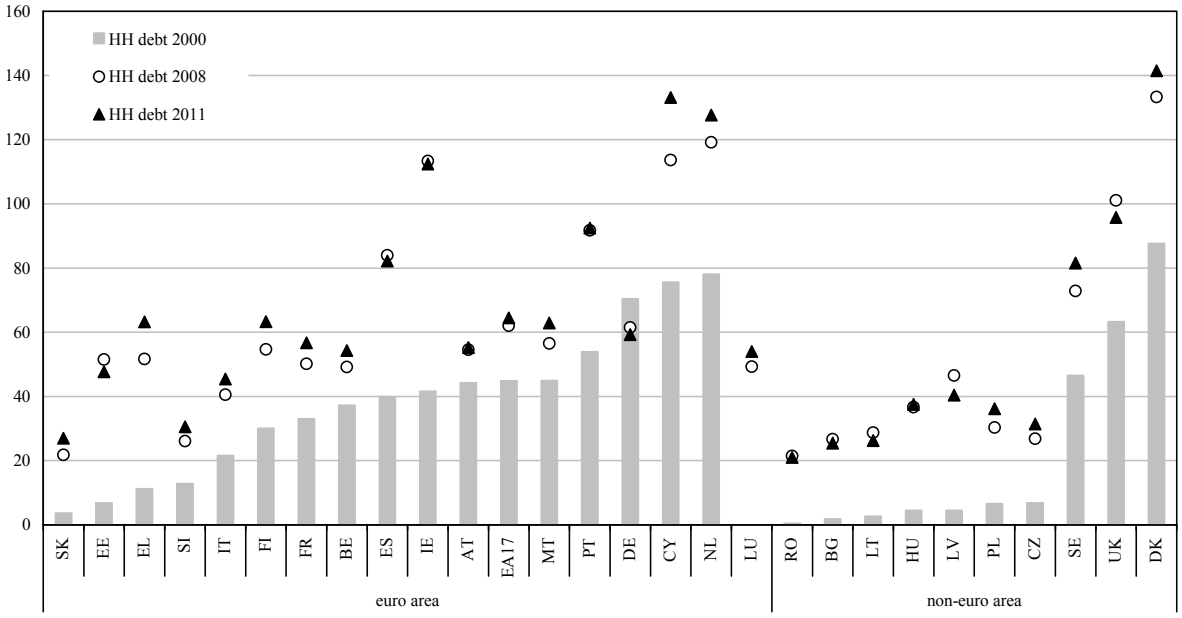
---

[*] European Commission, Directorate-General for Economic and Financial Affairs.

The views expressed in this paper are those of the authors and should not be attributed to the European Commission.

Figure 1

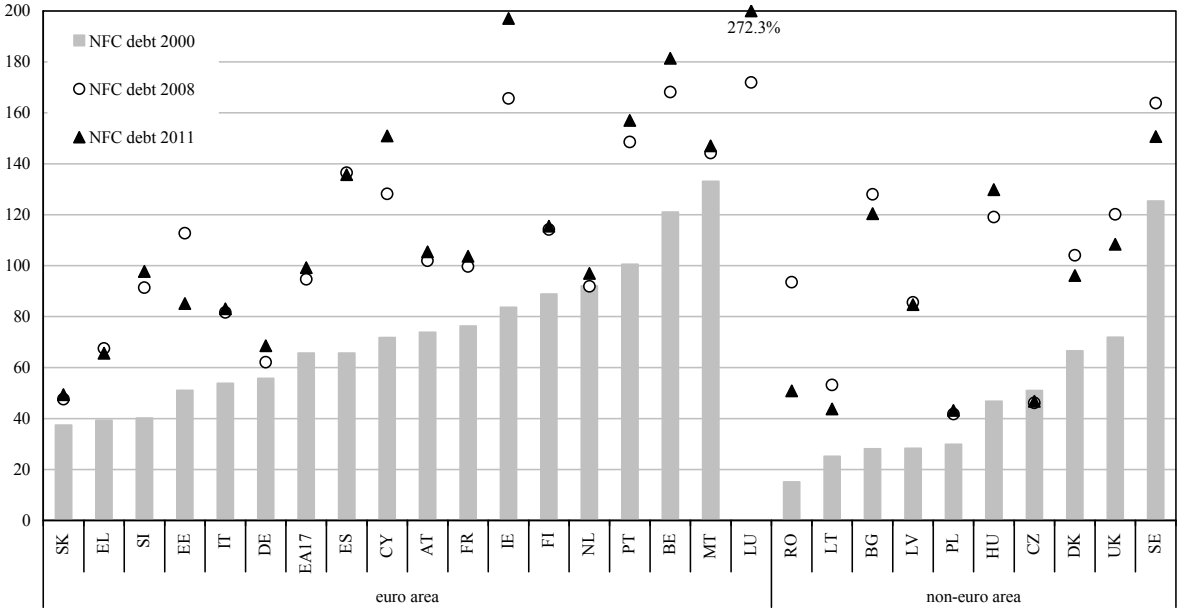
Indebtedness of EU27 Countries Over the Last Cycle, Households
(percent of GDP)



Source: Eurostat.
Note: Non-consolidated figures. Debt includes loans and securities other than shares.

Figure 2

Indebtedness of EU27 Countries Over the Last Cycle, Non-financial Corporations
(percent of GDP)



Source: Eurostat.
Note: Non-consolidated figures. Debt includes loans and securities other than shares.

Table 1

Household Debt and Interest Burden
(percentage of disposable income)

Household Debt to Disposable Income *(percent)*			
Country	**2000**	**2008**	**2011**
BE	62.6	79.9	89.5
DE	108.0	92.0	87.8
IE	114.6***	209.1	212.3
EL	17.3	70.0	88.4
ES	69.1	127.4	125.4
FR	54.2	74.7	82.9
IT	34.0	58.3	65.3
CY	115.0	156.5	186.3
LU	n.a.	126.8	132.7**
NL	163.7	249.8	266.0
AT	73.7	86.6	89.0
PT	84.5	127.8	126.3
SI	23.4***	42.4	46.7
SK	6.9	36.7	43.2
FI	61.2	98.1	104.2
EE	15.0	94.7	88.4
BG	n.a.	49.7	46.7*
CZ	13.4	50.2	56.3
DK	202.5	293.5	286.1
LV	8.6	72.4	66.5
LT	4.8***	45.0	41.2
HU	9.8	64.6	64.0
PL	9.9	47.9	58.1
RO	1.4	33.4	39.1
SE	103.9	146.3	159.2
UK	103.6	161.0	145.2

Interest Burden to Disposable Income *(percent)*			
Country	**2000**	**2008**	**2011**
BE	2.5	3.0	1.7
DE	5.2	4.0	2.8
IE	5.1***	9.0	3.1
EL	2.3	2.8	2.2
ES	2.3	5.3	2.9
FR	2.2	3.6	1.9
IT	1.0	2.2	0.9
CY	7.3	4.4	3.5
LU	n.a.	5.9	2.5**
NL	9.2	11.7	6.5
AT	2.4	3.0	1.7
PT	2.6	8.0	3.0
SI	1.7***	2.3	1.7
SK	0.7	2.1	1.5
FI	2.6	4.7	1.7
EE	0.7	9.3	2.1
BG	n.a.	2.4	0.7*
CZ	1.3	1.3	0.8
DK	12.5	15.0	9.1
LV	0.1	3.1	1.5
LT	0.1***	2.4	0.9
HU	0.9	3.6	2.7
PL	2.2	2.3	1.8
RO	0.4	1.0	2.7
SE	4.7	6.3	4.5
UK	5.7	7.5	0.6

* Corresponds to 2010, ** corresponds to 2009,*** corresponds to 2002.
Source: Eurostat.

countries (Figures 1 and 2), reflecting the existent heterogeneity in credit market dynamics, the variety of financial institutional frameworks, as well as different deleveraging potential needs amongst Member States.

The negative feedback loop between the sovereign and the banking sector stands as an additional differentiating factor, increasing the pressure in countries facing deleveraging needs in the public sector. Banking sector deleveraging, the contagion between sovereigns, floor effects from sovereign yields and financial market segmentation along national lines hindering the cross-country allocation of savings to the most productive investments, led to a high degree of uncertainty and to stronger amplification effects on economic activity through the banking sector.

All in all, existing deleveraging pressures in the private sector, although necessary in highly indebted countries, stand as a source of concern at the current juncture, especially in the context of fiscal consolidation faced by some Member States. Designing policy responses aimed at facilitating the correction of existing imbalances while limiting the negative impact on growth remains thus one of the key policy challenges lying ahead (see Roxburgh *et al.*, 2012 and IMF, 2012, for recent analyses on this issue).

The identification of forces at work and existing sources of vulnerability, underlying both the still high levels of indebtedness and/or deleveraging pressures, stands as a necessary first step in the definition of such policies.

In this light, this paper **first aims at identifying those EU Member States with a highly indebted non-financial private sector and likely to face deleveraging forces**. Since the assessment of debt burden against different benchmarks may point to different conclusions, we take into account the informational content of several indicators using an encompassing metric based on clustering and composite indicator techniques. This analysis allows us to identify two sets of countries which are more prone to face deleveraging pressures, respectively in the households and non-financial corporations' sectors.

With a view to analyse the impact of deleveraging on economic activity, we proceed by assessing quantitatively the deleveraging needs of each one of the economies identified as facing high pressures. For this purpose, we use two different approaches: (*i*) a threshold approach, which compares the current level of households and non-financial corporations debt with a static benchmark based on historical data – either the country-specific 2000 level or the third quartile of the common distribution of indebtedness rates, following the methodology underlying the Macroeconomic Imbalance Procedure (MIP) scoreboard; (*ii*) a stationarity approach, according to which net worth must be (weakly) increasing in order for debt to be sustainable. Based on the later we compute the annual deviation of the debt-to-GDP ratio from the "sustainable" level. The build-up of pressures is easily identified between 2002 and 2007, when the gap between the actual debt and its balanced or sustainable path increased rapidly. This period is then taken as a reference to calculate the cumulated increases in deleveraging pressures for each of the Member States concerned.

As the deleveraging needs in the non-financial sector are highly influenced by the underlying credit market conditions, **the former are then assessed against credit supply and demand indicators in each of the selected Member States**. This analysis allows us to take into account the potential impact of the financial sector health underlying the sustainable level of indebtedness and, therefore, differentiate the Member States under analysis based on these criteria.

Based on historical experience, the necessary reduction of the excessively high levels of non-financial private sector indebtedness identified in the paper could take many years and involve a significant negative impact on economic activity. **The final objective of the paper is thus to evaluate the extent and impact of deleveraging and underlying balance-sheet adjustment on**

the dynamics of the main macroeconomic aggregates. A dynamic general equilibrium model simulates the impact of a deleveraging shock in the households sector under different scenarios, including the possibility of a simultaneous deleveraging process in the public sector. This analysis allows us to infer not only the potential impact of deleveraging in economic activity, but also the main channels through which deleveraging effects are propagated.

Against this background, Section 2 presents a toolkit to assess, in a systematic way, sectoral balance sheets developments and deleveraging prospects in the non-financial private sector (taking also into account credit supply and demand dynamics) and Section 3 focuses on the impact of balance sheet adjustments in the household sector on the main macroeconomic aggregates, taking into account the interlinkages between the different institutional sectors in the economy and potential spillovers across countries.

2 Non-financial private sector balance sheets: a surveillance framework

For surveillance purposes, it is important to develop an analytical framework to assess, on a systematic basis, private sector balance sheet dynamics with a view of capturing, *(i)* the likelihood; *(ii)* the extent; *(iii)* the immediacy; and *(iv)* the impact on the main macroeconomic aggregates of households and firms' deleveraging processes.

This section develops the first three points and leaves the simulation of the implications of private sector deleveraging episodes for the economic activity to Section 3. First, the prospects for balance sheet repair in the private sector are assessed in Section 2.1 through the lens of various indebtedness and leverage indicators, relating debt to agent's income and wealth. Second, the translation of the deleveraging pressures into quantifiable "adjustment shocks" as presented in Section 2.2 is based on debt sustainability analysis, comparing current levels against estimated and/or *ad hoc* benchmarks. Third, the imminence and strength of deleveraging in the private sector is highly affected by underlying credit market conditions that reflect cross-country differences in terms of institutional settings, structural features and current macroeconomic conditions. In this line, Section 2.3 offers a snapshot of credit demand and supply components that qualify the initial assessment on debt overhang, building a bridge between the estimated adjustment shock and the empirical evidence on historical deleveraging episodes in the households and non-financial corporate sectors.

2.1 A sectoral look at the debt overhang

This section attempts at identifying EU Member States where (non-financial) private sector debt overhang and/or current/subsequent deleveraging processes stand out as an immediate concern. In this context, special attention is given to (*i*) the definition of debt and (*ii*) the reference variable against which it is assessed:

(i) Indebtedness is defined as the sum of outstanding loans and securities other than shares.[1] It is currently based on non-consolidated data, *i.e.* including intra-sector liabilities such as intra-enterprise loans. This definition is in line with the headline scoreboard indicator on private sector debt in the MIP.

However, this concept represents our starting point and the merits of alternate definitions should also be taken into account. In this vein, this note explores two alternative developments: first, by including other items in the concept of indebtedness, such as trade

[1] The data used in this section stem from the annual financial accounts and balance sheets (AFA) collected by Eurostat and the quarterly financial accounts (QFA) collected by the ECB.

credits (belonging to the category "other accounts payable"); second, by assessing the implications of using consolidated data, abstracting from intra-sector incurrence of debt.

(ii) Debt can be gauged against agents' income, evaluating their capacity to repay existent commitments, but also against financial assets as a more general concept of wealth, representing the other side of the coin of debt-generating liabilities.

The informational content of the various definitions covering these two aspects may point to diverging conclusions in terms of the degree of (over)indebtedness. In order to overcome this apparent mismatch and better understand the differences in interpretation, these two yardsticks will be further refined. On the one hand, the Gross Domestic Product (GDP), which is by default taken as the income generating benchmark, will be disaggregated into more sector-specific indicators. On the other hand, financial assets will be complemented, when available, with non-financial assets as the latter account for a significant share of existing wealth. In addition, valuation effects and the transactional value of assets, which tends to be much more volatile than debt, are also taken into account in order to provide an alternative definition of leverage.

Lastly, irrespective of the indicator at hand, the analysis of debt levels must be complemented by a flow analysis: both the pace and extent of the leverage process that took place over the last cycle in most Member States provide first-hand signals of building indebtedness pressures, which might lead to periods of balance sheet repair.

2.1.1 Measures of indebtedness

Debt is usually measured against the servicing capacity of an economy, as in the debt over GDP ratio (Figure 3). Alternatively, leverage indicators, which relate the level of debt to different measures of asset positions, are also frequent in the literature (Figure 4).

As mentioned above, the concept of debt is based on non-consolidated sources. As can be seen in Figure 3, the gap between non-financial corporations'[2] consolidated debt-to-GDP and its non-consolidated correspondent goes from around 100 percentage points in Belgium to virtually zero in a number of countries, including Greece, the Netherlands, Slovakia and Denmark. Taking into account the merits of both sources, there are practical as well as fundamentally-grounded reasons endorsing the use of non-consolidated data.

On the practical side, only non-consolidated data is available for all Member States.[3] Moreover, quarterly data provided by the ECB are non-consolidated and these are used to complement annual data with the latest developments. Furthermore, consolidation practices and their reporting to Eurostat for data compilation differ amongst Member States and can also affect comparability. On the more fundamental side, non-consolidated data presents important information about the total indebtedness of the non-financial corporate sector: by including intra-sector debt it acknowledges that apart from bank loans, an increasingly important source of financing, especially during the crisis, may be intra-companies. Moreover, when considering debt against financial assets, consolidation of debt instruments (loans and securities) is paired by consolidation of the same instrument on the asset side (in the denominator). Therefore, the gap in the debt-to-asset indicator for firms between the consolidated and the non-consolidated version (Figure 4) does not reflect first-hand differences in over-indebtedness pressures. It is rather a reflection of the extent of intra-sector activities that lie within the asset instruments (affecting the denominator) that are not included in the definition of debt (not affecting the denominator), *i.e.*, shares, deposits and other accounts receivable.

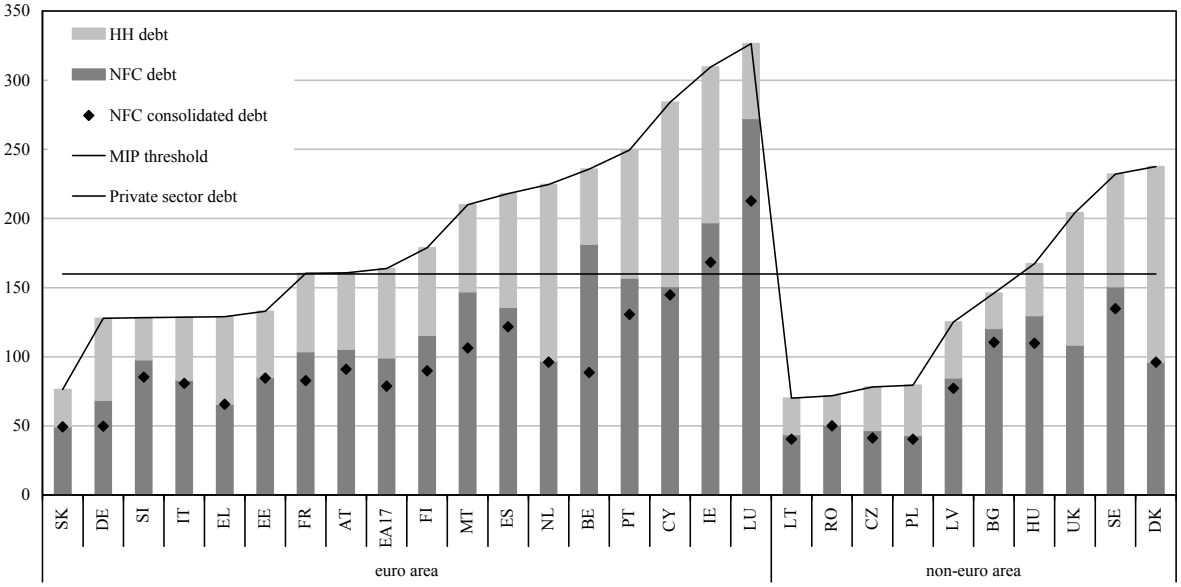
---

[2] Consolidated and non-consolidated debt coincide in the household sector.

[3] The United Kingdom does not report consolidated balance sheet data.

Figure 3

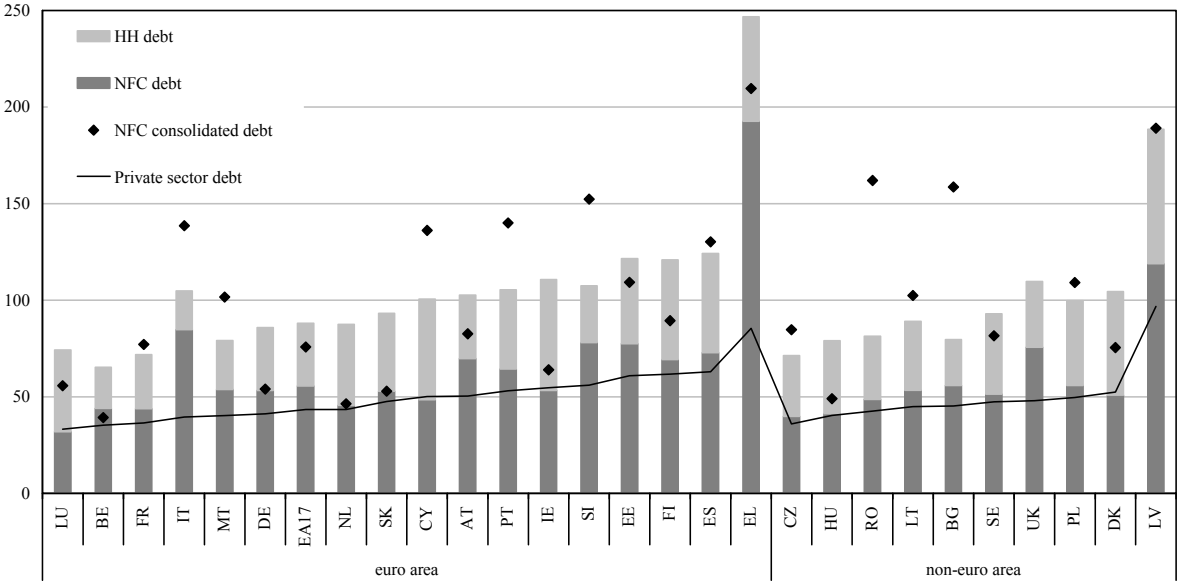
Indebtedness of EU27 Countries, 2011, Sectoral Decomposition
(percent of GDP)



Source: Eurostat.
Note: Non-consolidated data. Debt includes loans and securities other than shares.

Figure 4

Indebtedness of EU27 Countries, 2011, Sectoral Decomposition
(percent of financial assets)



Source: Eurostat.
Note: Non-consolidated data. Debt includes loans (F4) and securities other than shares. (F3). Financial assets include currency and deposits (F2), securities other than share (F3), loans (F4), shares and other equity (F5), Insurance and technical reserves (F6) and other accounts (F7).

One drawback of non-consolidated data, however, lies in its inability to assign different risk/debt profiles to countries depending on the source of the liabilities (either banks or intra-sector). This qualification is particularly important whenever intra-sector liabilities are dominated by intra-group transactions. If intra-group loans form the bulk of intra-sector credit, nonconsolidated data may be biased due to national and multinational (non-financial) corporate accounting practices.[4] High amounts of intra-enterprise loans issued for fiscal reasons might not reflect increasing deleveraging pressures, to the extent that they are purely driven by accountancy practices. It also does not reflect the potential increasing importance of intra-company loans during the crisis to compensate the existing constraints in access to financing in the banking sector.

Moreover, the definition of indebtedness adopted does not include the category "other accounts: payable" (where trade credits are considered), in line with the definition of debt agreed in the MIP procedure. As signalled in the ECB monthly bulletin of February 2012, euro area firms' liabilities consist, to a large extent, of bank loans. As the crisis developed and banks reined in supply, other sources of financing became more important for non-financial corporations, in particular securities issuance and financing between firms via inter-company loans, suggesting some buffer role. In this line, trade credit became also more relevant. Nevertheless, it exhibits high volatility and still represents a small share of liabilities, introducing excessive noise in the aggregate data.

As can be seen in Figures 3 and 4, the assessment of debt burden against different benchmarks may point to different conclusions. As regards non-financial corporations, for example, the indicator of debt over GDP points to Belgium, Ireland or Luxembourg as being particularly highly indebted. However, if debt is related to total financial assets, Belgium and Luxembourg show rather low levels of indebtedness, while Ireland is closer to the euro area average. Paradoxically, Greek and Slovenian firms, which show very high levels of leverage, do not seem particularly highly indebted if debt is related to GDP. There are similarly sharp contrasts if one looks at households. For instance, Estonian households appear highly leveraged due to the losses in the value of their assets in recent years, although their debt is relatively small as a share of GDP. In order to reconcile the information coming from both indicators, a first attempt would simply look for refinements in their definition/benchmarks.

First, aggregated measures of affordability such as GDP might not provide an accurate picture of agents' ability to repay their debts and could be further disaggregated. On the one hand, households' disposable income could be considered as it accounts for differences in wealth redistribution within Member States and disparities in the balance of income flows with respect to the rest of the world (Figure 5). On the other hand, gross operating surplus provides a better signalling of a firm's capacity to generate income and thus service its debt (Figure 6). Although these alternative ratios present higher variance across the sample, the relative positioning of Member States is not altered significantly but for a few exceptions, such as Luxembourgish households or Estonian firms. Moreover, countries with comparatively higher tax burden (DK, SE) and countries that are a hub for multinationals (LU, HU, CZ, LV) stand at the higher end of the spectrum.

Second, when considering the leverage ratio (that is, the debt to assets ratio) it is important to gauge debt with respect to both financial and non-financial assets, especially in the case of households as the latter represent the bulk of their wealth. For this purpose we use Eurostat's balance sheets for non-financial assets at current prices.[5]

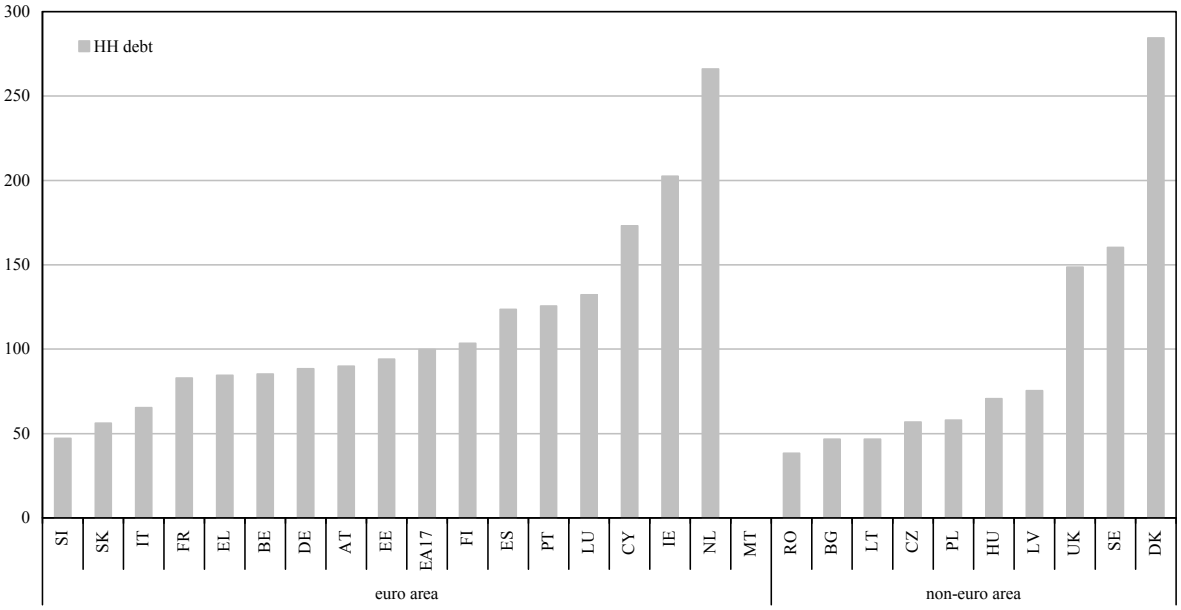
---

[4] For example, in Member States where each unit/branch of an enterprise-group reports on its credit/debt, the non-consolidated data would probably show higher figures than in Member States where the headquarter reports on total group consolidated credit/debt.

[5] The value of dwellings held by households is available for 19 countries and we extend it to 22 using national sources. However, data availability for firms is almost inexistent. Moreover, the releases are not frequent enough and 2010 data are still missing for several Member States.

Figure 5

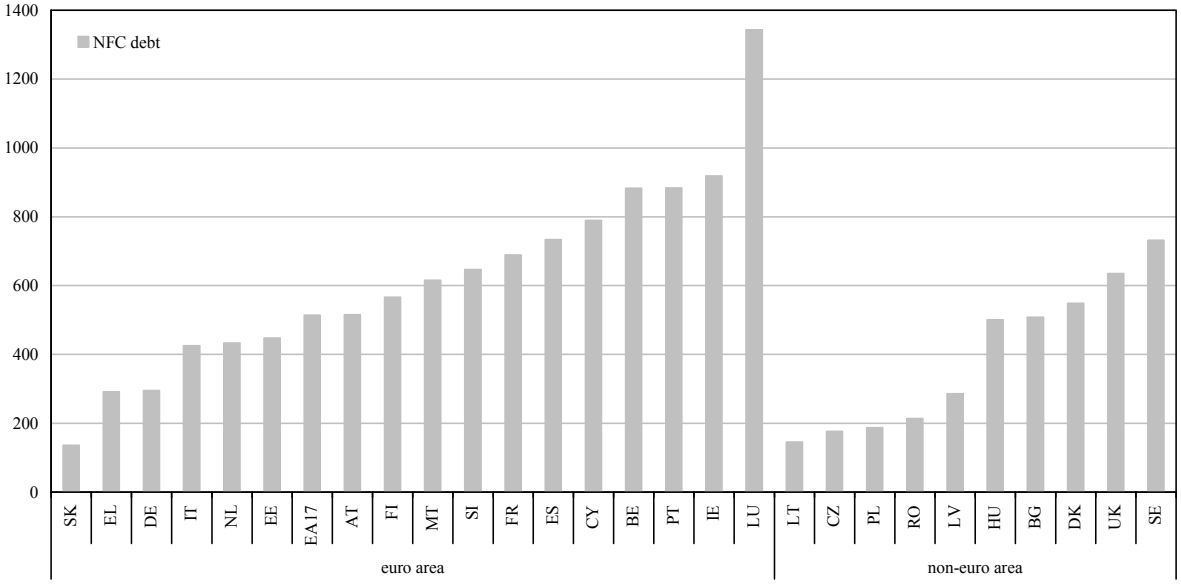
Indebtedness of EU27 Countries, 2011, Households
(percent of gross disposable income)



Source: Eurostat.
Note: Non-consolidated figures. Debt includes loans and securities other than shares. Data for BE, CY, SK, BG, LV, LT, HU, RO and the UK is available only up to 2010. Only 2009 is available for LU. No data are available for MT.

Figure 6

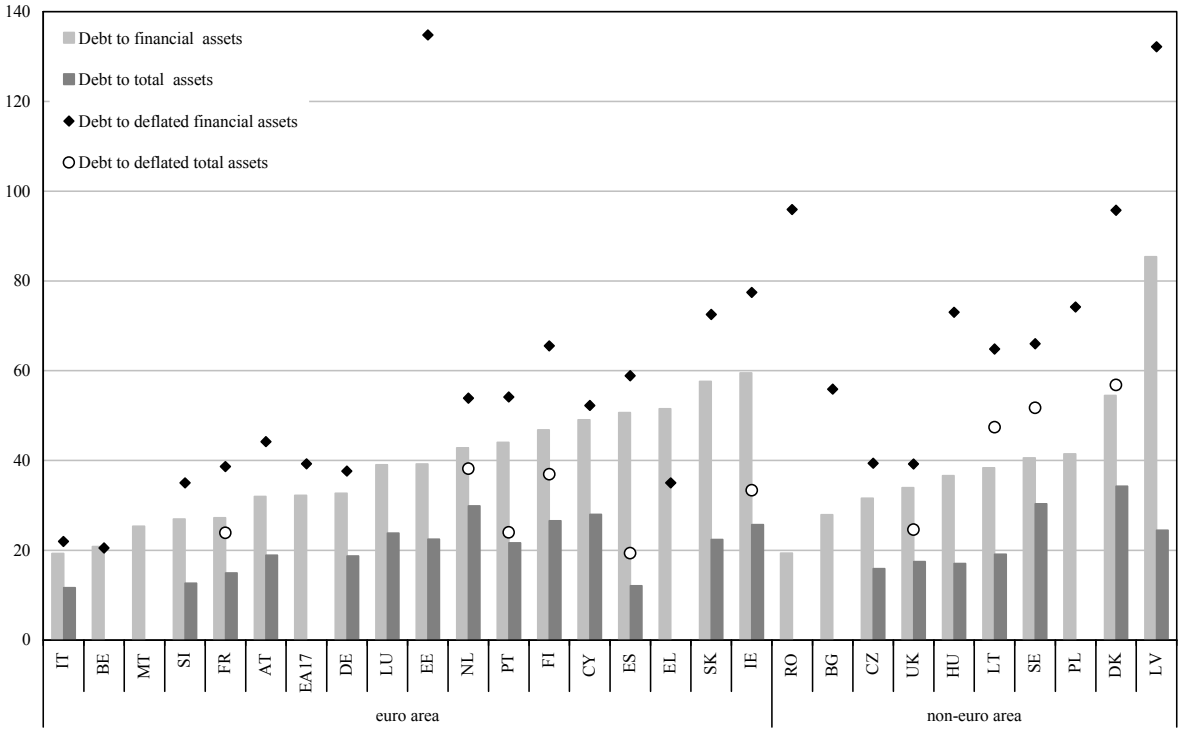
Indebtedness of EU27 Countries, 2011, Firms
(percent of gross operating surplus)



Source: Eurostat.
Note: Non-consolidated figures. Debt includes loans and securities other than shares and data for 2011 are only available for the NL, PT and SE.

Figure 7

Indebtedness of EU27 Countries, 2010, Households
(percent of total assets)



Source: Eurostat.
Note: Non-consolidated figures. Debt includes loans and securities other than shares. Non-financial assets for DE, IT, CY, EE, LV, HU corresponds to 2009 figures. Moreover, the accumulation of deflated transactions starts in 1999.

Figure 7 shows that the gap between households' debt to financial assets and debt to total assets ratios is higher in Spain, Ireland, Slovakia or Latvia, where the proportion of housing in household balance sheets is also higher. On the contrary, due to specificities in their public pension system, the gap is smaller in Member States such as the Netherlands or Sweden as their asset position is more diversified.

Third, valuation effects, which affect both financial assets (mainly via shares and other equity as well as other accounts receivable and payable) and non-financial assets (e.g., house prices) should also be taken into account, given that they are much more volatile than debt instruments, especially in a downturn when indebtedness (stock) adjustments tend to last longer on average. As can be seen in Figure 8, balance sheet expansion might imply constant leverage ratios for the private sector as debt grows in line with the expansion of assets. However, if we adjust assets for valuation effects,[6] balance sheet growth is now asymmetric as shown in Figure 9, which translates into an increasing notional leverage ratio.

When analysing debt sustainability one should therefore take into account the transactional value of the assets, filtering for valuation effects in both financial and non-financial assets, as the concept of notional leverage represents a better indication of the ability of households and firms to incur liabilities.

[6] Valuation effects on the debt-generating instruments are minor and therefore not affecting the conclusions of the analysis.

Figure 8

Private Sector Balance Sheet Dynamics
(leverage is kept constant)

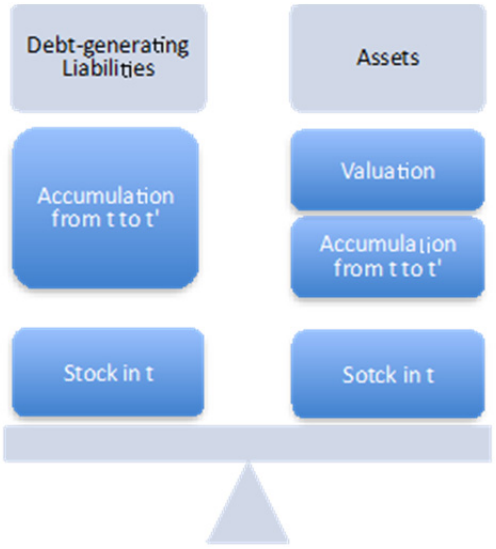
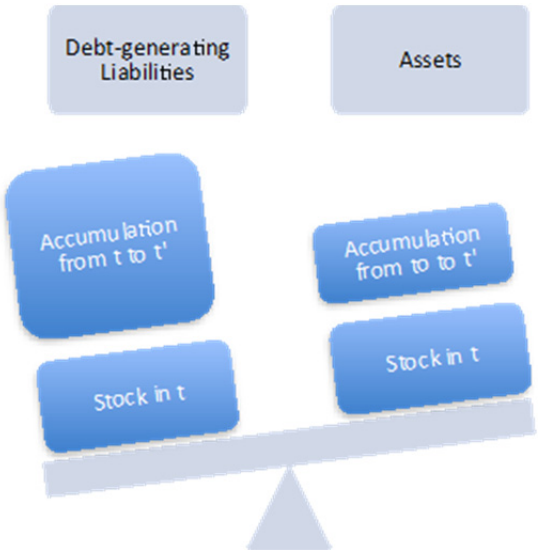


Figure 9

Private Sector Balance Sheet Dynamics Adjusted for Valuation Effects
(notional leverage reflects accumulation of pressures)



We follow Bakk-Simon *et al*. (2012) and calculate notional assets and liabilities by accumulating existing transactions[7] to the corresponding stock[8] (Figure 7). The selection of the starting date for the accumulation of deflated transactions is of importance. By considering the 1999 stock level as the starting point, we are assuming implicitly Member States economies as being in equilibrium/steady state in that year. This simplification allows for cross-country comparison on the evolution of notional leverage.

As expected, given the common period of asset price increases in the run up to the crisis, notional ratios are biased upwards. But the relative ranking of countries is roughly kept once comparing deflated vs. non-deflated ratios but for a few exceptions. Notably, the sharp depreciation experienced by Greek assets over the last years has turned notional leverage below its non-deflated counterpart. On the contrary, countries experiencing booms in stock markets and real estate, like Ireland, Spain, Bulgaria, Estonia, Latvia, Hungary or Romania, present striking gaps between their notional and their current leverage. These results also call for special attention to changes in debt, and not only to the levels, as an indicator of deleveraging pressure.

Similar conclusions can be drawn by looking at firms' balance sheet behaviour. As reported in Figure 10, liabilities grew hand in hand with nominal assets: leverage growth rates are centred on the origin, pointing towards the non-existence of significant positive long-term trends. However, when discounting for valuation effects, liabilities grew disproportionately more when compared to assets (Figure 11). Positive annual growth rates on average imply an upward trending notional leverage ratio.

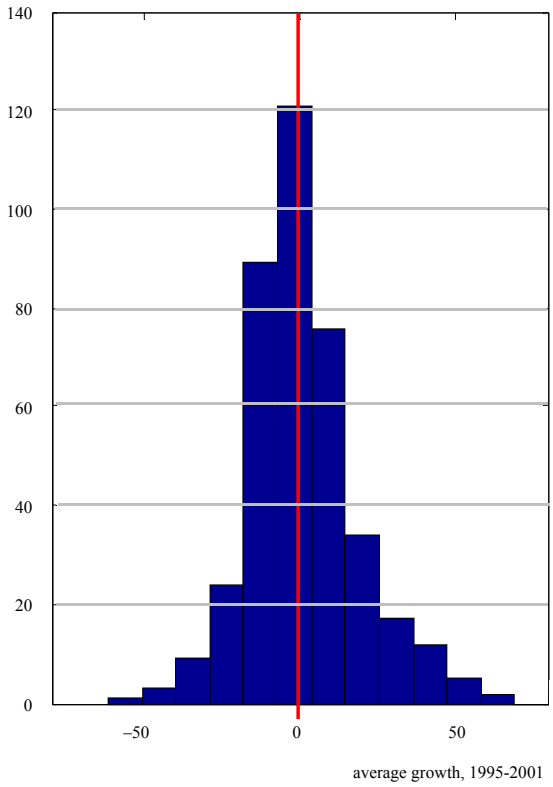
---

7 From the national sectoral accounts transactions data.

8 Non-financial assets are deflated with relative house prices.

Figure 10

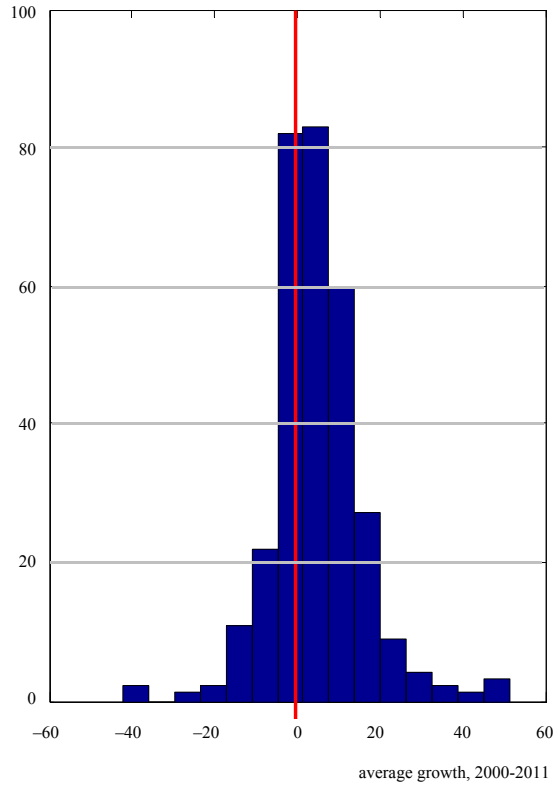
Non-financial Corporates, Leverage, EU27, Average Annual Growth
(frequency distribution)



Source: Eurostat.

Figure 11

Non-financial Corporates, Notional Leverage, EU27, Average Annual Growth
(frequency distribution)



Source: Eurostat.

2.1.2 Likelihood of debt overhang and deleveraging pressures

As it is difficult to extract a clear-cut conclusion on the existing debt overhang and the size of possible deleveraging pressures by looking at different indicators in isolation, an encompassing metric covering all the relevant aspects is developed in this section.

Using the basic indicators developed in the previous section as inputs, both for firms[9] and households,[10] clustering and composite indicator techniques help in identifying EU Member States that are facing or are prone to face deleveraging pressures in the non-financial private sector. We focus on the evolution of the ratios over the accumulation phase (from 2000 to 2008) and on their 2011 level in order to cover for actual deleveraging potential as well as diverging starting points and catching-up processes. Indeed, the existence of catching up effects could mitigate the need for deleveraging despite rapid accumulation of debt in the past.

---

[9] Debt over GDP, debt over gross operating surplus, debt over financial assets, as well as debt over deflated financial assets.

[10] Debt over GDP, debt over disposable income and debt over financial assets as well as debt over deflated financial assets, to mimic the indicators selected for the non-financial corporations. Due to the specified data issues related to non-financial assets, only financial assets are retained in the clustering analysis in order to allow for cross-country comparability across the 27 Member States and use the latest available data.

Against this background, clustering techniques are used, in a first stage, to find underlying similarities in the data and classify countries accordingly. The analysis is performed for households and firms separately, looking first at both capacity to repay indicators (their change in the upswing and their current level) and subsequently at the two different leverage ratios (including also their cumulated change as well as their current level). Each one of the four clustering exercises includes therefore four dimensions. Member States are then grouped into non-mutually exclusive clusters.

Subsequently, principal component analysis is implemented in order to reduce the dimensionality of the data and allow for a two-dimensional representation (see Box 1 for a methodological description). In all cases, the first two common factors are selected as they explain most of the variance in the sample. By looking at the factor loadings of the different indicators, the first factor could be identified as representing common dynamics to all indebtedness ratios in the build-up phase, while the second factor is associated with the level effect.

Figures 12 to 15 show the groupings of Member States around cluster centres.[11] The degree of membership to the different groups is represented by level curves, signalling the corresponding distance to the centroid. Based on these results, some preliminary conclusions on existing debt overhangs can be drawn:

- as regards households capacity to repay (Figure 12), Ireland, Spain, Estonia, the Netherlands, Latvia, Denmark, the United Kingdom and, to some extent, Cyprus are amongst those that experienced a rapid increase in household indebtedness before the crisis. Despite the varying starting position in terms of household debt, the information content of the level dimension also points to the same set of countries as potentially prone to suffer from deleveraging pressures, on top of Portugal and Sweden. Ireland, Latvia and Estonia also appear as subject to high pressures when considering actual leverage as well as its build-up (Figure 13). A second cluster of countries includes Member States listed above as Spain, the Netherlands (to a lesser extent), Denmark and Cyprus but also others such as Greece, Slovakia Lithuania and Poland, where the comparison of household debt against assets (Figure 13) is less favourable than against income (Figure 12);
- on the firms' side, there is also a clear positive relationship between the accumulation and the level factors when considering the capacity to repay (Figure 14). Countries like Belgium, Ireland, Spain, Cyprus, Portugal and Bulgaria stand out as presenting vulnerabilities related to their firm's indebtedness. This snapshot is highly nuanced when looking at firm's asset side (see Figure 15). Belgium and Cyprus present a healthier picture while firms in countries like Greece, Italy, Slovenia and Latvia appear as subject to higher pressures. As a robustness check, this exercise was also run with consolidated data and the results are consistent but for the case of Belgium,[12] where the relevance of intra-company loans calls for further qualifications when assessing non-financial corporates debt sustainability.

In a second stage, the information obtained through principal component analysis can be further streamlined by means of the construction of composite indicators with weights based on the common factors. The selection of the factors as well as their interpretation is common to the cluster analysis. The loadings, however, are now used as intermediate weights for the individual indicators in the construction of the composite, according to the proportion of the total variance of the indicator explained by the specific factors (see Nicoletti *et al*. (2000) for an application and OECD (2008) for a deeper technical explanation).

---

[11] The analysis is not carried out for Luxembourg and Malta due to data availability reasons.

[12] Intra-company loans in Belgium amount to almost 100 per cent of GDP.

Figure 12

Household Sector Deleveraging Pressures Considering the Capacity to Repay

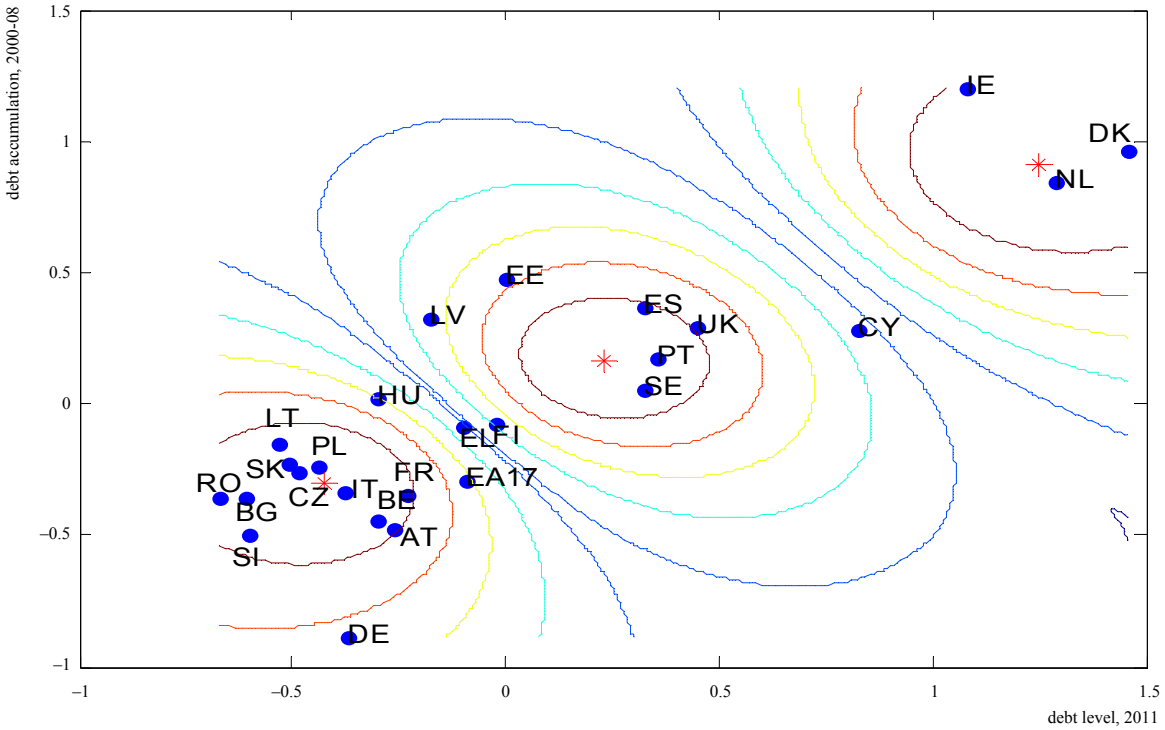


Figure 13

Household Sector Deleveraging Pressures Considering Assets

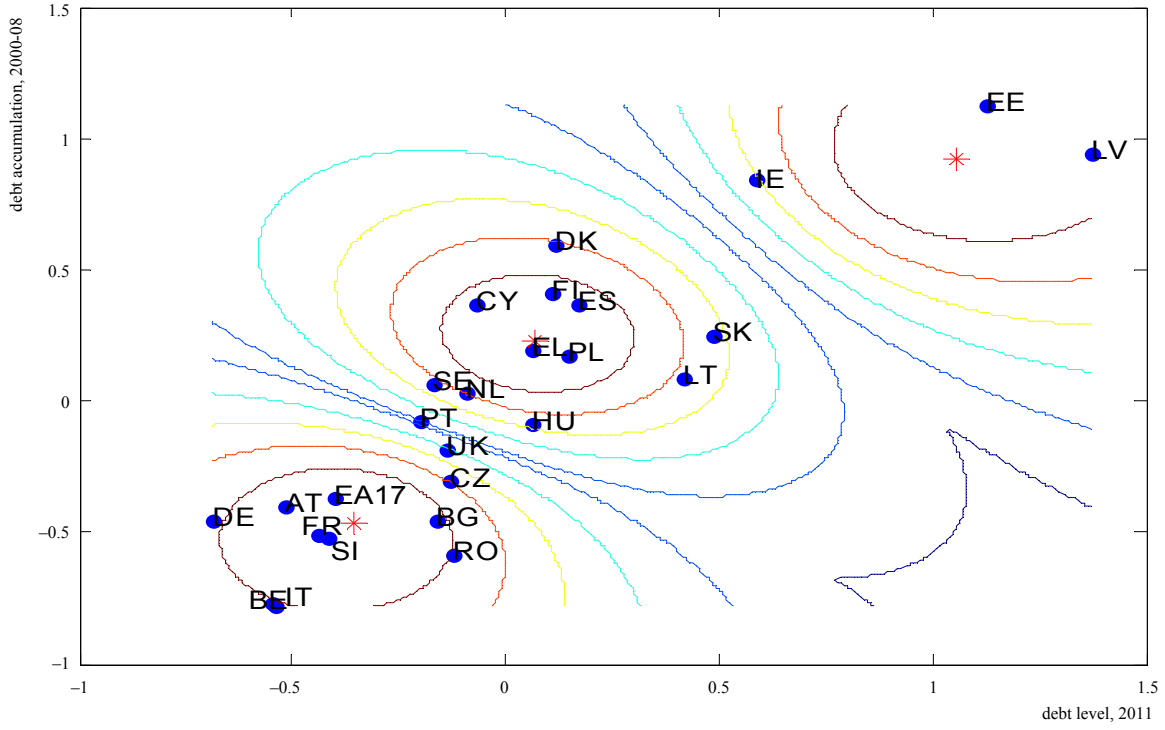


Figure 14

Non-financial Corporates Sector Deleveraging Pressures Considering the Capacity to Repay

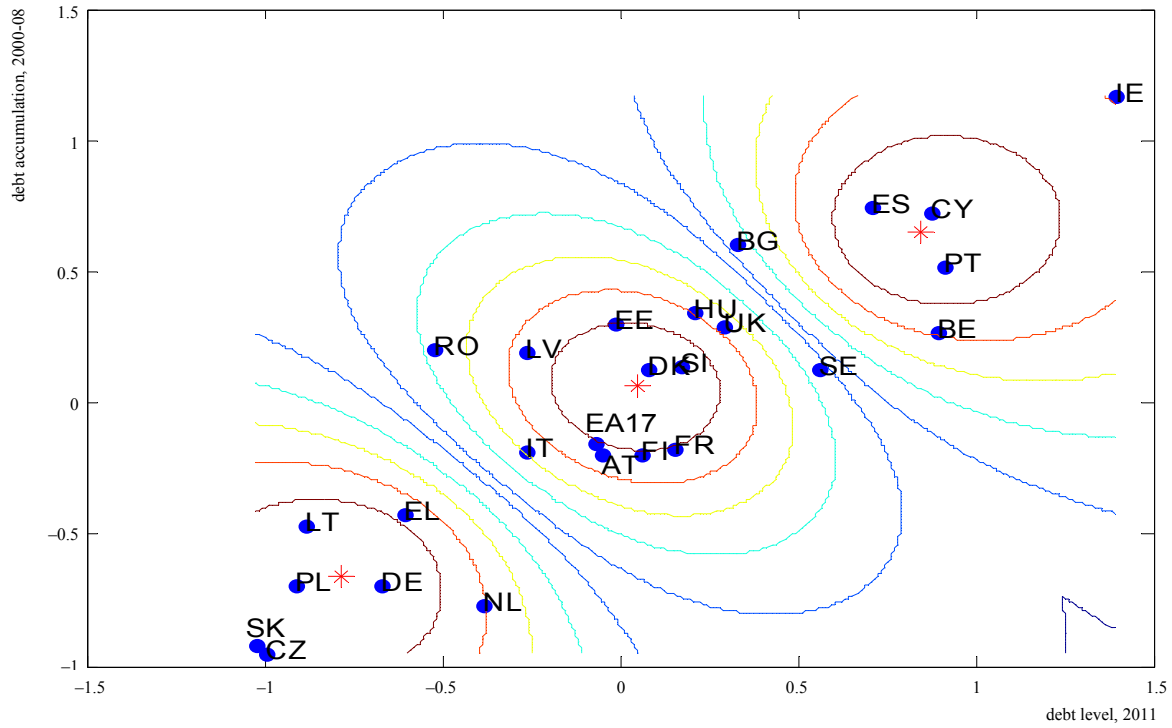
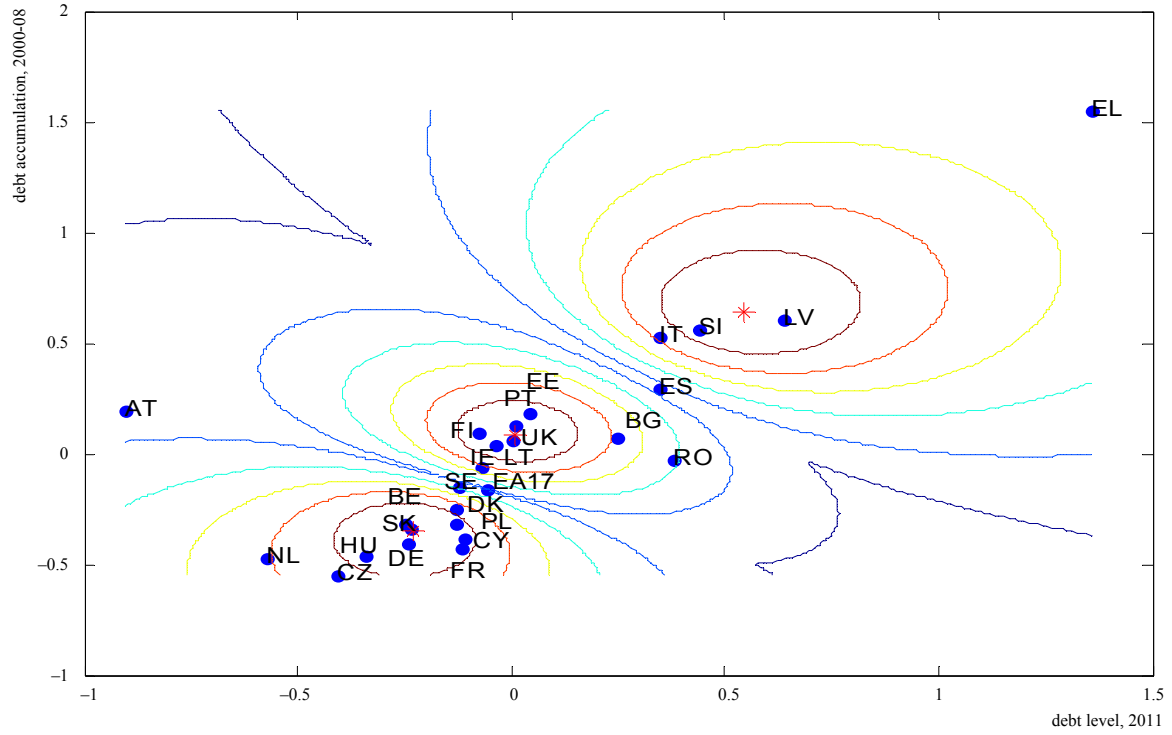


Figure 15

Non-financial Corporates Sector Deleveraging Pressures Considering Assets



BOX 1
FUZZY CLUSTERING AND PRINCIPAL COMPONENT ANALYSIS OF PRIVATE LEVERAGE

Cluster analysis is aimed at finding underlying similarities in the data and classifying the countries accordingly. Clusters represent groups of countries where members are more similar to one another than to non-members. Similarity is assessed mathematically as a distance measure between multi-dimensional data vectors. *Fuzzy* clustering algorithms allow for countries to belong to different subgroups in various degrees (given by boundaries or level curves), as clusters are not mutually exclusive.

The analysis for the non-financial corporations and the household sectors uses four variables. As the number of subgroups is *a priori* unknown, we use validation indices in order to determine the optimal number of clusters. Following the partition coefficient (PC) and the classification entropy (CE) criteria, we determine the optimal number of groups to be three. Once the number of clusters is determined, we apply the C-means algorithm, which yields an optimized position of the countries along the initial dimensions with respect to cluster centres, defined as weighted means of the countries belonging to the group.

As a final step, in order to reduce the dimensionality of the exercise, we perform principal components analysis on the leverage indicators according to their autocorrelation matrix and its associated eigenvectors. We select the first two components as their eigenvectors are above or close to 1 and they jointly explain more than 75 per cent of the total variance of both household and firms data (see Table I).

Table I

Eigenvalues of the Leverage Indicators

	Households				Firms			
	Dimension I		Dimension II		Dimension I		Dimension II	
	Eigenvalue	Variance(%)	Eigenvalue	Variance(%)	Eigenvalue	Variance(%)	Eigenvalue	Variance(%)
Factor 1	2.93	0.73	2.87	0.72	2.98	0.74	2.85	0.71
Factor 2	0.90	0.23	0.73	0.18	0.76	0.19	0.86	0.21
Factor 3	0.15	0.04	0.35	0.09	0.22	0.06	0.25	0.06
Factor 4	0.02	0.01	0.06	0.01	0.04	0.01	0.04	0.01

Note: Dimension I refers to the capacity to repay while Dimension II relates debt to assets.

In order to give an economic meaning to the common components, we interpret their loadings with respect to the different indicators (after performing a standard VARIMAX rotation). The first factor represents the common dynamics of all the leverage indicators in the pre-crisis phase (until 2008), while the second one refers to the joint level effect. The loadings are then used to project the initial position of the different countries in the multi-dimensional space (four dimensions in each one of the cases) into the two-dimensional space given by the factors.

Along these lines, Figures 16 and 17 characterise (for households and firms, respectively) all the relevant information on existing deleveraging pressures according to the two dimensions at stake (capacity to repay and leverage). To make the interpretation of the figures easier through quadrants, *ad hoc* lines are drawn signalling the countries for which at least one of the dimensions of the composite indicator is above the 0.5 level. The following countries can be identified as more prone to face deleveraging pressures in the household and non-financial corporation sectors: Cyprus, Denmark, Spain, Ireland, the Netherlands, Portugal, Estonia, Latvia, Slovakia, Sweden and the United Kingdom on the household side and Belgium, Bulgaria, Cyprus, Greece, Spain, Hungary, Ireland, Italy, Portugal, Estonia, Latvia, Slovenia, Sweden and the United Kingdom on the corporate side.

Nevertheless, the assessment of the deleveraging pressures faced by the identified economies requires the definition of a benchmark against which the indebtedness levels can be measured. In other words, one needs to define a sustainable or long run equilibrium level of debt for each country, taking into account, to the extent possible, the factors that may influence it over time (e.g., valuation effects and prevailing conditions in the financial sector). This is the main focus of the following two sections.

2.2 Deleveraging potential based on a sustainability analysis

With a view to analyse the impact of deleveraging on economic activity, the needs of each one of the economies identified as suffering from high pressures are now assessed quantitatively.

As mentioned, this assessment requires a benchmark against which to gauge actual developments in indebtedness: a long-run equilibrium or sustainable level. This analysis would yield an approximation of the shock needed, in each country under scrutiny, to achieve a more sustainable debt-to-GDP ratio.

A significant amount of research has been conducted on external and public debt sustainability (notably by the European Commission, the IMF and the ECB).[13] As mentioned by Wyplosz (2007), different definitions of external or public debt sustainability could be used, including *(i)* one based on solvency, requiring net worth to be always positive, *(ii)* an IMF definition, according to which debt is sustainable if it satisfies the solvency condition without a major correction given the cost of financing, and *(iii)* the definition underlying Arrow *et al*. (2004) according to which net worth must be (weakly) increasing (therefore not ruling out the possibility of net worth being initially negative as long as it is rising and eventually becoming non-negative, thus meeting the solvency condition).

The IMF concept is made operational by requiring debt not to exceed a specific *ad hoc* threshold. Arrow *et al*.'s definition does not imply any specific threshold for debt and can be made operational by ignoring the unobservable present value of primary balances and requiring the debt-to-GDP ratio to be stationary, or, since stationarity is difficult to assess in practice, by requiring debt ratio to be on a non-increasing trend, which does not rule out occasional but temporary increases.

2.2.1 Debt sustainability based on thresholds

Some recent studies follow the first approach: Cecchetti *et al*. (2011) derive implicitly thresholds for the debt ratios by concluding that beyond a certain level household debt (85 per cent

[13] On public debt sustainability see, for instance, the European Commission Sustainability and Public Finances Reports, Ostri *et al*. (2010) and the European Central Bank (2011).

Figure 16

Composite Indicator on Deleveraging Pressures for EU27 Member States, Households

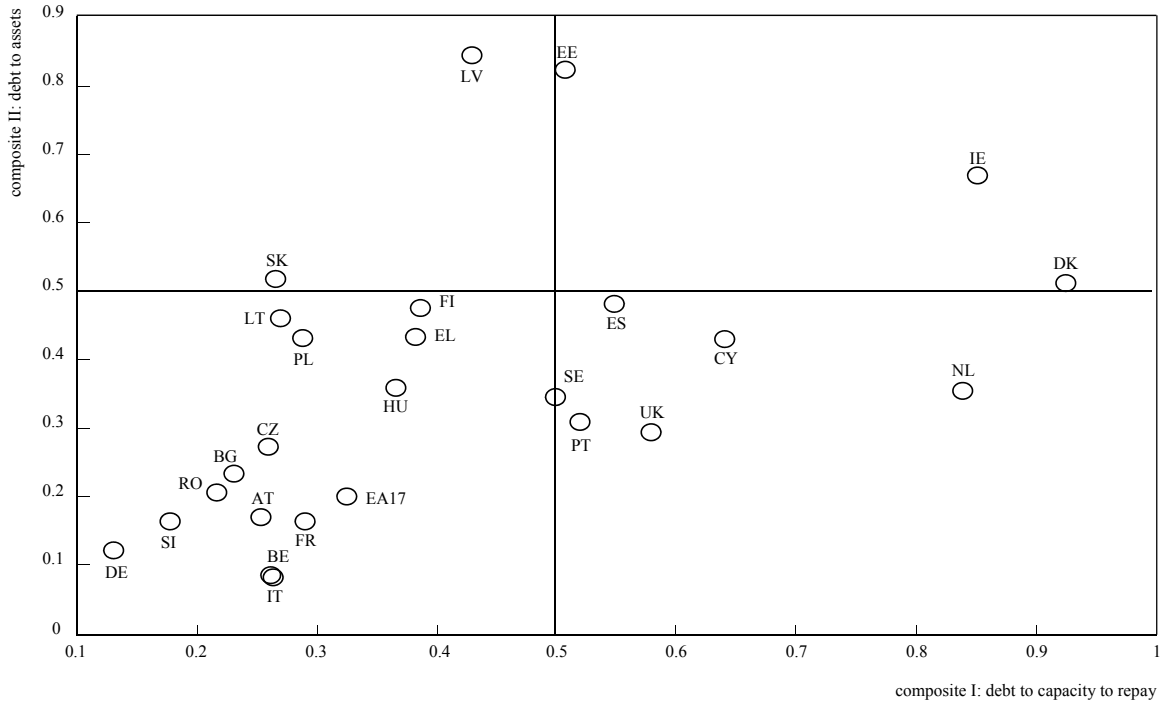
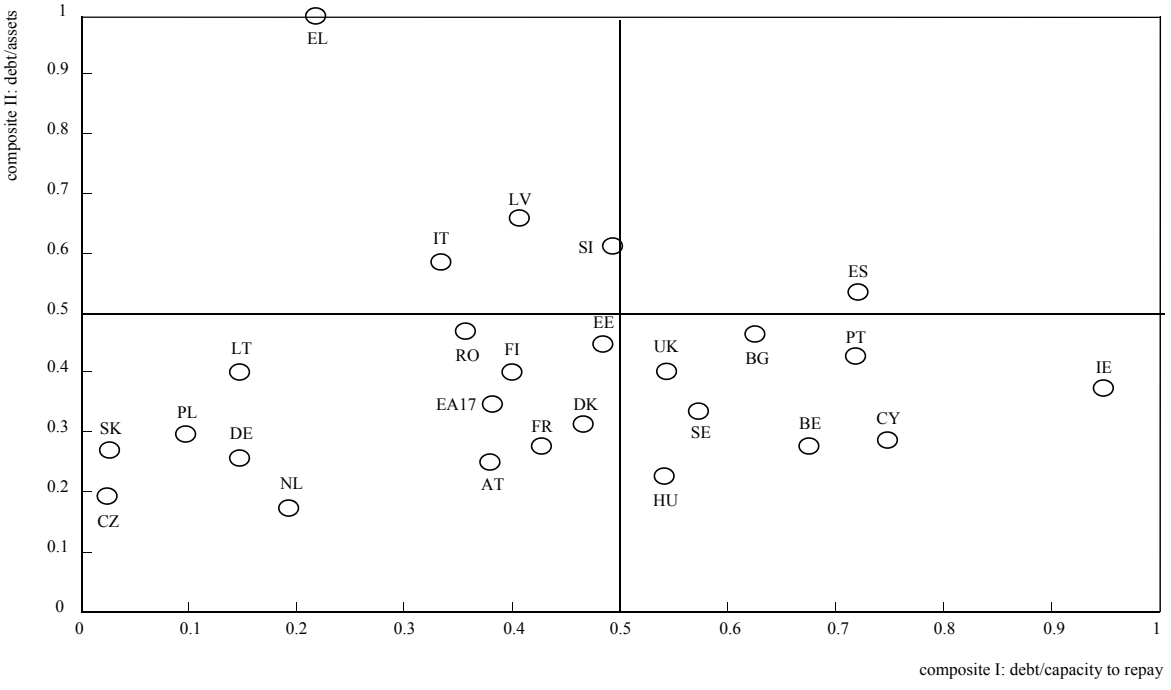


Figure 17

Composite Indicator on Deleveraging Pressures for EU27 Member States, Non-financial Corporates



of GDP) has a negative effect on growth.[14] In the same line, Arcand *et al*. (2012) conclude that the marginal effect of financial depth on output growth becomes negative when credit to the private sector reaches 100 per cent of GDP. According to the authors, a similar threshold was found by Easterly *et al*. (2000) when focusing on output volatility: output volatility starts increasing when credit to the private sector reaches 100 per cent of GDP. However, this figure seems to be quite small (for the private sector as whole), especially in countries where financial innovation and institutional developments may justify higher levels of equilibrium/sustainable private sector indebtedness. This issue is also raised in a forthcoming OECD study (Bouis *et al*. 2013) which, to assess the need for debt reduction, compares the current levels of the debt ratios with their pre-boom levels of 2000 (based on the finding that increases in debt-to-GDP ratio preceding financial crisis have tended to be reversed subsequently).

Based on the historical experience on deleveraging, Tang and Upper (2010) found that financial crises tend to be followed by a prolonged period of debt reduction in the non-financial private sector and that private sector debt-to-GDP ratios fell by an average of 38 p.p., returning to approximately the levels seen before the boom. In the same line, the IMF's World Economic Outlook (April 2012) suggests that household deleveraging tends to be more pronounced following busts preceded by a larger build-up in household debt and that deleveraging takes time (pointing to a median duration of household deleveraging episodes of seven years, with a reduction in the debt-to-income ratio of 23 p.p.). In contrast, there is no decline in the debt-to-income ratio following low-debt housing busts. Instead, there is a small and statistically insignificant increase.

In this vein, Tables 2 and 3 report (*i*) the evolution of household and firm debt ratios (as percentage of GDP), for the Member States identified as subject to high sectoral deleveraging pressures, and (*ii*) the adjustment required for each one of the countries to return to either their 2000 debt ratio or to reach a statistical threshold.[15]

The tables show that debt reduction is now taking place in several countries (*e.g.* households in IE, ES, PT, EE, DK and UK as well as firms in BG, EL, ES, IT, EE, LV and the UK), but the shock needed to achieve the two thresholds defined above is still quite significant and even unrealistic for most of them, taking into account the evidence on past episodes of adjustment summarized above. The table also captures the "catching up" countries for which debt ratio levels are significantly lower when compared to the statistical threshold, despite large increases before the crisis. This effect is reflected by the gap between the required adjustment needed to return to the 2000 level of debt-to-GDP ratio and to achieve the "MIP style" statistical threshold (SK, LV and EE for households and LV, EE as well as SI, BG and HU although to a lesser extent, for firms). The case for EL and IT firms is less clear-cut as they were selected according to their high debt with respect to assets. Their sustainability should thus involve debt and also asset considerations.

In fact, this kind of analysis ignores not only asset considerations but also (*i*) country specific factors (*e.g.* catching-up processes and adjustment capacity) and *(ii)* the possibility of a dynamic threshold, which would take into account the influence of valuation effects on debt sustainability. In order to cover for these two deficiencies, a stationarity approach to debt sustainability is developed in the next subsection.

2.2.2 Debt Sustainability based on the stationarity approach

Following Arrow *et al*. (2004), private debt will be sustainable whenever it evolves in line

---

[14] However, the authors also mention that the impact, in the case of households, is very imprecisely estimated.

[15] Computed as the upper quartile of the distribution of the indicator, using 1994-2007 data.

Table 2

Household Debt-to-GDP Ratio
(required adj., percent)

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011		2000	Threshold
IE							41.6	47.8	54.0	61.4	74.0	93.5	120.3	129.9	126.5	116.5	113.1		71.5	54.4
ES	27.9	28.6	30.2	33.0	36.5	39.9	41.8	45.1	49.6	55.0	62.0	71.8	83.7	86.9	84.4	84.7	82.0		42.0	23.3
CY	62.4	62.9	64.1	65.2	71.1	75.6	73.6	73.5	70.9	72.5	92.1	85.1	101.3	112.5	118.3	126.7	129.7		54.1	71.0
NL	52.8	56.5	61.5	66.0	71.6	78.1	84.2	90.1	95.7	98.0	102.4	106.9	117.9	120.3	121.8	124.7	123.8		45.7	65.2
PT	22.7	26.0	34.8	40.7	48.3	54.0	59.0	63.5	67.4	71.4	74.6	80.7	89.1	91.4	94.0	97.8	93.5		39.6	34.8
SK	3.9	4.0	4.3	4.7	4.3	5.1	5.7	7.0	8.5	8.8	13.0	16.8	24.0	28.9	32.0	33.1	27.2		22.1	27.2
EE	1.1	2.5	5.3	4.8	5.4	6.9	8.7	11.4	14.3	17.5	22.5	34.7	54.6	58.7	50.5	46.4	47.6		40.8	–11.1
LV				2.2	2.7	4.6	4.9	7.0	9.9	13.0	18.9	30.9	53.9	58.7	47.4	42.1	40.0		35.5	–18.6
DK	74.4	78.5	82.1	83.8	84.2	87.7	91.5	93.7	94.9	98.5	106.8	113.9	131.9	133.2	136.8	135.2	133.2		45.5	74.5
SE	43.0	42.0	42.2	42.2	44.2	46.5	48.5	50.1	52.5	54.5	56.9	61.8	69.8	70.1	72.4	76.8	78.1		31.5	19.4
UK	57.8	56.9	57.6	58.7	60.9	63.3	66.1	70.8	76.3	82.3	82.7	89.6	100.1	99.3	95.6	93.0	89.3		26.0	30.6

Threshold: 58.7 per cent; for IE the year 2002 was used as a reference. The last two columns provide information about the deleveraging effort in the end of 2011 needed for each Member State to return to the 2000 indebtedness level or to reach the statistical threshold.
Source: Eurostat.

Table 3

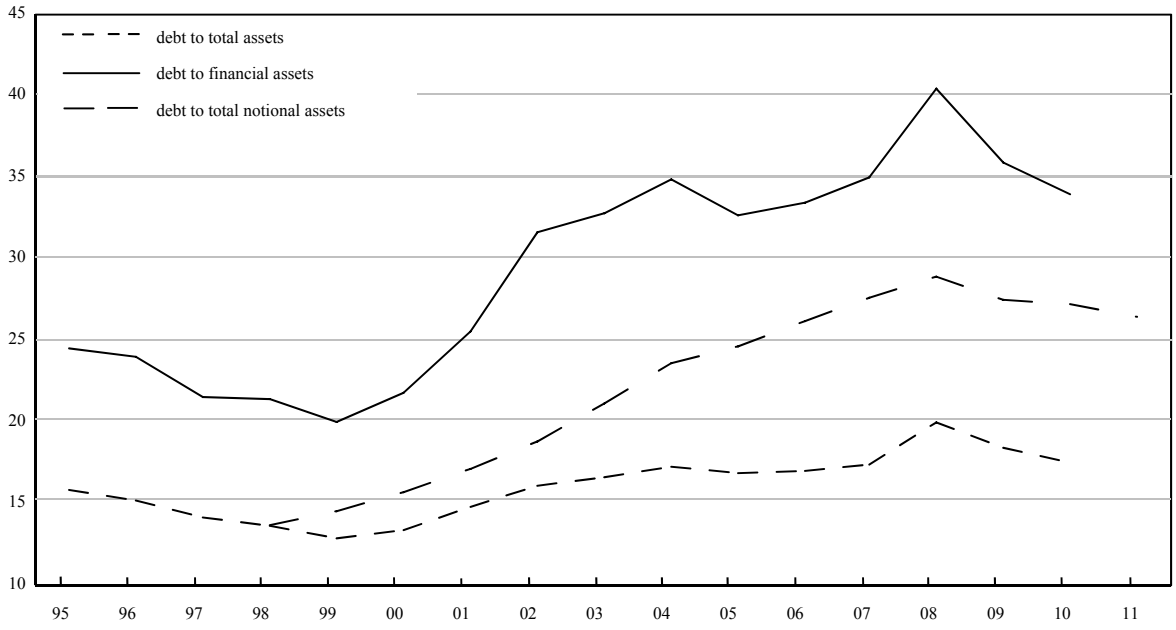
Non-financial Corporations Debt-to-GDP Ratio
(required adj., percent)

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2000	Threshold
BE	75.9	77.5	87.7	92.5	103.2	121.1	133.1	130.9	154.1	147.8	142.1	148.1	156.5	168.2	176.9	179.6	181.4	60.3	90.6
BG						28.1	37.5	36.1	51.3	62.9	75.7	82.1	108.8	128.0	146.3	142.6	120.5	92.3	29.6
IE							83.7	92.1	91.0	98.4	106.6	121.9	120.7	165.7	188.8	197.2	197.1	197.1	106.2
EL	25.9	26.1	27.4	29.9	33.7	39.4	40.9	40.0	47.6	48.8	53.4	55.8	59.4	67.5	69.8	66.0	65.6	26.3	–25.2
ES	40.5	39.6	40.3	42.0	46.4	65.7	73.3	75.8	90.2	95.5	104.7	121.2	131.8	136.5	140.4	141.4	135.8	70.0	44.9
IT	49.3	48.4	48.2	47.1	50.8	53.9	57.7	58.6	65.0	66.6	69.3	73.0	78.7	81.6	84.3	84.0	83.1	29.3	–7.7
CY	53.4	57.6	60.4	64.3	65.2	71.9	75.3	77.6	87.8	84.6	95.1	98.6	112.7	128.2	137.0	145.8	150.9	79.0	60.1
HU	24.0	27.3	31.7	33.3	36.3	46.8	47.9	49.5	68.0	66.5	78.7	84.6	95.4	119.1	132.5	114.2	129.8	83.0	39.0
PT	49.8	48.4	81.8	88.2	92.4	100.6	113.4	113.4	120.2	116.2	118.4	123.0	134.2	148.6	156.9	155.7	157.0	56.4	66.2
EE	20.9	27.0	39.6	44.8	43.5	51.0	56.3	61.3	79.1	86.9	90.1	107.9	111.6	112.8	116.1	94.2	85.2	34.1	–5.6
LV				20.7	22.2	28.3	35.2	34.8	47.8	55.0	63.8	77.4	79.6	85.6	96.0	91.7	84.7	56.4	–6.1
SI							40.2	43.6	54.6	58.8	66.1	69.0	80.9	91.4	97.5	97.2	97.8	97.8	6.9
SE	102.9	102.4	105.7	110.8	113.3	125.4	138.7	143.5	150.0	123.4	128.1	125.6	141.0	163.8	167.5	151.4	150.7	25.3	59.8
UK	54.7	52.8	54.8	60.9	66.6	71.9	75.0	78.3	88.3	91.5	102.0	109.4	106.3	120.1	116.4	109.9	108.4	36.5	17.6

Threshold: 90.83 per cent; for IE and SI the year 2001 was used as a reference. The last two columns provide information about the deleveraging effort in the end of 2011 needed for each Member State to return to the 2000 indebtedness level or to reach the statistical threshold.
Source: Eurostat.

Figure 18

Household Leverage Indicators, UK
(percent)



Source: ESTAT and own calculations.

with the Present Discounted Value (PDV) of net revenues (*i.e.*, the net worth[16] follows a non-decreasing trend). In this context, solvency could be defined in more restrictive terms as requiring net worth to be positive. As mentioned before, the stationarity approach does not imply any specific threshold for the debt: it can be made operational by requiring household leverage (debt/assets) to be stationary. Private debt evolution should therefore match the dynamics of total assets as two sides of a coin so as to avoid unsustainable developments (non-stationary leverage ratios).

Following the analysis made in the previous section, we now focus on the group of countries which were identified as facing significant deleveraging pressures. Moreover, taking account of the lack of data on the non-financial assets held by non-financial corporations and the fact that the next section focuses on the impact of households' deleveraging on the economic activity, we will concentrate on the household sector debt sustainability gauging debt with respect to total assets (thus focusing on the following subset of countries: IE, ES, CY, NL, PT, DK, SE and UK, *i.e.* excluding the catching-up economies).[17]

As can be seen in Figure 18 for the United Kingdom (taken as an illustrative example), the consideration of the aggregate pool of assets implies not only a downward shift in leverage but also a flattening impact on its dynamics when compared to the debt to financial assets ratio. Indeed, households' balance sheet growth on the liabilities side came together, in many Member States, with expanding non-financial assets due to overheating housing markets, implying non-increasing dynamics in the debt-to-total assets leverage indicator (dashed line).

---

[16] Defined as the PDV of net revenues less the current debt.

[17] Firms' analysis available from the authors upon request.

However, account should also be taken of the impact of valuation effects on leverage evolution as the concept of notional leverage ideally represents a better indication of the ability of households to incur liabilities, as detailed before. Indeed, when considering assets adjusted for valuation, the expansion of households' balance sheet seems now imbalanced in the case of UK and notional leverage turns out to be upward trending, *i.e.,* non-sustainable in Arrow's terms (see Figure 18).

In order to quantify the extent of the deleveraging needs for each one of the selected Member States, notional leverage (*i.e.*, debt to total notional assets) is gauged against its non-deflated version. The latter is considered as a benchmark as it generally satisfies stationarity requirements. Therefore, taking deflated assets as given, a sustainable level of debt must pair the evolution of notional leverage with its balanced benchmark (*i.e.*, the sustainable debt to total notional assets ratio will match debt to total assets dynamics). It is thus possible from this analysis to derive the path of debt underlying a stationary debt to notional or deflated assets ratio.

Definition:

Household debt is considered sustainable whenever it implies stationarity in terms of notional leverage. In practical terms, debt must evolve in line with total deflated assets.

A diverging positive trend of the notional leverage ratio from a balanced path imply increasing deleveraging pressures as debt effectively becomes less sustainable (and vice versa). The ultimate objective of this section of the analysis thus lies in the quantification of these pressures and their corresponding translation into an expected deleveraging shock.

Figures 19 to 26 report the annual deviation of the debt-to-GDP ratio from the sustainable path as well as the cumulated changes since the beginning of the sample. Debt is presented in terms of GDP to facilitate the interpretation of the numbers. Looking at the figures, the build-up of pressures is easily identified between 2002 and 2007, when the gap between the actual debt and its balanced or sustainable path increased rapidly. Using this period to calculate the cumulated increases in "excessive debt", these range from 7.2 per cent of GDP in Portugal to 44.8 per cent of GDP in Denmark.

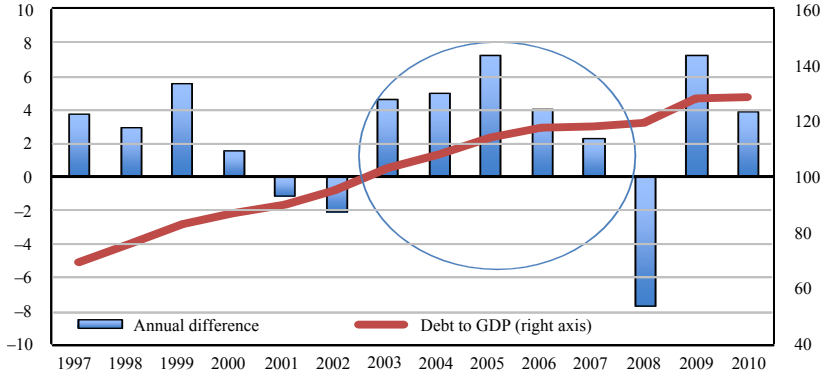
The rebalancing of household sector balance sheets towards a more sustainable level implies the closure of the gap between the actual and the balanced or sustainable debt ratios as we saw earlier. This movement depends, on the one hand, on the actual level of debt to GDP going down (deleveraging efforts from households reducing their liabilities) and, on the other hand, on the benchmark going up (through corrections or negative valuation effects in asset prices that will allow for an increase in the sustainable level of debt).[18] The pace of the adjustment towards a more sustainable level of indebtedness will crucially depend on the interaction between these two forces. As can be seen in the case of Spain and Ireland, where both factors have been at play (house prices bust and actual deleveraging), there has been a sharp rebalancing (closing of the gap). In the case of Portugal, the current gap, as assessed by the stationarity approach, is significantly lower due to the absence of an asset price boom before the crisis.

This theoretical framework is in line with the empirical evidence presented in the April 2012 WEO (IMF, 2012), suggesting that part of the stronger contraction in economic activity following high-debt housing busts reflects a more intense household deleveraging process: "The larger declines in economic activity are not simply a reflection of the larger drops in house prices and the

[18] If households incur in liabilities according to the evolution of the nominal pool of assets, which is in turn under a sharp adjustment process, the gap between actual and sustainable debt will indeed be negative, as the sustainable level takes deflated assets as a reference, easing the deleveraging pressures.

Figure 19

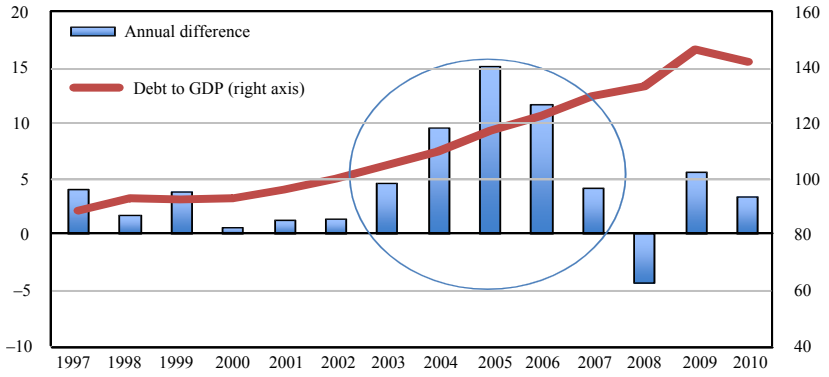
Household Sector Deleveraging Forces, NL
Difference Between Actual and Sustainable Debt
(percent of GDP)



Source: Own calculations. Cumulated gap of 23.2 p.p.

Figure 20

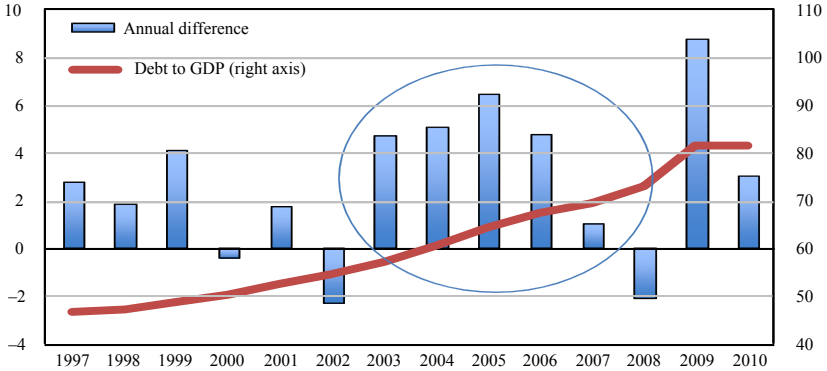
Household Sector Deleveraging Forces, DK
Difference Between Actual and Sustainable Debt
(percent of GDP)



Source: Own calculations. Cumulated gap of 44.8 p.p.

Figure 21

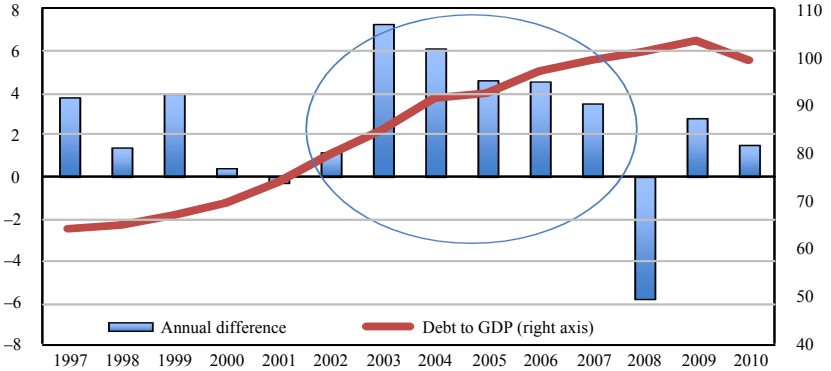
Household Sector Deleveraging Forces, SE
Difference Between Actual and Sustainable Debt
(percent of GDP)



Source: Own calculations. Cumulated gap of 21.9 p.p.

Figure 22

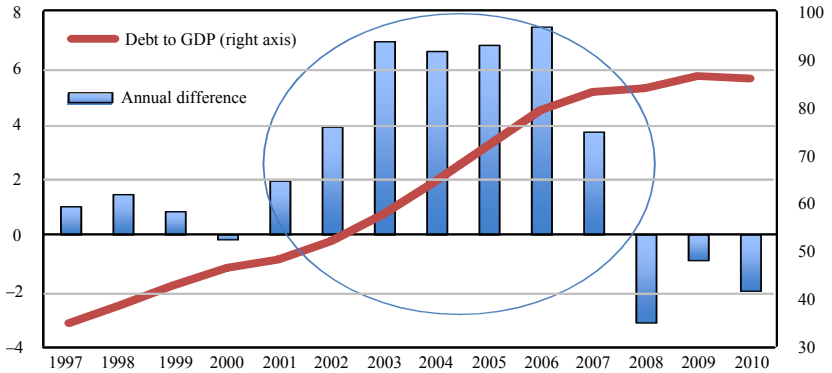
Household Sector Deleveraging Forces, UK
Difference Between Actual and Sustainable Debt
(percent of GDP)



Source: Own calculations. Cumulated gap of 26 p.p.

Figure 23

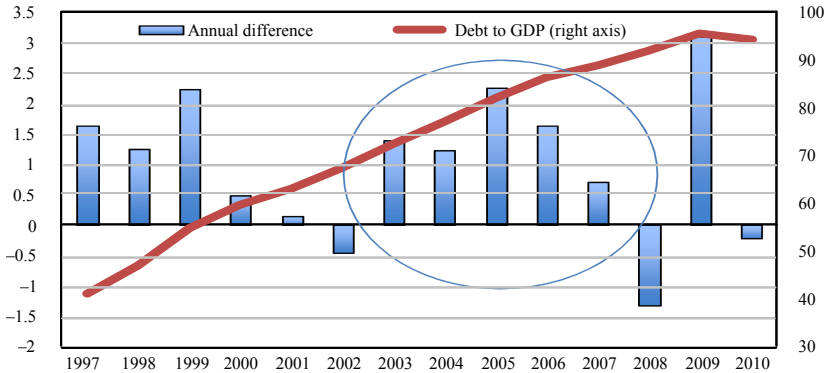
Household Sector Deleveraging Forces, ES
Difference Between Actual and Sustainable Debt
(percent of GDP)



Source: Own calculations. Cumulated gap of 35.3 p.p.

Figure 24

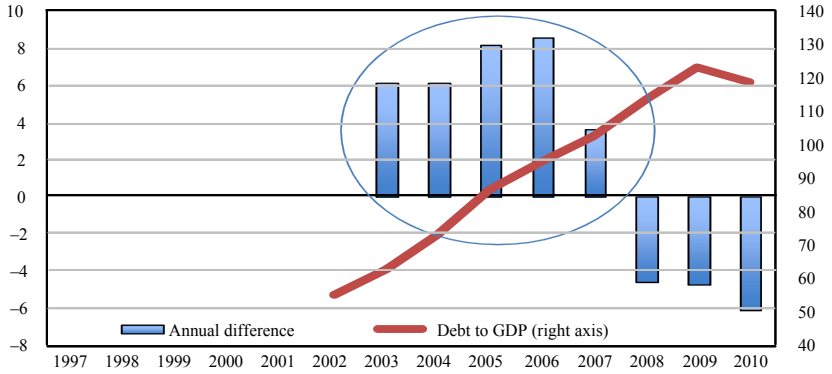
Household Sector Deleveraging Forces, PT
Difference Between Actual and Sustainable Debt
(percent of GDP)



Source: Own calculations. Cumulated gap of 7.2 p.p.

Figure 25

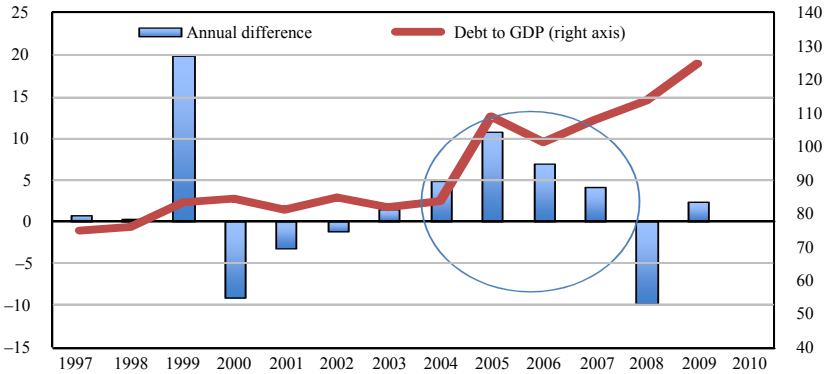
Household Sector Deleveraging Forces, IE
Difference Between Actual and Sustainable Debt
(percent of GDP)



Source: Own calculations. Cumulated gap of 32.5 p.p.

Figure 26

Household Sector Deleveraging Forces, CY
Difference Between Actual and Sustainable Debt
(percent of GDP)



Source: Own calculations. Cumulated gap of 26.3 p.p.

associated destruction of household wealth. It seems to be the combination of house price declines and pre-bust leverage that explains the severity of the contraction" (p. 91).

Our identification strategy provides a dynamic, country-specific benchmark against which to assess households' deleveraging pressures, departing from the static *ad hoc* thresholds and yielding more refined conclusions. Moreover, it provides a natural starting point for model simulations looking at the aggregated impact of household deleveraging processes.

However, as mentioned by Rinaldi and Sanchis-Arellano (2006), differences related to institutional characteristics and structural supply-side factors should not be ignored as they play a key role in determining the stability of financial conditions and therefore the equilibrium level of household debt. Macroeconomic stability, financial developments and legal or institutional changes can lead to an increase in the level of debt towards a new equilibrium by easing credit rationing without having increased risk. For this purpose, the next section will qualify the results on the likelihood and extent of deleveraging pressures by looking at credit markets through the main credit supply and demand indicators.

2.3 Qualifying factors for deleveraging pressures

Credit market conditions are an important qualifying factor for deleveraging processes and their assessment provides useful information to better understand the dynamics of the deleveraging pressures identified in the previous section.

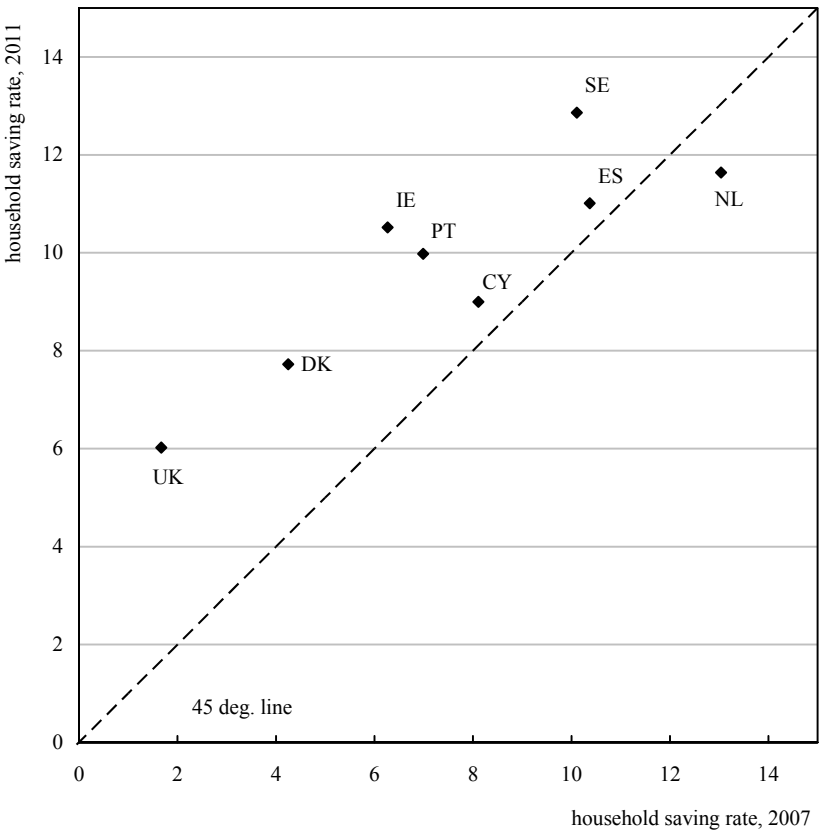
The evolution of indebtedness is affected not only by the borrowers' willingness to take on debt but also by overall changes in lending attitudes of the financial sector (see Box 2). In the build-up phase, indebtedness is positively affected by favourable current credit supply and demand conditions. Conversely, in the deleveraging phase supply tightness and/or depressed demand can impact both the speed and the extent of the debt adjustment. For a given adjustment need identified in the sustainability analysis, different lending market conditions translate into different deleveraging processes, allowing also for deleveraging to overshoot (or undershoot, depending on the aforementioned conditions) the predicted adjustment. In short, credit supply constraints, which can be triggered by deleveraging pressures in the financial sector itself, have a direct impact on non-financial sector deleveraging (the credit crunch effect). Moreover, the latter can also be affected by households and non-financial corporations' reluctance to take on more debt due to, for instance, a more prudent attitude towards indebtedness. In fact, as shown in Figure 27, households' saving rate increased, with the exception of the Netherlands, in all Member States identified in the previous section as having higher potential deleveraging pressures. This can be explained, at least in part, by a more prudent attitude of households due to greater macroeconomic instability.

One should not, however, neglect the feedback loops between deleveraging, credit supply and demand conditions and the economic activity. By affecting economic activity, non-financial sector deleveraging has an impact on credit supply (*e.g.*, through potential non-performing loans) and on credit demand (due to recessionary effects). Although the purpose of this section is not to assess the relative importance of demand and supply conditions in explaining the recent development in credit markets, one should keep in mind these feedback effects when assessing the results.

Lending interest rates are a natural starting point for an analysis of lending conditions. As can be seen in Figure 28, interest rates for non-financial corporations have evolved in a relatively stable spread structure before the crisis period. Afterwards, a disconnection can be seen, pointing to the existence of credit market segmentation: Portuguese and Greek rates spiked up sharply; spreads in Spain also increased although to a lesser extent. When looking at house-purchase lending, the spread structure has been less stable over the period. During the crisis period, lending spreads

Figure 27

Changes in the Saving Rate – Household Saving Rate



Source: ESTAT.

relative to Germany increased in the Netherlands, Spain and Ireland. However, the absolute level of household lending rates remains below their respective 2008 levels.

The evolution of lending rates needs to be interpreted jointly with aggregate credit flows presented in the bottom panel of Figure 28. Credit flows to NFCs and households were significantly negative in several Member States during 2009/10 and 2011/12. In cases like Ireland and Spain, the observed reaction of credit flows seems stronger than that of lending rates. Such path would be consistent with a situation where both demand and supply contracted simultaneously, leading to a strong fall in loans and increase in lending rates. Lenders could also optimally try to prevent rates from rising to market clearing levels to avoid problems related to adverse selection and moral hazard (see Stiglitz and Weiss, 1981). In such a setting credit rationing occurs and unsatisfied loan demand exists at prevailing rates.

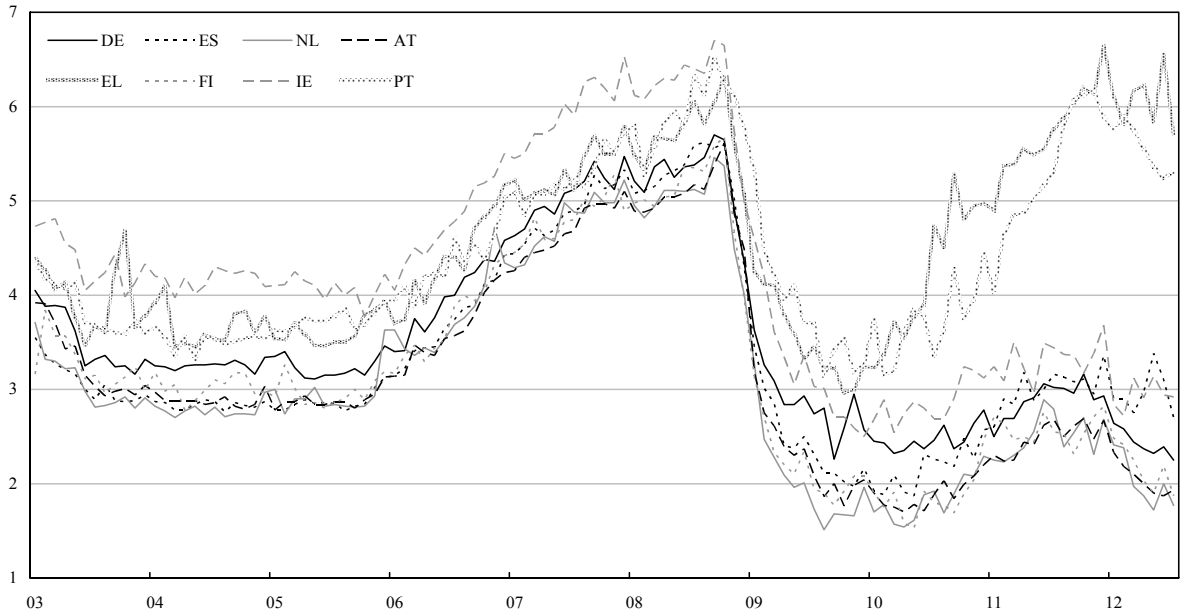
Against this background, the analysis in this section focuses on a selection of variables that influence or reflect credit supply or demand conditions. They are interpreted as qualifying factors for the deleveraging pressures identified in the previous section.

2.3.1 Credit demand and supply conditions

The set of credit supply-related indicators includes financial soundness indicators: the change in overall non-performing loans (NPL) relative to 2007, the Tier 1 capital ratio and banks' return on equity. Bank soundness has been shown to be an important factor in credit supply and is a significant factor affecting financing conditions (Bernanke and Lown, 1991, Woo, 1999, Bê Duc *et al.*, 2005). However, conclusions should be drawn carefully, in particular on the path of the capital ratio whose changes may reflect not necessarily an increase in the level of capital but a decrease in banks' assets (the denominator), thus affecting negatively the households' and/or firms' access to financing.

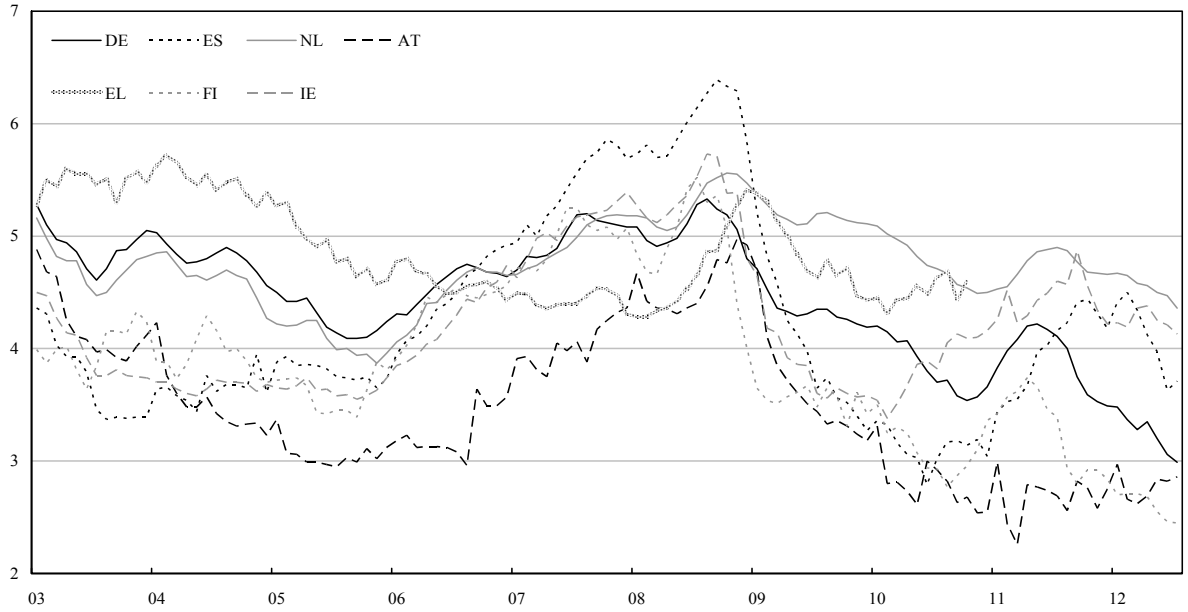
Figure 28

Interest Rates and Credit Flows in Selected Member States
Interest Rates to NFCs, Loans Above 1M EUR up to 1 year Maturity
(percent)



Source: ECB.

Interest Rates to Households, Loans for House Purchases
over 1 year Maturity Without Collateral
(percent)



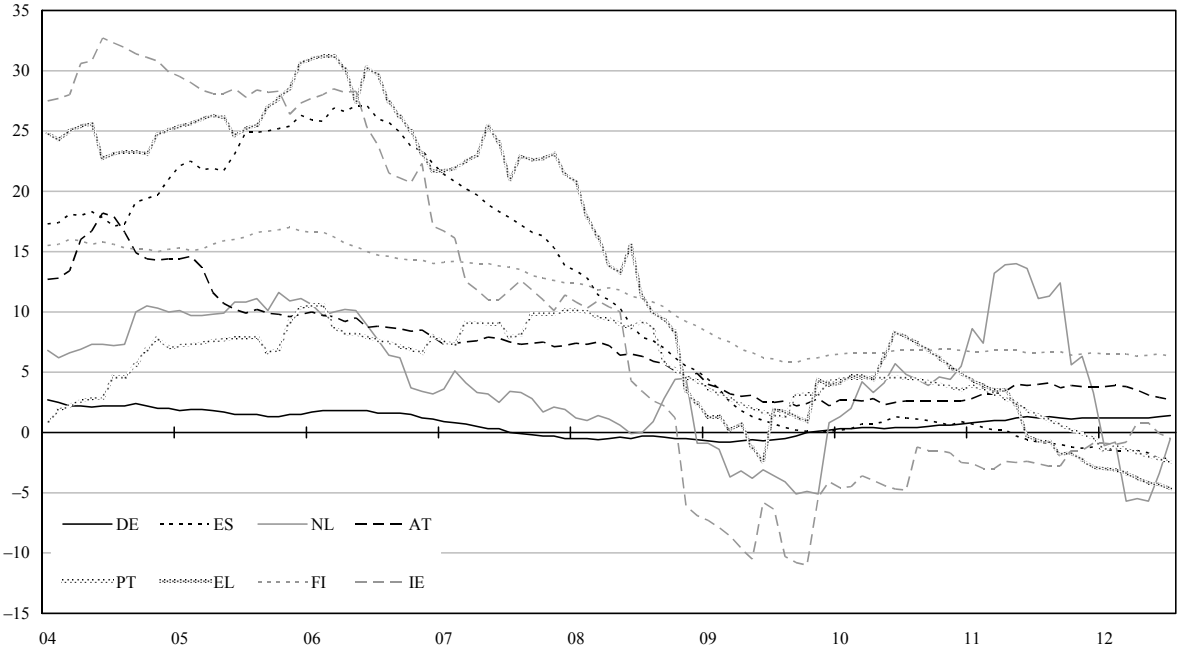
Source: ECB.
Note: EL data until 2010.

Figure 28 (continued)

Interest Rates and Credit Flows in Selected Member States
NFC Credit Flows, YoY Growth

Source: ECB.

Household House-purchase Credit Flows, YoY Growth



Source: ECB.

To address the link between sovereigns and the banking sector, mentioned in the introduction, the sovereign CDS spreads were also included in the set of variables affecting the credit supply side, as well as the banks' exposure to high risk foreign claims capturing potential negative external spill-overs effects (again, the results should be interpreted carefully as sovereign CDS spreads are themselves influenced by the situation in the banking sector).

These indicators of financial sector soundness are complemented with information gathered from lending surveys as the Eurosystem Bank Lending Survey (BLS),[19] which collects information on supply and demand conditions in the euro area credit markets and the lending policies of euro area banks. On the credit supply side, we use information about changes in bank's credit standards as applied to the approval of (*i*) loans or credit lines to enterprises and (*ii*) loans for house purchase granted to households. We use a trailing 4-quarter average of the net percentage of banks that tightened their credit standards. According to de Bondt *et al*. (2010), the BLS is a reliable leading indicator for bank lending: the BLS outcomes significantly lead bank loan growth by four quarters for enterprises and by one quarter for households. Credit standards lead also corporate bond spreads by one quarter. Conversely, the correlations between credit standards and bank lending rate spreads are comparatively low and there are different lead-lag relations depending on the class of borrowers.

We also use the survey on the access to finance of SMEs (SAFE) in the euro area: question Q7B - Application success in the past 6 months is used to construct the loan request failure rate, equal to the percentage of requests that did not receive all or most of the amount requested.

On the loan demand side, we include the Consumer Confidence Indicator and the Economic Sentiment Indicator, released monthly by the European Commission,[20] as they may provide some information about the willingness of households and NFCs to take more debt. The unemployment rate and the house price evolution (relative to 2007Q4) are also included. The house price change, by influencing the collateral underlying mortgage loans, provides some information about the potential impact coming from the financial accelerator effect. At the same time, the short-term dynamics of the house market may influence sentiment and therefore the overall willingness of households to take on debt.

Finally, we also include, in the loan demand set of variables, direct lending survey data. From the BLS we use information about changes in demand for (*i*) loans or credit lines to enterprises and (*ii*) loans for house purchase granted to households. From the SAFE survey we use the question Q5 - External financing needs over the past 6 months. The net balance is computed by taking the difference between the percentage of firms where financing needs increased and those where they decreased.

Having introduced the various indicators, we now proceed by (*i*) constructing stress maps of credit supply and demand conditions in Member States that were identified as likely subject to major deleveraging pressures in previous sections; and (*ii*) developing overall indicators of demand and supply pressures.

2.3.1.1 Stress maps

Along each dimension (variable) of the stress map, the scale is given by the minimum and maximum observation among Member States with available data. The "Average" is, by order of preference, (*i*) the aggregate EU27 value in the dataset, or (*ii*) the aggregate value for all Member

---

[19] http://www.ecb.int/stats/money/surveys/lend/html/index.en.html.

[20] http://ec.europa.eu/economy_finance/db_indicators/surveys/index_en.htm.

States with available data, or (*iii*) the weighted average of the variable using data from Member States for which the variable is available (authors' calculations).

We then run an analysis based on a relative comparison of individual Member States at a given point in time. There are several arguments in favour of such an approach. First, it might be unfeasible to devise country-specific absolute thresholds for each variable, as such thresholds would be endogenously related to the values of all other variables. Additionally, a relative analysis complemented with a view on the overall trend for individual indicators may be a useful first approximation of actual tensions faced by individual Member States. In effect, borrower credibility is a relative concept and investors tend to judge debtors (country-sectors) from a relative rather than an absolute point of view.

The left column in Figure 29 shows that supply-side pressures could be of concern in Cyprus and Portugal. Financial soundness variables (increases of NPL rate, bank profitability and capital coverage) are particularly pressing in Cyprus (jointly with sovereign tensions). They are also signalled in Portugal, Ireland and Spain. Direct surveys signal lending tightening in Cyprus, Portugal, and, to some extent, in Spain and the Netherlands.

The right column in Figure 29 points to deteriorating credit demand conditions in Cyprus, Portugal, Ireland, Spain, and the Netherlands. The general economic context and sentiment are likely to weigh on demand in Cyprus and Portugal. A house price correction is part of demand pressures in Ireland, Spain and Cyprus. Furthermore, survey data point to demand contraction in Ireland, Portugal, Cyprus, Spain and the Netherlands.

2.3.1.2 Country synthesis of supply and demand pressures

The above qualitative analysis allowed us to discuss which specific issues affect credit supply and demand in individual Member States. We now proceed by constructing overall indicators of demand and supply pressures in order to gauge the likely effect on the short-term deleveraging dynamics.

Our overall indicator is based on the average rank of a Member State on each variable. Specifically, for each Member State we calculate its rank (percentile) along all variables. We then calculate, separately for supply and demand variables, the average rank and we scale it between 0 and 10. Tables 4 and 5 present the individual variables and the overall pressure indicator for all Member States. Both tables start by reporting information on the eight Member States under analysis.

The minimum and maximum of the overall supply pressure indicator (high values signal a tight credit supply) in table 4 are respectively Finland and Cyprus. Vulnerable and programme countries tend to score high on this indicator, while 'core' countries tend to have moderate values. The only exception is Ireland which has a moderate supply indicator, both due to a high capitalization as well as moderate results on the lending surveys.

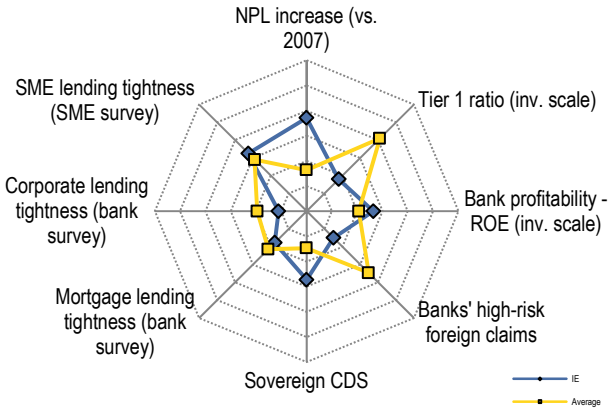
As for the credit demand pressures indicator in table 5 (high values signal a depressed credit demand) the minimum and maximum are respectively Sweden and Greece. Again, high pressures are mostly signalled in program and vulnerable Member States. One exception is the Netherlands, whose high demand pressure indicator is driven by negative sentiment and lending surveys.

Figure 29

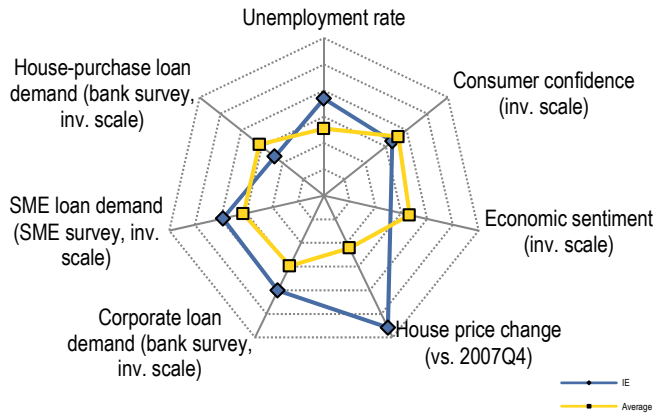
Stress Maps of Credit Supply and Demand Conditions for Member States with Likely Deleveraging Pressures, 2012

Ireland

Supply

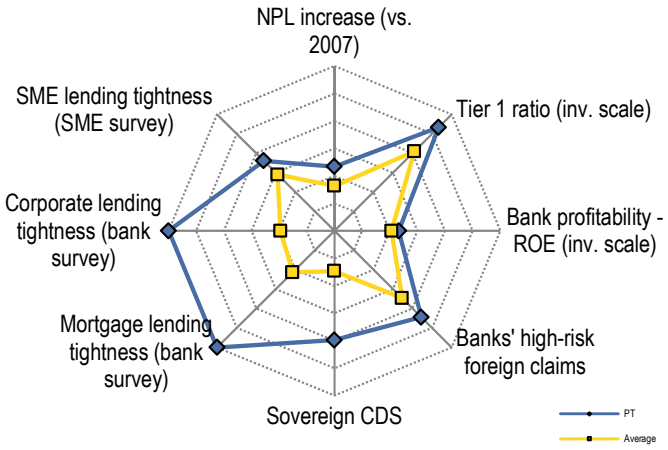


Demand



Portugal

Supply



Demand

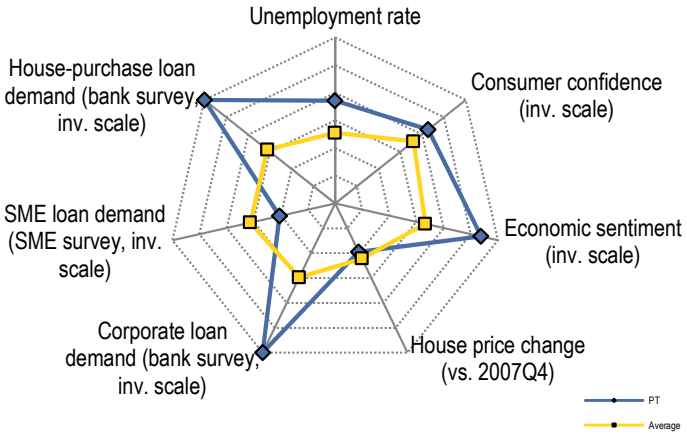
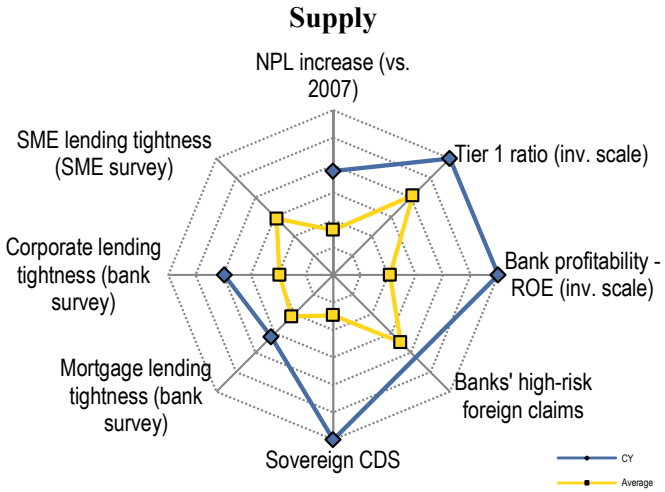
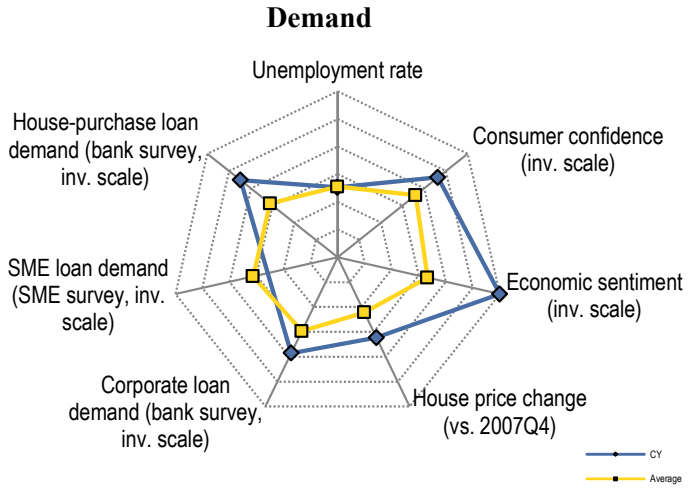


Figure 29 (continued)

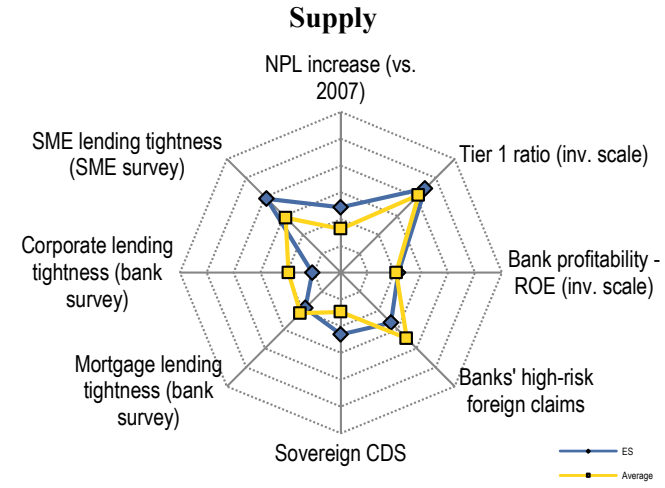
Stress Maps of Credit Supply and Demand Conditions for Member States with Likely Deleveraging Pressures, 2012

Cyprus





Spain



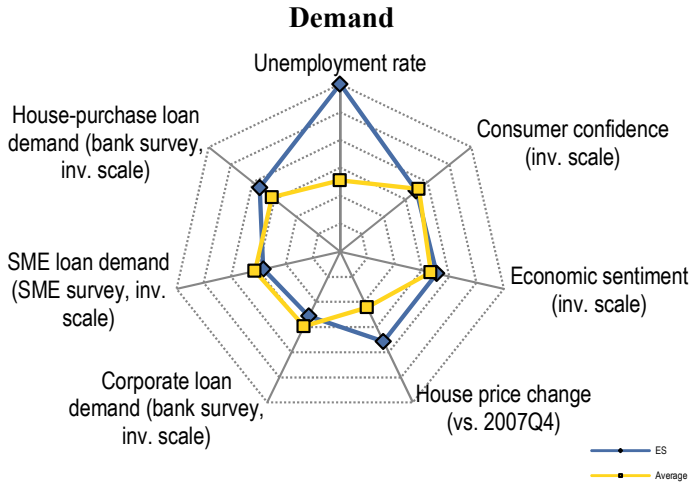
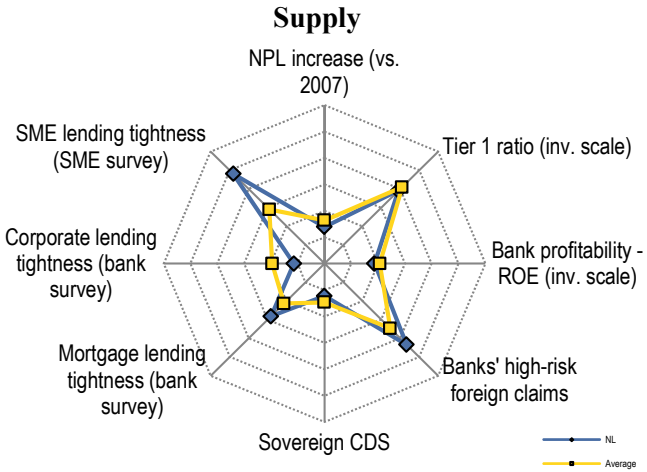
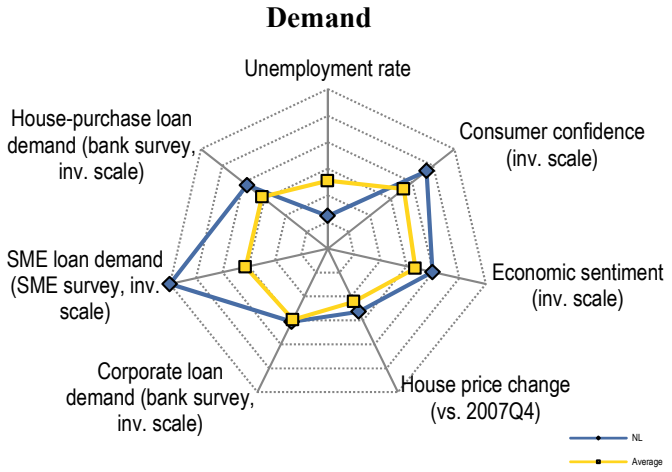


Figure 29 (continued)

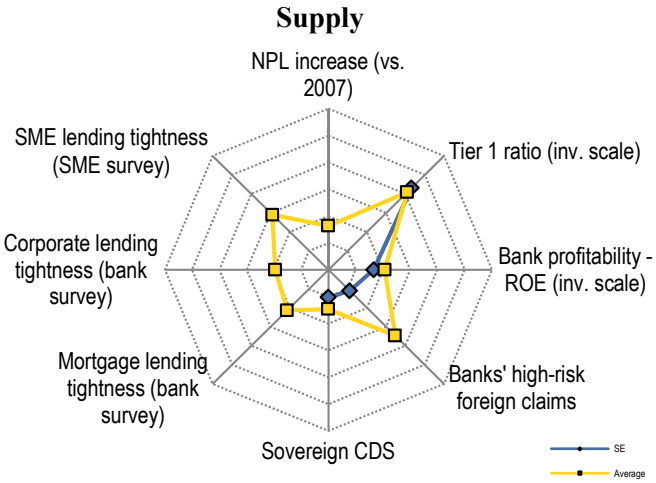
Stress Maps of Credit Supply and Demand Conditions for Member States with Likely Deleveraging Pressures, 2012

Netherlands





Sweden



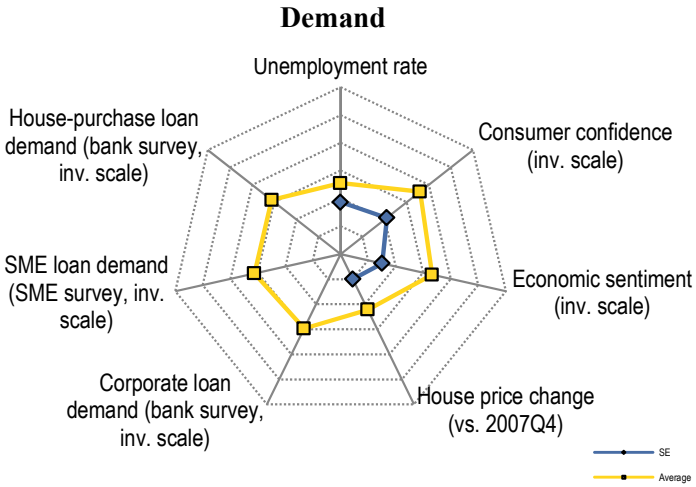
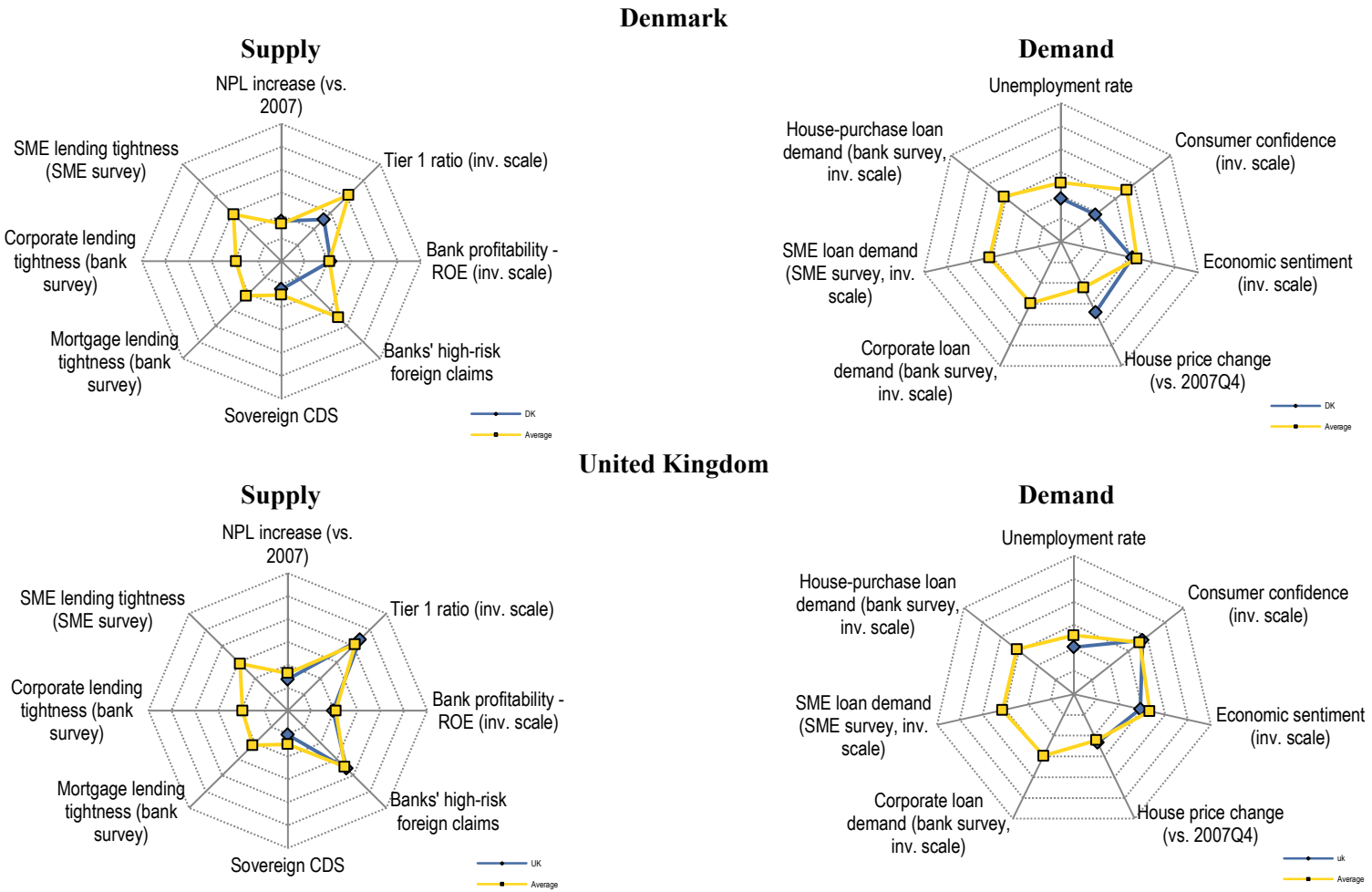


Figure 29 (continued)

Stress Maps of Credit Supply and Demand Conditions for Member States with Likely Deleveraging Pressures, 2012



Source: ECB, BIS, IMF, Thomson Reuters, ESTAT, European Commission, Staff calculations.
Note: For annual data we present 2011 values, for quarterly data we present 2012Q1 or Q2, as available. House price change calculated for 2011Q4.

Table 4

Credit Supply Conditions

Country	NPL Increase (vs. 2007)		Tier 1 Ratio		Bank Profitability (ROE)		Banks' High-risk Foreign Claims *(percent of GDP)*		Sovereign CDS		Mortgage Lending Tightening (Bank Survey)		Corporate Lending Tightening (Bank Survey)		SME Lending tightening (SME Survey)		Overall Supply Pressures
	Last	Prev. Year	Last	Prev. Year	Last	Prev. Year	Last	Prev. Year	Last	Prev. Year	Last	Prev. Year	Last	Prev. Year	Last	Prev. Year	
CY	8.6	1.6	7.0	11.0	–86.0	9.1			1595	354	35.0	30.0	45.0	10.0			**9.1**
PT	4.1	2.5	8.6	8.3	–4.1	6.7	16.7	17.6	967	734	80.0	70.0	75.0	95.0	35.3		**8.5**
ES	4.4	3.3	10.6	9.7	0.1	8.0	8.5	8.4	450	223	13.9	5.6	2.5	7.5	38.7	33.5	**6.2**
NL	1.1	1.0	11.8	11.8	6.2	7.5	16.2	16.5	113	33	29.2	31.0	3.6	0.0	49.0		**5.3**
IE	8.4	7.8	16.7	11.6	–11.1	–65.2	3.2	3.4	579	745	12.5	0.0	3.1	0.0	31.3		**5.0**
UK	1.0	1.0	10.7	10.9	4.2	4.4	12.7	13.3	59	56							**4.5**
DK	2.2	2.3	14.9	14.1	0.6	2.4			110	26							**4.2**
SE			10.9	10.7	10.7	10.2	1.4	1.3	51	17							**2.9**
IT	4.8	3.7	9.5	8.7	–13.0	3.7	5.2	5.3	431	131	37.5	15.6	46.9	15.6	38.0	19.2	**7.7**
BG	15.6	13.9	15.7	15.2	4.6	6.0			292	209							**5.7**
BE	1.4	1.2	15.1	15.5	1.4	10.5	12.0	13.4	168	118					27.0		**4.2**
EE	3.9	8.7	18.5	12.7	25.5	4.9			109	76	25.0		6.3				**3.3**
LV	9.5	14.7	13.5	10.9	5.1	–21.1			261	192							**5.6**
HU	12.1	8.0	11.7	11.6	–7.9	0.1			475	251							**8.1**
EL	9.3	4.3	9.6	10.9	–43.5	–4.7	6.9	7.0		2168					62.6		**8.0**
SI		1.8	9.3	8.6	–11.1	–3.1			356	90	10.0	10.0	30.0	10.0			**7.2**
RO	10.0	7.3	14.2	14.1	1.3	3.0			370	241							**6.3**
FR	1.6	1.5	10.9	10.8	5.6	8.4	20.5	21.5	103	59	15.1	–2.8	16.3	–10.1	21.0	18.5	**5.1**
LT	15.3	15.4	12.0	10.8	17.0	–3.9			246	192							**5.1**
AT	1.7	1.6	10.3	10.0	1.5	6.4	23.9	25.8	112	46	2.5	0.0	17.5	0.0	5.6		**5.0**
SK	2.1	2.0	12.5	11.4	11.1	9.8			247	85	14.4		26.7				**4.8**
PL	2.1	2.5	11.9	12.6	12.3	9.9			187	139							**4.0**
MT	–0.1	0.6	13.2	13.3	5.8	12.1			448	211	0.0	0.0	6.3	6.3			**3.6**
CZ	2.9	3.5	13.7	13.6	13.7	15.2			117	74							**3.4**
DE	–0.2	0.6	11.7	11.4	2.2	1.9	12.2	13.3	43	27	4.3	–2.3	1.6	–5.8	12.1	10.5	**2.9**
LU	–0.1	–0.2	16.1	15.1	6.2	8.5					8.3	–4.2	14.3	0.0			**2.5**
FI	0.2	0.3	13.7	13.7	8.1	7.0	0.9	1.0	79	33					14.7		**2.0**
Average	1.9	1.7	11.4	11.1	1.7	3.5	12.2	12.9	188	100	18.3	7.5	15.5	4.8	27.3	20.8	

Source: ECB, BIS, IMF, Datastream, ESTAT, European Commission, Staff calculations. Note: For annual data we present 2011 values, for quarterly data we present 2012Q1 or Q2, as available.

Table 5

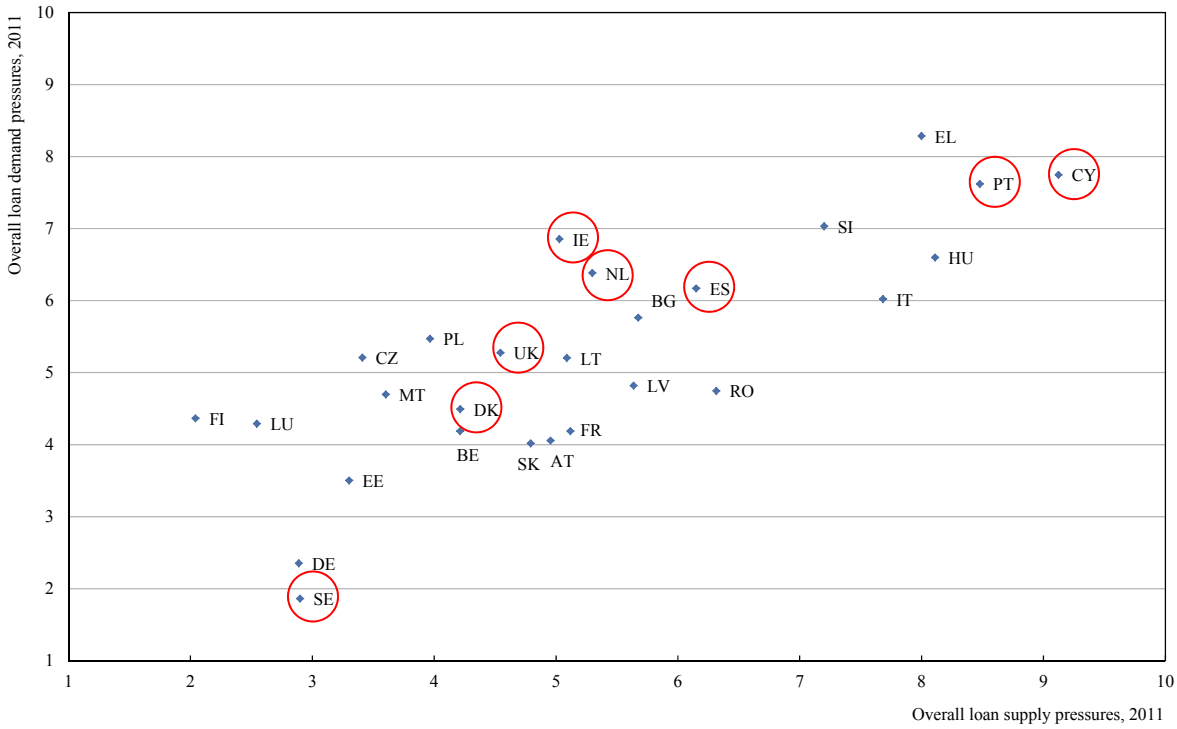
Credit Demand Conditions

Country	Unemployment Rate		Consumer Confidence		Economic Sentiment		House Price Change (vs. 2007Q4)		Corporate Loan Demand (Bank Survey)		SME Loan Demand (SME Survey)		House-purchase Loan Demand (Bank Survey)		Overall Demand Pressures
	Last	Prev. Year	Last	Prev. Year	Last	Prev. Year	Last	Prev. Year	Last	Prev. Year	Last	Prev. Year	Last	Prev. Year	
CY	10.1	6.7	–2.1	–0.2	74.1	85.3	–16.7	–11.8	–20.0	20.0			–60.0	–30.0	**7.7**
PT	14.8	12.3	–1.8	–1.8	77.9	86.5	–0.5	4.0	–45.0	–25.0	12.1		–100.0	–65.0	**7.6**
ES	23.8	20.7	–1.2	0.1	89.1	96.4	–21.1	–11.2	–5.0	0.0	8.2	9.4	–38.9	–8.3	**6.2**
NL	5.0	4.2	–2.2	–0.2	86.4	98.9	–9.2	–5.9	–10.7	–3.6	–8.0		–42.9	–34.5	**6.4**
IE	14.7	14.1	–1.0	–0.7			–46.8	–36.1	–21.9	–6.3	2.6		–5.0	–1.3	**6.9**
UK	8.2	7.7	–1.4	–0.9	92.9	100.2	–5.3	–4.9							**5.3**
DK	7.5	7.5	0.2	1.2	91.6	104.8	–19.1	–12.7							**4.5**
SE	7.5	7.7	0.0	1.5	101.5	113.2	11.7	13.7							**1.9**
IT	10.1	8.0	–3.3	–1.1	79.7	99.4	1.3	3.7	–15.6	15.6	17.4	11.2	–50.0	21.9	**6.0**
BG	12.0	11.2	–1.0	–0.9	97.4	96.3	–25.7	–21.1							**5.8**
BE	7.1	7.2	–0.3	0.6	90.5	107.6	9.1	6.9			1.5				**4.2**
EE	10.9	13.6	0.6	1.1	102.9	108.2	–32.7	–40.0	–6.3				31.3		**3.5**
LV	15.4	17.1	0.9	0.2	104.6	103.0	–41.3	–42.3							**4.8**
HU	11.1	11.0	–1.0	–0.4	86.9	101.0	–10.4	–9.4							**6.6**
EL	21.7	15.2	–2.5	–2.8	74.1	75.0	–4.1	2.6							**8.3**
SI	8.2	8.1	–2.7	–0.6	81.6	97.4	–7.2	–8.4	–35.0	20.0			–35.0	5.0	**7.0**
RO	7.2	7.1	–0.1	–0.9	97.2	94.5	–52.2	–42.3							**4.7**
FR	10.0	9.6	0.1	0.1	91.7	107.5	2.9	–0.7	–10.6	3.1	12.1	6.7	–64.6	26.0	**4.2**
LT	13.6	16.7	0.0	0.1	100.3	109.6	–28.1	–34.4							**5.2**
AT	4.1	4.4	–0.7	1.0	96.7	103.5	2.3	1.9	–17.5	–7.5	–2.3		–5.0	5.0	**4.1**
SK	13.7	13.6	0.0	–0.1	96.2	95.5	–14.9	–12.8	13.3				20.4		**4.0**
PL	10.0	9.4	–0.9	–0.1	90.7	97.7	–10.9	–6.4							**5.5**
MT	6.0	6.5	–1.3	–1.1	94.5	97.5	1.8	1.5	–31.3	–12.5			–12.5	–12.5	**4.7**
CZ	6.8	6.9	–1.4	–0.8	86.9	95.5	1.0	1.1							**5.2**
DE	5.6	6.3	0.7	1.9	100.5	113.8	7.0	5.0	6.8	26.9	–1.6	–1.4	29.6	30.7	**2.4**
LU	5.2	4.7	–0.9	1.0	88.3	103.6	11.0	4.1	–35.7	–3.6			0.0	33.3	**4.3**
FI	7.5	8.0	–1.4	–0.3	94.4	106.2	10.9	9.0			4.5				**4.4**
Average	10.2	9.5	–1.2	0.0	90.4	104.1	–3.9	–2.9	–9.8	8.5	6.6	4.4	–24.3	11.5	

Source: ECB, BIS, IMF, Datastream, ESTAT, European Commission, Staff calculations.
Note: For annual data we present 2011 values, for quarterly data we present 2012Q1 or Q2, as available. House price change calculated for 2011Q4.

Figure 30

Overall Lending Supply and Demand Pressures



Source: Staff calculations.

Using the information gathered in the tables above, Figure 30 plots credit supply and demand conditions against each other in order to visually identify Member States with accumulated demand and supply deleveraging pressures. The analysis reveals that among the shortlist countries from Section 2.2 immediate pressures could be highest in Cyprus, Portugal and, to a lesser extent, Spain, where both supply and demand risks are high. As mentioned before, one should however keep in mind that this result, especially in what concerns the demand side, might be also driven by the deleveraging process itself, given the impact of the latter on economic activity.[21]

Pressures in Ireland and the Netherlands could also be significant, especially from the demand-side. On the other hand, short-term pressures in Denmark and the UK seem somewhat lower, while in Sweden they are much less significant.

2.3.1.3 From the assessment of debt overhang and deleveraging pressures to the analysis of the impact of non-financial private sector deleveraging on economic activity

All in all, the degree and the extent of unsustainability of pre-crisis debt levels together with the analysis of the conditions on credit markets provide a first-order assessment of the potential for deleveraging in Member States.

---

[21] The existing feedback effects might actually underlie the positive relationship between the two indicators shown in Figure 30. This topic would deserve further analysis.

BOX 2
DELEVERAGING IN THE FINANCIAL SECTOR

As mentioned in the introduction, this study attempts to identify EU Member States where debt overhang and/or deleveraging processes in the non-financial private sector stand out as an immediate concern. Although the deleveraging in the financial sector is not directly addressed in the study, one should bear in mind its impact on the deleveraging pressures faced by non-financial sectors. In fact, the on-going balance sheet adjustment process in households and non-financial corporations in some EU Members is strongly linked to private financial outflows from "vulnerable countries" and credit constraints underlying financial sector deleveraging.

The conditions in the EU banking sector worsened considerably towards the end of 2011, with the intensification of the sovereign debt crisis and the deterioration of economic growth perspectives. In parallel with the non-financial sector, banks faced deleveraging pressures coming from both demand and supply factors (Praet, 2012): the lack of profitable opportunities for investment, the presence of deleveraging forces arising in other sectors of the economy, and banks' insufficient balance sheet capacity to hold assets.

A recent research study by Barclays (2012) identifies four primary triggers for deleveraging in the banking sector: state-aid rules underlying bank restructuring (still on-going), EBA requirements (completed at this stage), Basel III (spreading as banks face pressure to achieve the new capital ratios sooner) and long-term funding issues. In addition, the entanglement between oversized banks and their respective sovereigns leads to rising sovereign solvency risks. This adds to the aforementioned deleveraging pressure, by leading to the reduction of cross-border activities and to an outflow of funds from "vulnerable" countries. Given the intermediation function of the banking sector, these pressures coming both from the market and supervisory capital requirements, from the increase in funding costs and from reversed cross-country capital flows (the latter attenuated by the ECB non-standard measures), have an impact on economic activity by contributing to the deleveraging in the non-financial sector.

In this context, and as mentioned by Gambacorta and Marqués-Ibáñez (2012), the role of the financial sector stability in promoting a smooth transmission of credit to borrowers became even more evident during the crisis. The bank lending channel theory suggests that exogenous shocks (or situations of severe financial distress) may have an amplified effect on the economic activity due to the specificities of the financial sector (e.g., information asymmetry, uncertainty, imperfect substitutability between bank lending and other sources of financing and costs underlying a capital increase). This mechanism explains to a large extent the current credit constraints and, consequently, the deleveraging pressures currently faced by the non-financial private sector. Even if the corporate bond market and the intra-company loans have helped large firms in reducing the potential aforementioned constraints, small and medium sized enterprises, especially in vulnerable countries, and households do not have access to a similar alternative financing source.

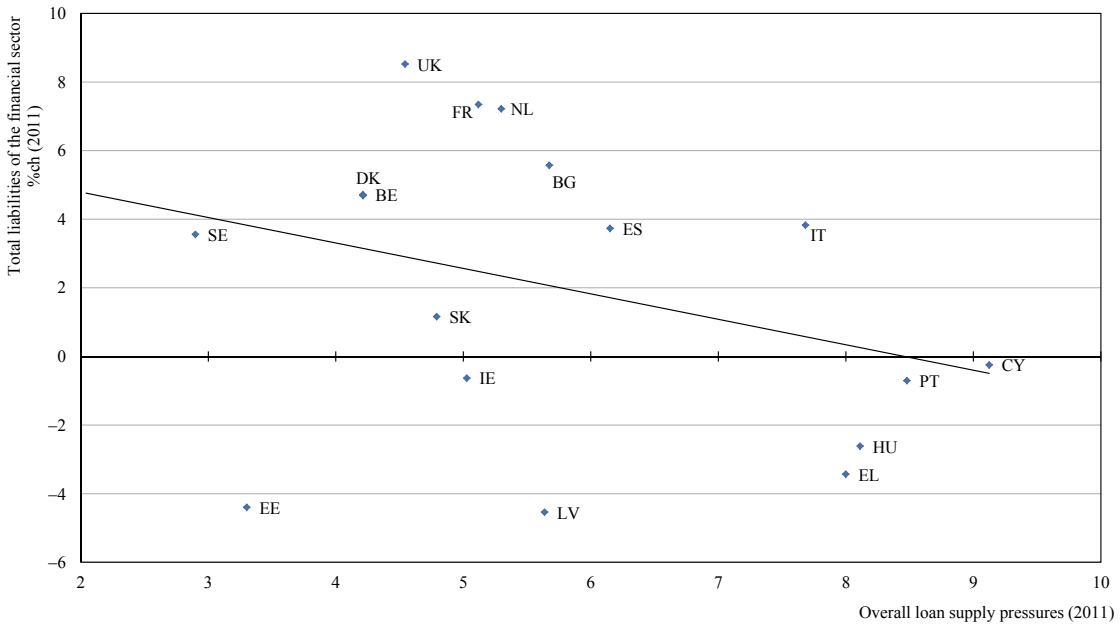
Against this background, we assess whether the loan supply pressure indicator developed in this paper captures the on-going changes in the balance sheet of the financial sector. Figure 31 plots the indicator against the 2011 annual growth rate of the total financial sector liabilities for the countries identified as potentially highly indebted (listed in Tables 2 and 3). Figure 32 focuses on the asset side, by plotting the pressure indicator against the 2001 annual growth rate of lending assets (loans and securities other than shares).

There seems to be a negative relationship between our loan supply pressure indicator and the growth of financial sector liabilities. Similarly, the indicator seems to capture the changes in financial sector assets. Estonia and, to a lesser extent, Latvia are notable outliers: their financial sectors seem to undergo stronger deleveraging processes than what our indicator would suggest. In effect, the financial soundness indicators for these Member States have recently improved, while the balance sheet adjustment was still ongoing.

All in all, the overall supply pressure indicator provides information on the undergoing changes in the balance sheets of the financial sector, both in terms of the overall size as well as in terms of the evolution in assets.

Figure 31

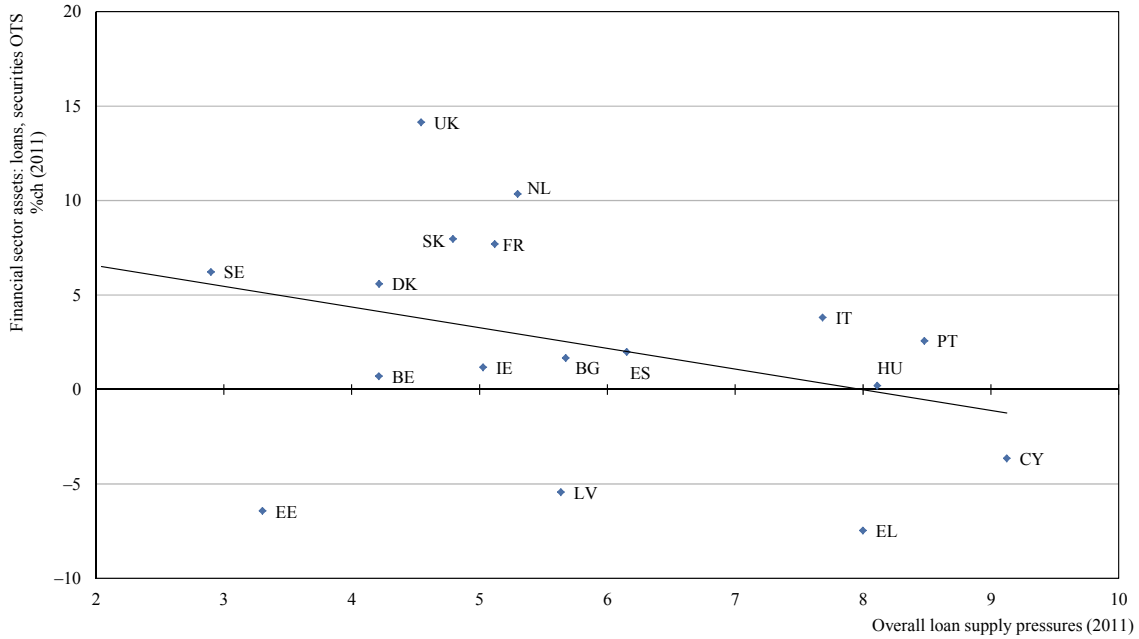
Credit Supply Pressures and Financial Sector Size



Source: ESTAT, Staff calculations.

Figure 32

Credit Supply Pressures and Financial Sector Lending



Source: ESTAT, Staff calculations.

The screening of the different indicators on indebtedness and leverage with a view of pooling their informational content into aggregate measures of over-indebtedness risks, provides a first-hand signal of countries that are likely to be faced with deleveraging pressures. The materialization of the estimated potential for deleveraging into actual reduction of debt is not straightforward, however, and needs to consider credit market conditions, which qualify sustainable debt levels according to differences in domestic financial sectors.

Another aspect that should be taken into account, and that is also country specific, relates to the pace of adjustment: bringing the debt down to a sustainable level before debt distress occurs is highly desirable, but it can also be costly in terms of growth and employment. There is a trade-off between a fast debt rollback and the associated costs, which must be assessed taking due account of each country specificities.

Following these considerations, the next section attempts at deriving the transmission channels through which these processes work and, at the same time, providing an order of magnitude of their impact on the main macroeconomic aggregates.

3 Deleveraging and macroeconomic adjustment

In the previous section, a build-up of deleveraging pressures in the household sector between 2002 and 2007 has been identified for a number of Member States. Following the interpretation of the metrics used, the current households' debt-to-GDP ratios in these Member States are unsustainable, which suggests that they are increasingly likely to enter a period of debt deleveraging. In fact, this process appears to have already started in countries like Ireland and Spain, and is in line with empirical literature (as described in Section 2.2, several authors have found that financial crises are typically followed by periods of consolidation in the non-financial private sector).

Based on historical experience, the necessary reduction of the excessively high levels of private sector debt, accumulated in many EU Member States before the current crisis, will take many years. Importantly, periods of private debt reduction may be painful, and household deleveraging, in particular, is associated with large contractions in the economic activity (see Roxburgh *et al*., 2012 and IMF, 2012). Understanding the extent and impact of deleveraging and underlying balance-sheet adjustment on the dynamics of the main macroeconomic aggregates and financial stability is, hence, crucial for defining appropriate policy objectives for the scope, structure and speed of the deleveraging process. Unfortunately, the scope for empirical analysis to provide information to policy makers on the likely impact of deleveraging on the economy is limited: while the list of financial crises followed by private debt deleveraging is long, a large majority of these episodes refer to medium-income countries.[22] More importantly, several EU Member States today face a combination of risks (*e.g.*, deleveraging pressures and decrease of households' wealth due to a fall in house prices), which were not necessarily observed in past crises. The modelling approach, which is followed in the remainder of this section, provides a more ample scope to capture these country-specific factors.

3.1 Analysis framework

In this section we use a 3-region version of QUEST to assess the impact of household sector deleveraging on the main macroeconomic aggregates. QUEST is an open economy new-Keynesian

[22] See Tang and Upper (2010) for a list. Two clearly relevant cases from the EU perspective are Finland and Sweden; see Roxburgh *et al*. (2012).

dynamic stochastic general equilibrium (DSGE) model developed by the European Commission (see Ratto *et al.*, 2009, Roeger and in't Veld, 2010, for a detailed description of the model),[23] and incorporating various real, nominal as well as financial frictions, used for policy analysis.

On the firms' side, the model includes three production sectors: a construction sector and two manufacturing sectors producing traded and non-traded final consumption goods. In the model firms do not incur in debt. On the households' side, the model includes two main types of households:

- "Ricardian" households who own capital and have unlimited access to financial markets; their consumption decisions are based on the life-time income hypothesis and they are net debt-holders.
- "Credit-constrained" households, who have limited access to credit markets and can only get indebted against the value of collateral, in the form of housing stock, up to an exogenously given loan-to-value (LTV) ratio. These households are net borrowers in the model.[24]

A three region version of QUEST model, consisting of a medium-sized euro area economy characterized by a relatively large initial household debt-to-GDP ratio, the rest of the euro area and the rest of the world, is used, thus also allowing the study of spillovers effects between regions.

As mentioned, the model incorporates various frictions (real, nominal and financial), thus allowing to assess economies with different structural characteristics. In particular, the degree of real and nominal rigidities can be differentiated to reflect different characteristics of the labour and product markets. On the financial side, the model comprises two types of frictions. First, credit-constrained households are not able to smooth consumption over time. For this reason, exogenous shocks to the LTV ratio as well as (exogenous or endogenous) fluctuations in the value of their wealth (housing stock) translate into shocks to their consumption and then to investment, employment and output.25 Additionally, the model includes risk-premia on different assets, reflecting generalised risk perceptions, including at country and sectoral levels (*e.g.*, risk premium on housing or corporate investment).

Fiscal policy is described by a set of fiscal instruments, on the revenue[26] and expenditure[27] sides. The government budget does not need to be balanced every period and fiscal deficits are financed through public debt. This detailed and rich fiscal block allows for studying policy changes like public sector deleveraging, which may add to the effects of private sector deleveraging.

Finally, the model realistically depicts monetary policy arrangements between the euro area Member States. There is only one policy interest rate and Member States do not conduct independent monetary policy. Specific circumstances underlying the on-going crisis, like the policy rate being stuck at the zero-lower bound, can also be captured.

3.2 The effects of deleveraging on aggregate activity

In this section we use the model just described to assess the impact of households sector

---

[23] For references to QUEST model publications see: http://ec.europa.eu/economy_finance/research/macroeconomic_models_en.htm.

[24] There is also a third type of households, the so-called hand-to-mouth consumers, who do not have access to financial markets and consume their after-tax labour income and transfer earnings in every given period. These households do not play an important role in the described simulations and their share is kept at a low level (10 per cent).

[25] This feature distinguishes QUEST from most other general equilibrium models, which do not make a link between the level of debt and the available collateral, as Eggertsson and Krugman (2012) paper, which focuses on the role of deleveraging during the recent financial crisis.

[26] Different types of taxes.

[27] Public consumption, productive investment, transfers and unemployment insurance benefits.

deleveraging on aggregate activity, highlighting the main mechanisms through which deleveraging affects the economy and discussing alternative scenarios.

We focus our analysis on one medium size and of a relatively low degree of openness euro area Member State. The initial gross debt of credit-constrained households is set at 80 per cent of GDP. The average debt maturity is ten years.

3.2.1 Scenario description

The following scenarios are considered:

Baseline household deleveraging scenario

Deleveraging is captured by a combination of the two following shocks: (*i*) a drop in credit availability captured by a negative loan-to-value (LTV) ratio shock, and (*ii*) a fall in house prices captured as a shock to housing demand through an increase in the risk premium on housing investment.

The risk premium shock captures the foreclosure-house price deflation spiral: a fall in the LTV ratio leads to the insolvency of some households, forcing foreclosure of their houses; the excess of supply of houses, due to the aforementioned foreclosures, drives house prices down and, consequently, leads to a decrease in the value of the collateral, which further limits the access to credit (amplifying financial accelerator effect). The LTV ratio shock is calibrated to lead to a long-run 20 p.p. reduction in households' debt-to-GDP ratio. After 6 years this yields a fall of around 5 to 6 p.p. The risk premium shock on housing investment is calibrated to imply a permanent fall in house prices of around 15 per cent in the long run. This shock adds to the amplification effects described before by leading to a decrease in the value of collateral.

In all scenarios considered in this analysis, we assume that the reduction in household debt translates in full into a reduction in the economy's net foreign debt (an improvement in the net asset position). Technically, this is captured in the model as an exogenous increase in Ricardian households' desired foreign asset holdings, which mimics the reduction in credit-constrained households' debt reduction. This assumption captures two alternative situations, in which either domestic households are directly indebted to foreign lenders or, faced by a lack of domestic investment possibilities in the deleveraging economy, domestic lenders to whom domestic households were indebted are forced to reinvest in foreign assets. In fact, this reflects, in a way, the financial outflows that took place in countries with a highly negative net foreign asset starting position and that are now facing strong deleveraging pressures.

Under this baseline scenario, the nominal interest rate is fixed (no monetary policy autonomy) and fiscal consolidation measures are absent.

In addition to the baseline scenario, the following alternative scenarios are considered:

Structural reforms scenario

The deleveraging shocks described in the baseline scenario are simulated in an economy with more flexible labour and product markets, thus representing the impact of the adoption of key structural reforms. In particular, the flexibility of the economy is captured by lower real wage rigidities and nominal (price and wage) rigidities. This is especially relevant for economies characterized by sectoral imbalances (for example due to a construction boom before the crisis), in which a smooth reallocation of capital and labour across sectors crucially depends on well-functioning product and labour markets. The results of this scenario should also highlight the potential of structural reforms for alleviating the impact of the deleveraging process on the economy.

Generalised risk perception scenario

In this scenario we add an increase in the domestic risk premium, thus illustrating the impact of a generalised increase in the risk perception in the economy under analysis. Such an increase may be expected if the deleveraging process is accompanied by an increased uncertainty and/or by contagion from the household sector to other sectors of the economy, and may in fact reflect a situation where, in addition to the household sector, the non-financial corporations' sector is also facing deleveraging pressures (situation not directly captured by the model, as the non-financial corporations are not indebted). The risk premium shock is calibrated to be of 100 basis points for four years and fading out progressively thereafter.

(More) open economy scenario

Here we compare the impact of deleveraging in the baseline scenario, *i.e.*, in an economy with a relatively low degree of trade openness (Exports/GDP ≈ 30 per cent), with its impact in an economy with a relatively large degree of openness (Exports/GDP ≈ 60 per cent), to assess to what extent the degree of openness affects the deleveraging impact (taking into account the positive impact that deleveraging has on the current account, through the increase in exports and decrease in imports).

Private and public sectors deleveraging

This scenario addresses the effects of simultaneous private and public sectors deleveraging, by assuming that public authorities start a deleveraging process aiming at improving the budget balance by 2 per cent of GDP.[28] The fiscal measures are equally distributed over the revenue and expenditure side.

Spillover effects: joint deleveraging in the Member State and the rest of the euro area

This scenario assesses the impact of deleveraging in a currency union Member State when deleveraging is simultaneously occurring in the rest of that currency union.[29] Deleveraging in the rest of the currency union is captured by the same shocks. We assume in the simulations that the size of deleveraging in the rest of the currency union is 1/3 of that in the Member State considered. The currency union central bank is supposed to be restricted by the zero-lower bound (ZLB) in the first three years.

3.2.2 Results

Deleveraging has a marked negative impact on the economy

Baseline scenario: deleveraging in the households' sector

The simulation results displayed in Figure 33 show that a combined reduction in access to credit (LTV ratio shock) and drop in house prices (housing risk premium shock) lead to a relatively speedy deleveraging process: after 6 years households' debt-to-GDP ratio falls by about 9 p.p. The speed of deleveraging is roughly in line with empirical studies mentioned in Section 2.2. The debt overhang observed in some Member States may require an even larger degree of deleveraging. In the baseline scenario, the debt-to-GDP ratio is reduced by around 17 p.p. after 10 years, almost reaching the assumed long-run reduction of 20 p.p.

---

[28] This scale of fiscal consolidation has been chosen for illustrative purposes. It should be recognized that the required fiscal consolidation for some countries may well be in excess of this.

[29] As in the baseline scenario, the Member State concerned of the currency union is assumed to be indebted to foreigners: its net foreign asset position is negative.

This speedy and sizeable household debt reduction leads to a marked contraction in output. GDP falls by a maximum of around 3 per cent with the trough reached after 3 years. Output starts climbing back after this period towards its initial level, but at a slow pace.

There are several channels via which deleveraging affects output. First, falling households' demand leads to a significant contraction in housing investment and consumption, which has a direct negative effect on output. Second, there is an additional effect due to the so called debt-deflation spiral: falling prices slow down the speed of deleveraging in terms of the real debt, which forces households to deleverage more aggressively. In consequence, households have to shed relatively more nominal debt, which pushes prices further down.

The deleveraging shock leads also to lower investment in capital as the real interest rate rises: without an independent monetary policy the nominal interest rate does not fall sufficiently to offset the decrease in prices. Further, real wages fall persistently. Since labour supply tends to increase (due to the negative income shock for households) and the labour demand falls, the net impact on equilibrium employment is largely driven by the degree of wage flexibility: in the baseline calibration with relatively high degree of real and nominal wage rigidities, the fall in wages is relatively contained and unemployment increases more significantly.

The negative impact on the economy leads, via the automatic stabilisers, to a negative impact on the government's budget balance and to an increase in the public-debt-to-GDP ratio. At the same time, deleveraging also leads to a rebalancing of the economy as housing investment falls, thereby reducing the demand for non-traded goods. Demand shifts from housing investment towards consumption goods and production resources are redirected towards the traded sectors. The economy's net foreign asset position improves, not only due to the assumption described above, but also due to the decrease of the terms-of-trade (due to falling domestic prices) and net exports increase.

Structural reforms scenario

The structural reform scenario illustrates how a higher degree of real and nominal flexibility may dampen the impact of deleveraging on the economy. Figure 34 compares the impact of the baseline deleveraging scenario in an economy with relatively high degree of real and nominal rigidities to the impact of the same deleveraging shocks in a more flexible economy. The results suggest that employment, investment and production would fall less in the more flexible economy, especially in the first years of the adjustment process. The effect is sizeable: for example, the average output loss over 10 years due to deleveraging in the flexible economy is 0.75 p.p. per year smaller than the output loss in the rigid economy. At the same time, households whose income depends on wages and salaries only may be hit more seriously, which leads to a somewhat more marked fall in aggregate consumption and housing investment than in case of more sticky prices and wages. More flexibility is found to contain the deterioration of the public-debt-to-GDP ratio especially over the medium run. The speed of deleveraging is somewhat slower in the short run, but not markedly affected in the medium and long run compared to the benchmark scenario.

There are two main channels via which rigidities make the impact of households' deleveraging relatively more painful. First, the optimal reaction of the economy to deleveraging is a downward adjustment in real wages. If working properly, this mechanism allows to sustain a stable level of employment (unemployment stays virtually constant, see Figure 34) leading to a smaller fall in output. Real and nominal wage rigidities shut this channel by making the downward wage adjustment slower (labour becomes relatively more costly and firms shed workers, which results in an additional decrease in output). The second channel works via a price effect on the interest rate. While in an economy characterized by flexible prices, prices fall relatively more on impact, they quickly start climbing back towards their original level. In effect, after an initial short period of deflation, moderate inflation sets in. In an economy without independent monetary policy these

changes have a direct effect on the real interest rate: while the initial upward adjustment of the rate in the flexible economy is stronger, it is much quicker to revert back to its pre-deleveraging level. In fact, three years after the start of the deleveraging process the real rate actually falls below its initial level and only then starts converging to the steady state. In contrast, in the rigid economy, the real interest rate remains above its steady state for an extended period of time. Since lower interest rates make corporate investment cheaper, investment falls less in the flexible economy, helping to sustain a relatively high level of output.

Both, the baseline "rigid economy" scenario and its "flexible economy" counterpart, assume a sizeable fall in house prices. For economies characterized by the emergence of a housing bubble before the crisis this assumption may be thought of as reflecting the bursting of the bubble. Economies affected by the housing boom and the subsequent bust will require (and may be already in the process of) a major sectoral reallocation of capital and labour. Having this in mind, the baseline scenario and the "structural reform" scenario may also be seen as partly capturing the economic costs of such reallocation in a rigid and relatively flexible economy, respectively. In the rigid economy higher adjustment costs hinder an increase in labour and capital in the goods-producing firms, following a collapse in the housing sector.

Generalised risk perception scenario

A contagion from the housing sector to other economic sectors, as captured by a generalised increase in the risk premia in the deleveraging economy, is shown to aggravate the negative impact of the shock (Figure 35). This effect is primarily visible in a significantly larger fall in corporate investment. Consumption, employment and GDP also fall markedly more than in the benchmark case. This may thus give an idea of the magnitude of the effects when both households and non-financial corporations sectors face deleveraging pressures.

(More) open economy scenario

A higher degree of openness can attenuate the negative impact of the shock by the stabilising effect of increasing net exports in the wake of falling domestic prices (Figure 36). Foreign trade dampens the impact of the negative demand shock for domestic production – especially for the production of traded goods. Unemployment would then increase less and consumption fall less during the process of deleveraging. Note that a larger increase in current account as a share of GDP takes place: while exports and imports move (up and down, respectively) relatively less in the (more) open economy, due to their larger share in the total output, their aggregate adjustment is larger in terms of output.

Private and public sectors deleveraging

Public sector deleveraging in a period of private sector deleveraging is found to be challenging (Figure 37). Public sector deleveraging aggravates the fall in GDP and all domestic demand components, when compared to the baseline scenario. It should however be noted that the baseline scenario does not explicitly include a deleveraging need in the public sector, and is thus not comparable to a situation where the government itself is under funding pressure. Thus comparing to the baseline does not allow concluding that fiscal consolidation should not be undertaken. Since private deleveraging deteriorates the government's budget balance by itself, the government needs to undertake substantial and credibly permanent restrictive fiscal policy measures to achieve a reduction in the public-debt-to-GDP ratio over the medium term. Moreover, as in the case of the debt-deflation spiral, also real public debt is affected by emerging deflation: falling prices increase the level of real debt which further increases, although temporarily, debt-to-GDP ratio.

The simulations display an across-the-board fiscal consolidation package which leads to a permanent improvement in the budget balance by 2 per cent of GDP *ex ante*. As can be seen, this

prevents an increase in the public debt-to-GDP ratio which would otherwise emerge from private sector deleveraging. However, a marked reduction of the debt-to-GDP ratio can only be seen after about six years. It must also be pointed out that these simulations focus on the demand shortfalls associated with private and public sector deleveraging. Not considered in these calculations are negative demand effects from rising sovereign risk premia in the absence of fiscal consolidation. On the other hand, the trade balance and the net financial assets position are found to improve somewhat more with the contribution of deleveraging in the public sector.

Spillover effects: joint deleveraging with the rest of the euro area

Simultaneous deleveraging in various euro area Member States is found to amplify the negative impact of deleveraging in the Member State concerned when compared to the baseline scenario where the Member State is hit by an asymmetric shock (Figure 38). The deleveraging in the rest of the currency union has a negative impact on the Member State considered because of the falling external demand and the resulting lower stabilisation via foreign trade. The size of the spillover crucially depends on the absence of monetary easing during the first three years of simulation (recall that in this scenario the monetary union as a whole is assumed to operate on the zero lower bound). Given that the deleveraging is now assumed to take place in all Member States of the monetary union, allowing the QUEST monetary policy rule to operate freely would lead to substantial easing of the monetary conditions. This effect would to a large extent cushion the negative impact of deleveraging on the monetary union and hence neutralize the negative spillovers.[30]

4 Concluding remarks and policy implications

Depicting imbalances in private sector balance sheets requires an encompassing approach, covering the main relevant dimensions. First, debt must be gauged against agents' income, evaluating their capacity to repay existent commitments, but also against assets as a more general concept of wealth. Second, when considering leverage it is important to take into account non-financial assets, especially in the case of households as they represent the bulk of their wealth. Third, changes in private sector debt should go in line with the absorption capacity of the economy. Therefore, valuation effects should be taken into account when considering the evolution of assets. Following these principles, the following countries were identified as more prone to face deleveraging pressures:

- Cyprus, Denmark, Spain, Ireland, the Netherlands, Portugal, Estonia, Latvia, Slovakia, Sweden and the United Kingdom on the household side;
- Belgium, Bulgaria, Cyprus, Greece, Spain, Hungary, Ireland, Italy, Portugal, Estonia, Latvia, Slovenia, Sweden and the United Kingdom on the corporate side.

The analysis also captures, within this set of countries, some "catching up" economies for which debt ratio levels are significantly lower, despite large increases before the crisis: Slovakia, Latvia, Estonia, Slovenia, Bulgaria and Hungary.

Private sector debt sustainability analysis requires a benchmark against which to gauge actual developments in indebtedness: a balanced or sustainable level. The most common approach in the literature assesses current debt levels against *ad hoc* static benchmarks, ignoring important country-specific factors as well as the possibility of time-varying thresholds. To complement this approach, this paper develops a stationarity approach that forces households' debt

[30] In fact, according to the simulations, the reaction of the central bank when the monetary policy restriction is removed is so strong as to make the impact of deleveraging slightly less negative compared to the baseline scenario.

to grow in line with their notional or transaction-based assets (filtered from valuation effects). A positive diverging trend of debt from the balanced path implies increasing deleveraging pressures. The rebalancing of balance sheets depends, on the one hand, on debt reduction (effective deleveraging) and, on the other hand, on asset price valuation effects (*e.g.*, house price adjustment). The pace of the adjustment will crucially depend on the interaction of these two forces. As can be seen in the case of Spain and Ireland, where both factors have been at play (house prices bust and actual deleveraging), there has been a sharp rebalancing towards the closing of the gap. In the case of Portugal, the current gap, as assessed by the stationarity approach, is significantly lower due to the absence of a house price boom before the crisis.

The analysis of credit market conditions allows a further refining of the message on whether and how the identified deleveraging needs may translate into actual adjustments of indebtedness in the Member States concerned. The evolution of indebtedness is affected by both lending attitudes of the financial sector and borrowers' willingness to take on debt. Deleveraging in the financial sector may be seen as a cause, but also as a consequence of non-financial sector deleveraging, given the feedback effects existing between the two. On the credit demand side, the weak level of economic activity, the high level of uncertainty, low consumer and business confidence levels and the underlying deleveraging in the non-financial private sector continue to influence borrowing in a number of euro area countries. On the supply side, banks' capital constraints, the underlying adjustment in balance sheets and segmentation of financial markets affect negatively credit growth. **Our analysis suggests that immediate deleveraging pressures could be highest in Cyprus, Portugal and, although to a lesser extent, Spain, where both credit supply and demand risks are high.** Deleveraging pressures in Ireland and the Netherlands could also be significant, but coming more from the credit demand side. Short term pressures in Denmark and the UK seem lower, while in Sweden they seem to be currently at low levels.

The materialization of a households' sector deleveraging process has a significant negative impact on the economic activity through a decrease in housing investment and consumption, amplified by a debt-deflation spiral. The simulation of a deleveraging shock in a dynamic general equilibrium model also shows the negative consequences of a deleveraging shock on unemployment, notably when the economy is characterized by significant real and nominal wage rigidities. Nevertheless, this adjustment is accompanied by a positive external rebalancing with the reallocation of resources from non-tradable to tradable sectors. Structural reforms leading to a more flexible economy are key in this context, not only by contributing to a durable rebalancing process, but also by attenuating the negative impact of households' deleveraging: stronger real wages adjustment leads to a smoother reaction of employment and, consequently, of real output, while a faster adjustment in prices allows for an also faster adjustment in the real interest rate towards the equilibrium level. The need for simultaneous public sector deleveraging, as currently faced by some European economies, raises, however, some additional challenges: (*i*) public sector deleveraging aggravates the fall in GDP, and (*ii*) since households' deleveraging impacts negatively (via the automatic stabilisers) the government balance, restrictive fiscal policy measures lead to a decrease in the public debt-to-GDP ratio only in the medium term.

Despite clear signals of rebalancing and deleveraging, especially in some vulnerable economies as Spain, Portugal and Ireland, deleveraging in the non-financial private sector has still a long way to go in many European countries. Limiting the negative impact on growth remains one of the key policy challenges ahead.

- The room for manoeuvre to attenuate the underlying negative consequences for economic activity is extremely limited in countries whose *public sector* is also highly indebted – in some cases due to excessive private indebtedness that was transformed into public sector debt – and for which sovereign yields increased significantly during the crisis. In addition, the ongoing public sector deleveraging needs, especially when taking place in several Member States

simultaneously, adds to the recessionary pressures coming from the private sector. This context thus raises significant challenges in terms of fiscal policy. The Stability and Growth Pact offers a flexible framework to guide the differentiated pace of consolidation: in particular, it allows for the pace of consolidation to vary according to the particular characteristics of the Member States.

- This note highlights the importance of *structural reforms*, not only by guaranteeing a durable rebalancing process, but also by attenuating the negative impact of households' deleveraging. Measures aiming to decrease nominal and real rigidities, as envisaged by the labour and product market reforms now being implemented in programme and vulnerable countries, are crucial to attenuate the impact of private sector deleveraging on economic activity and unemployment.
- Measures targeted at guaranteeing an *orderly and coordinated deleveraging proces*s in the private sector should also be envisaged. In the current context of still high levels of indebtedness, low growth and low inflation, an adequate private sector insolvency framework might be needed to achieve timely deleveraging: improving insolvency and bankruptcy procedures in the household and non-financial corporations' sectors can become crucial to guarantee an orderly deleveraging process.
- In addition to the key role currently played by central banks in providing liquidity to the banking sector, and to the need for a well-capitalized and well-regulated banking system, *breaking the banks-sovereign link* and thus promoting a more supportive role of financial markets is also key in the current juncture.
- Finally, and looking forward, it is also important to guarantee that once the proper financing conditions are re-established, the rebalancing process continues to take place and macroeconomic imbalances, including private sector indebtedness, will not start building up again. Structural reforms are a necessary but not sufficient condition for this to happen. In addition, and given the procyclical nature of capital flows, the right financial supervision tools must be in place to guarantee that the new lending will support the rebalancing process (possibly including tax-reforms, such as amending favourable fiscal treatment on debt-related instruments). The *banking union and the reinforcement of micro and macro-prudential supervision* are of utmost importance in this context. The relevance of cross-border capital flows at EU level and the evidence from the past pointing to the role of the core countries' banking sector in fuelling the building up of macroeconomic imbalances in the periphery, are two clear examples pointing to the need for effective regulation and supervision of cross-border banking and for a more centralized macro-prudential supervision, especially at the euro area level.

ANNEX
FIGURES FROM QUEST SIMULATION

Figure 33

Combined Deleveraging and House Price Shocks
(baseline)

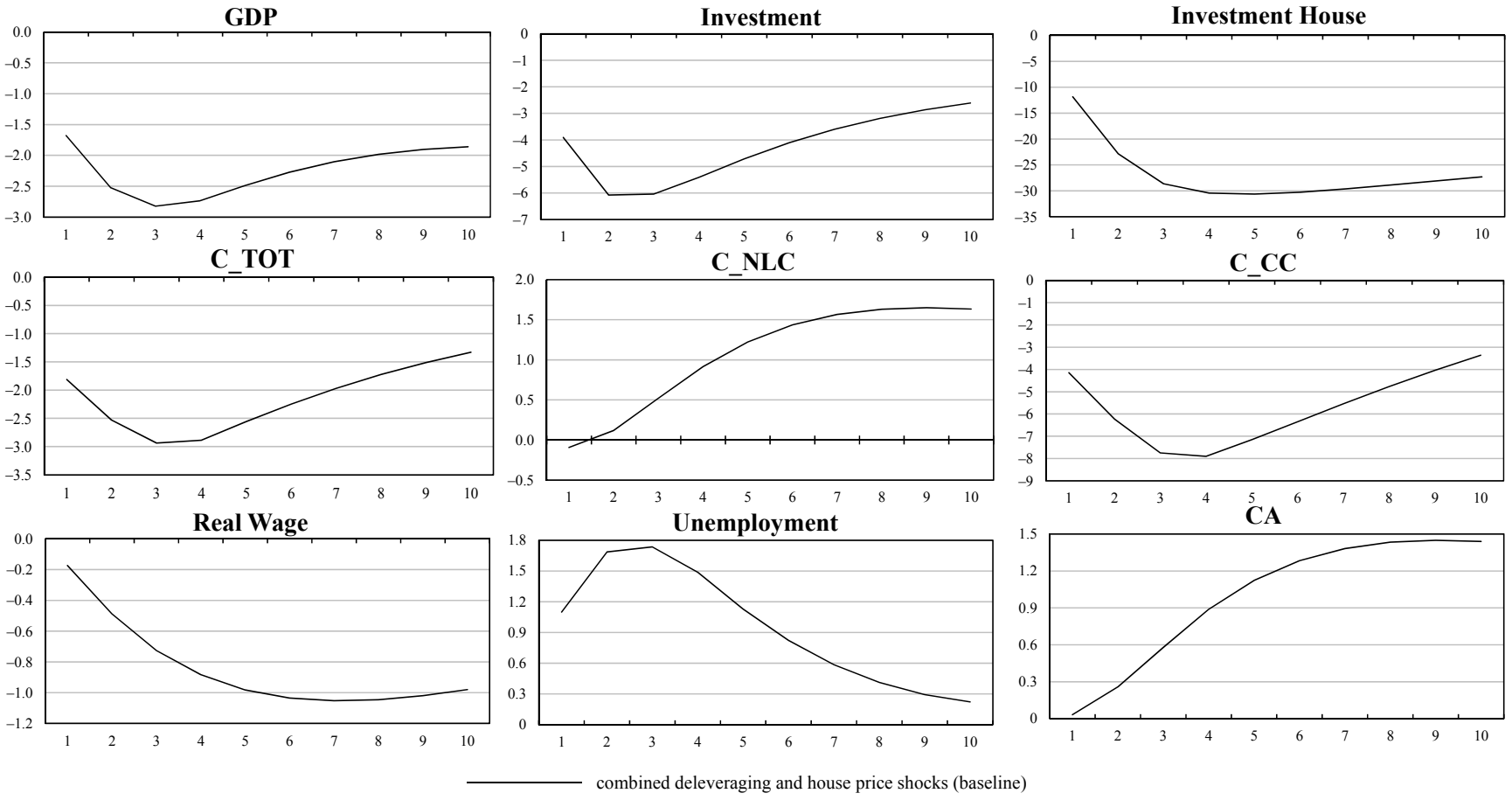


Figure 33 (continued)

Combined Deleveraging and House Price Shocks
(baseline)

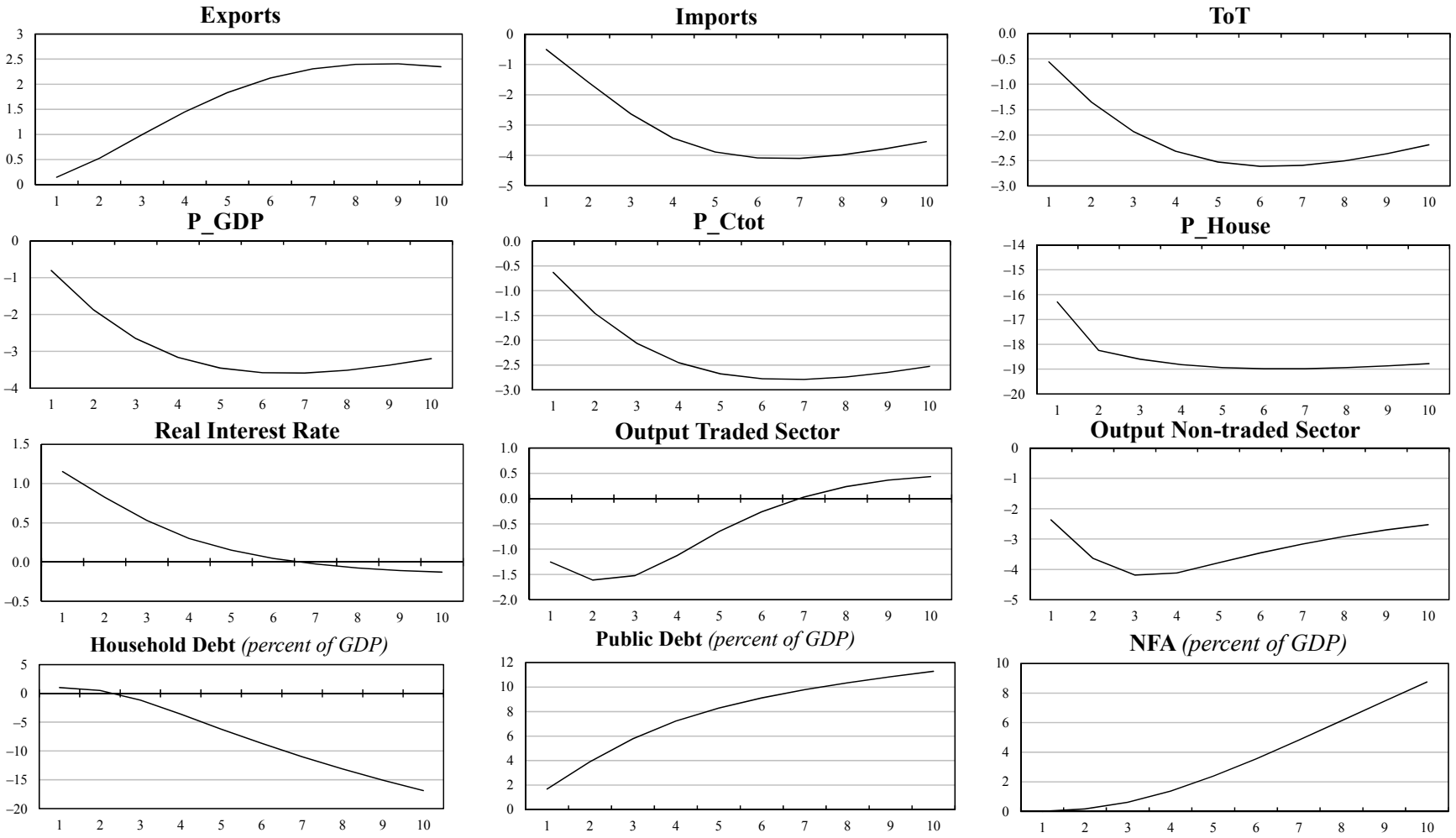


Figure 34

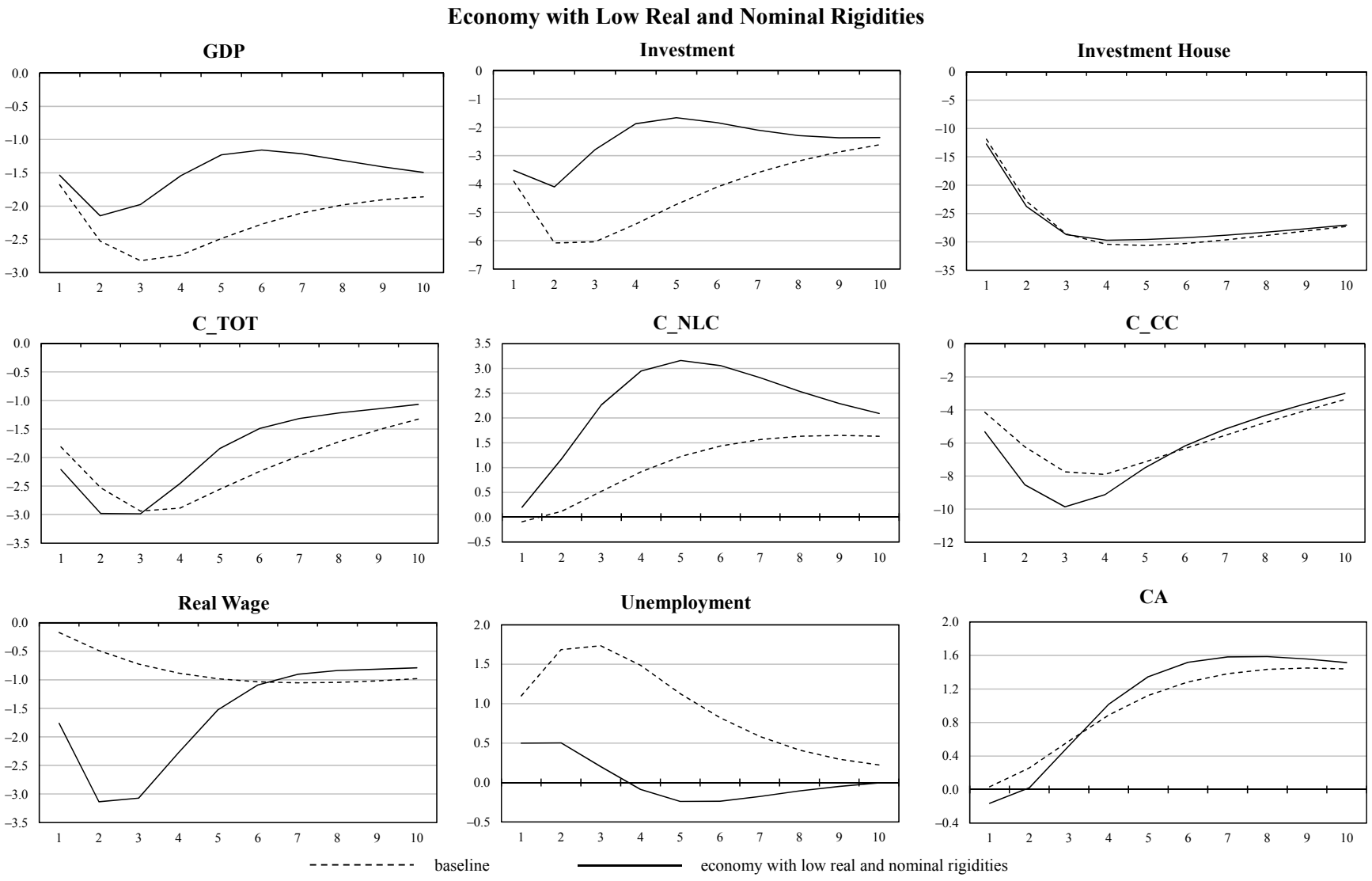

Economy with Low Real and Nominal Rigidities
GDP
Investment
Investment House
C_TOT
C_NLC
C_CC
Real Wage
Unemployment
CA
baseline
economy with low real and nominal rigidities

Figure 34 (continued)

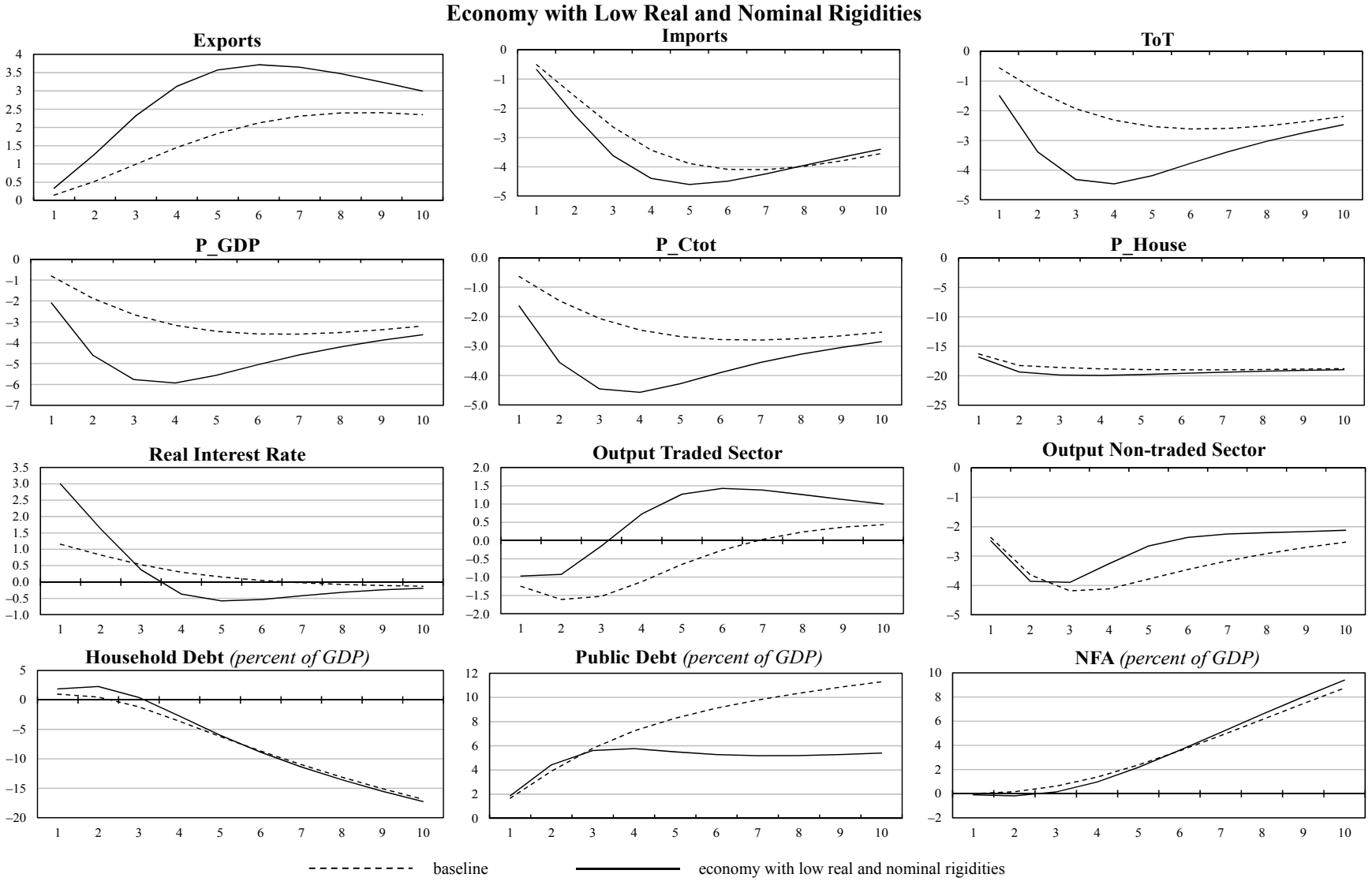


Figure 35

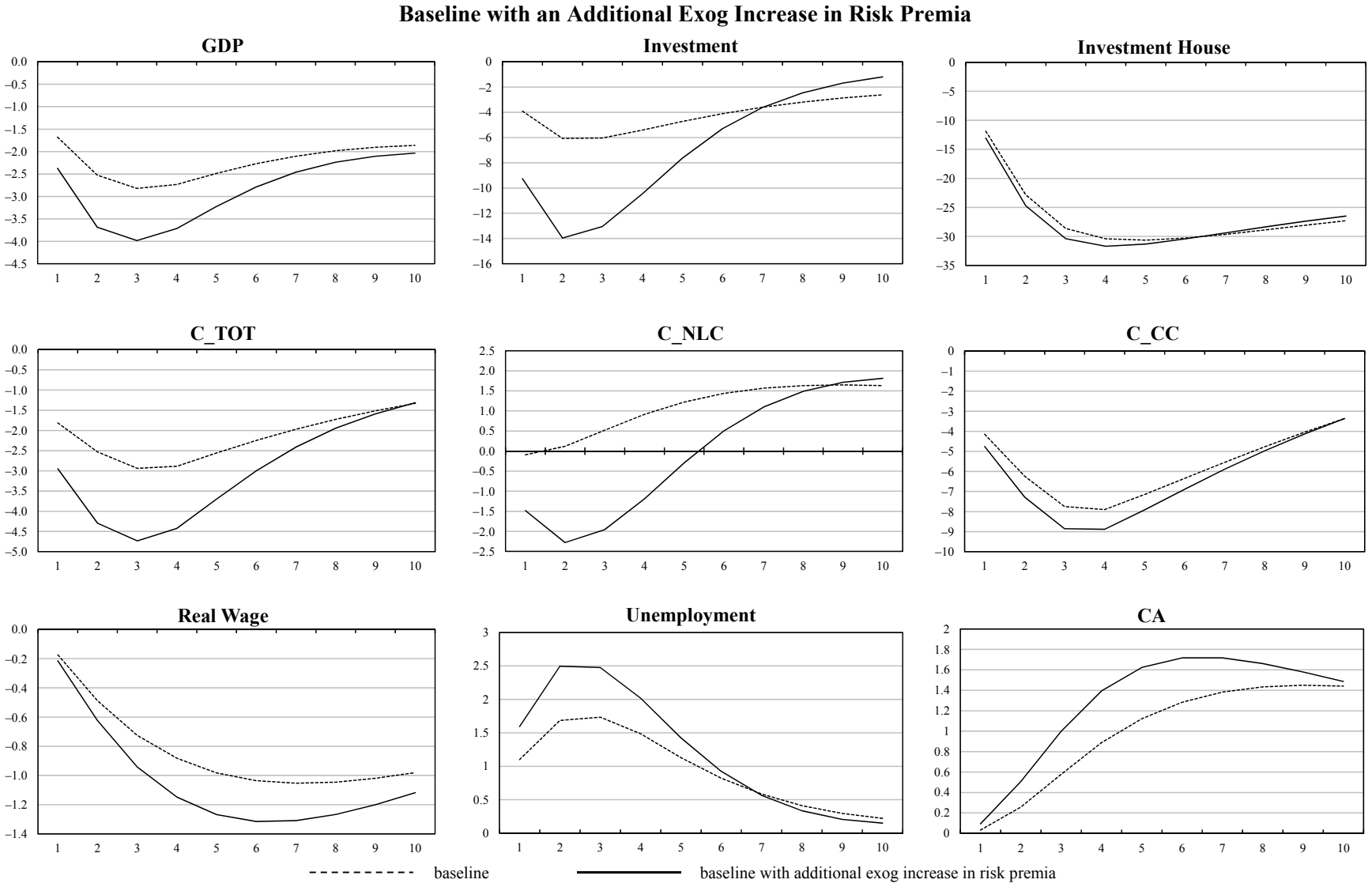

Baseline with an Additional Exog Increase in Risk Premia
GDP
Investment
Investment House
C_TOT
C_NLC
C_CC
Real Wage
Unemployment
CA
baseline
baseline with additional exog increase in risk premia

Figure 35 (continued)

Baseline with an Additional Exog Increase in Risk Premia

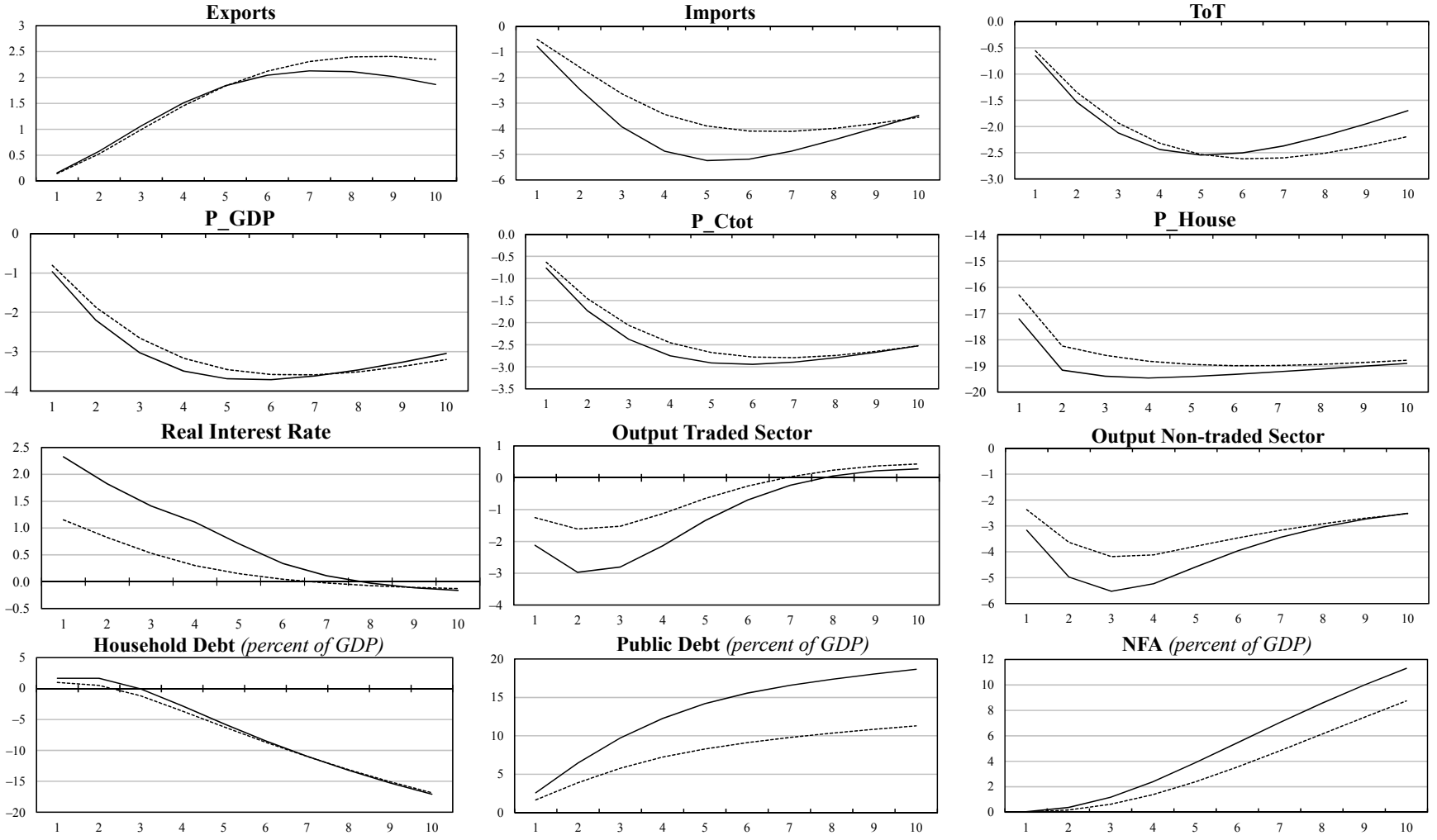


Figure 36

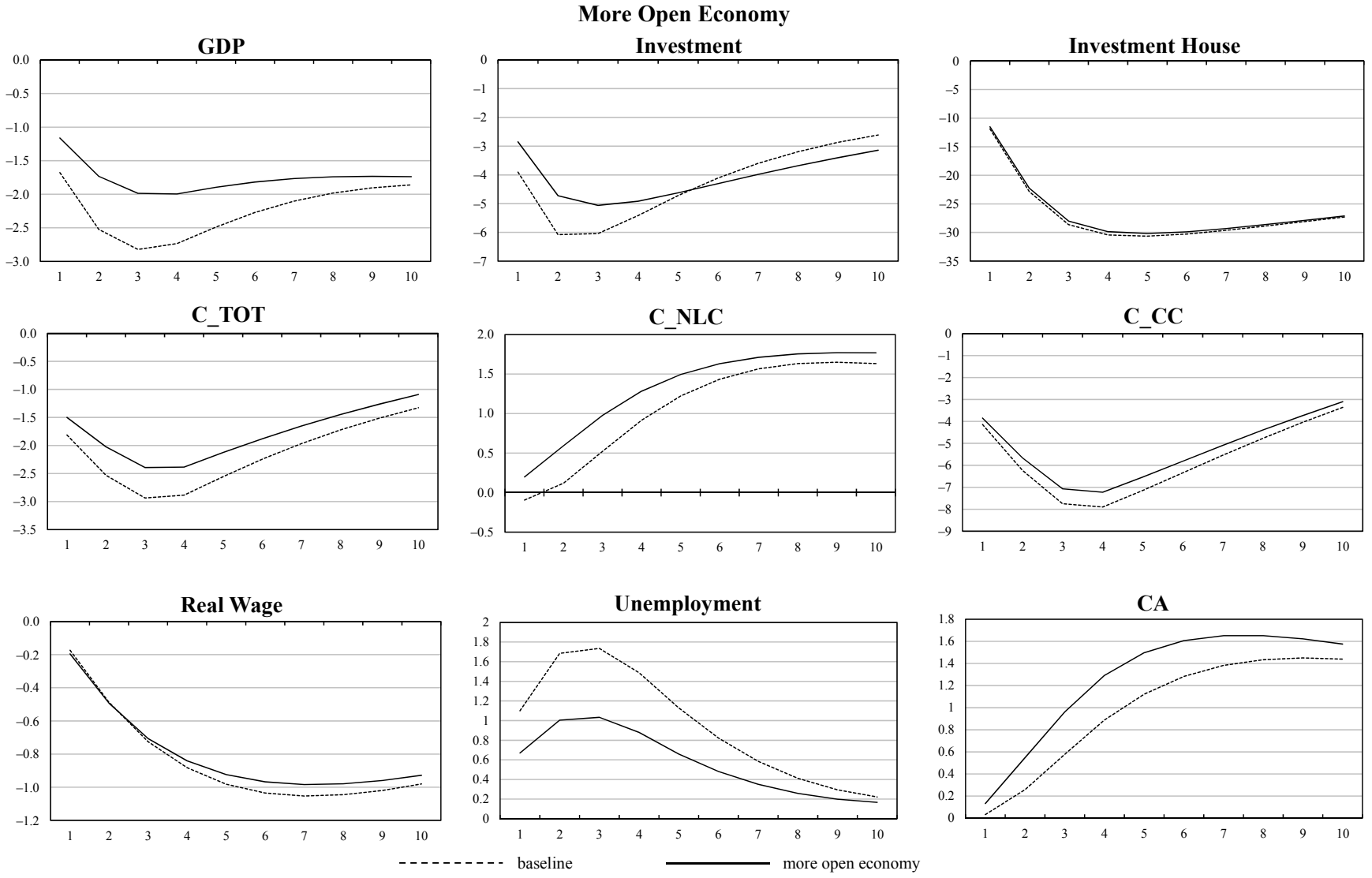

More Open Economy
GDP
Investment
Investment House
C_TOT
C_NLC
C_CC
Real Wage
Unemployment
CA
baseline
more open economy

Figure 36 (continued)

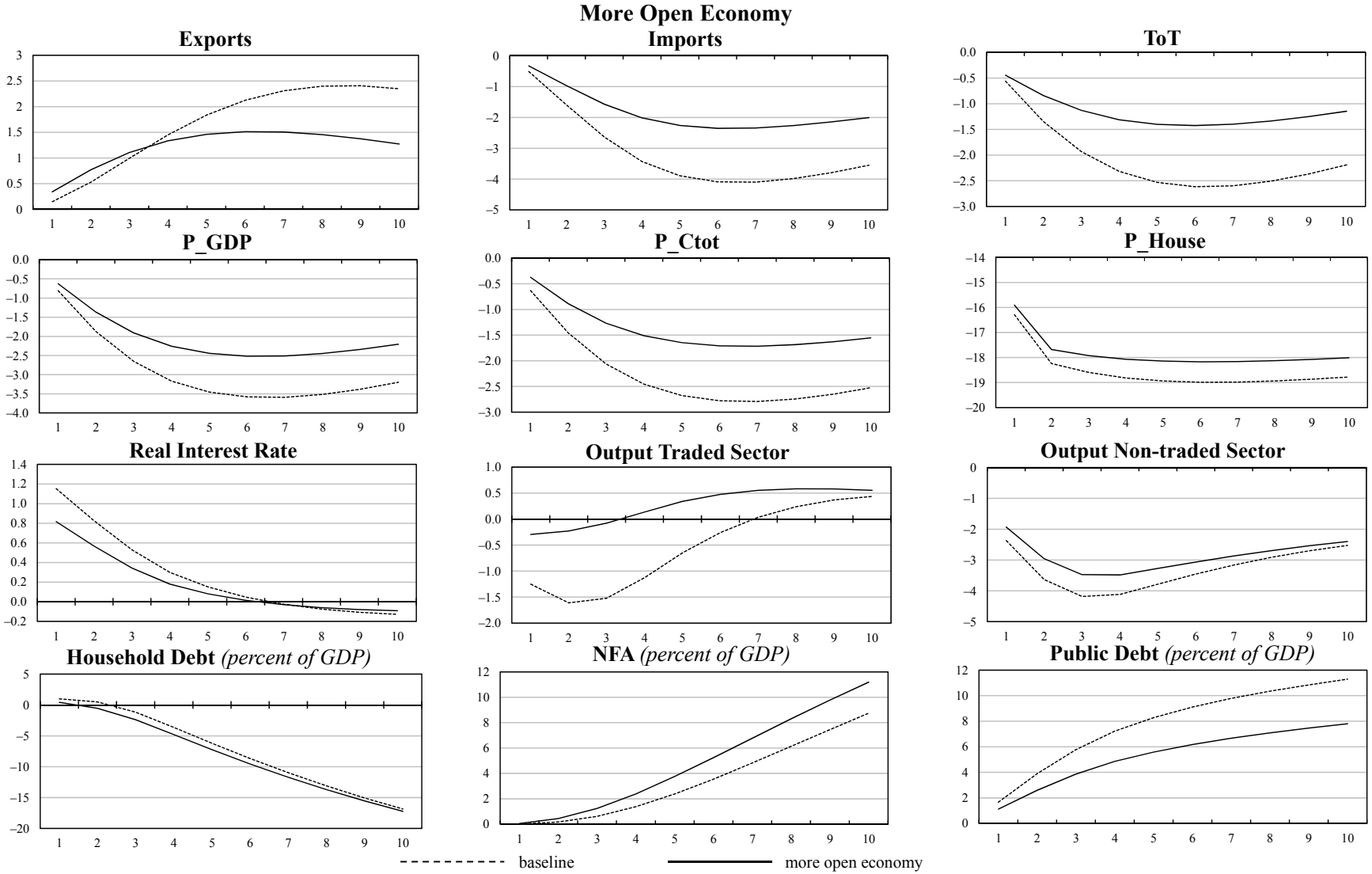


Figure 37

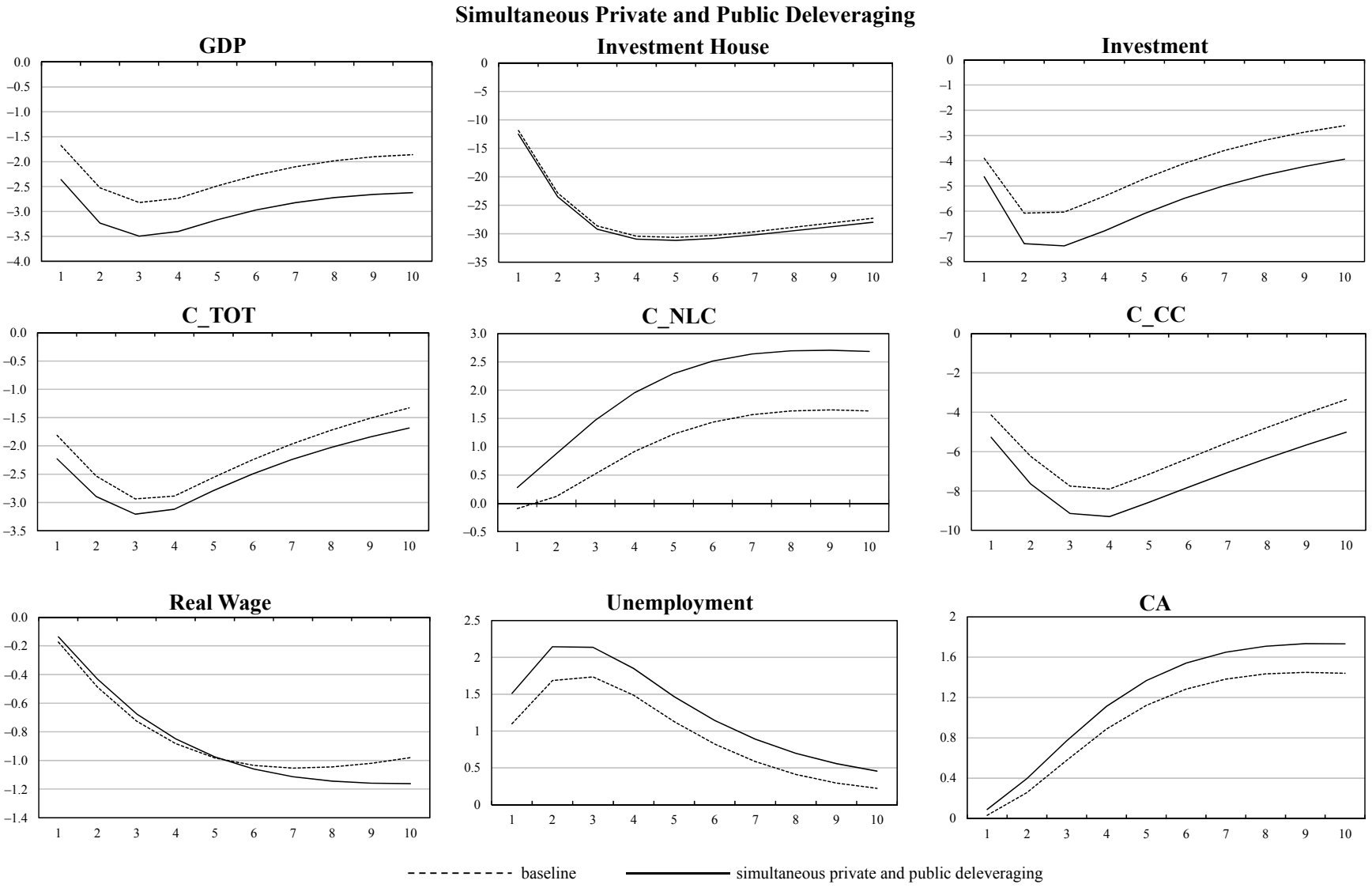

Simultaneous Private and Public Deleveraging
GDP
Investment House
Investment
C_TOT
C_NLC
C_CC
Real Wage
Unemployment
CA
baseline
simultaneous private and public deleveraging

Figure 37 (continued)

Simultaneous Private and Public Deleveraging

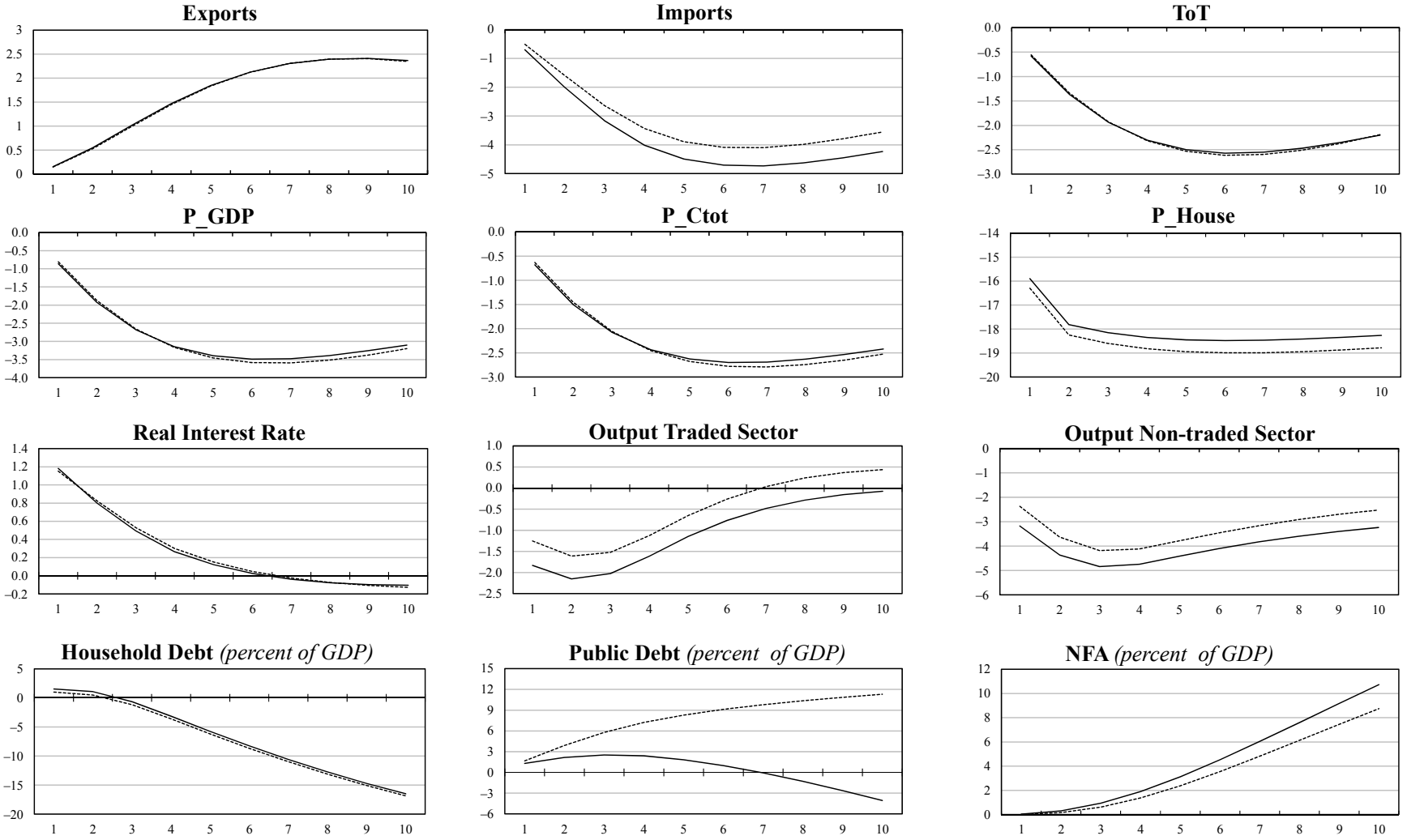


Figure 38

Simultaneous Deleveraging in Domestic Economy and the Rest of the Union, ZLB

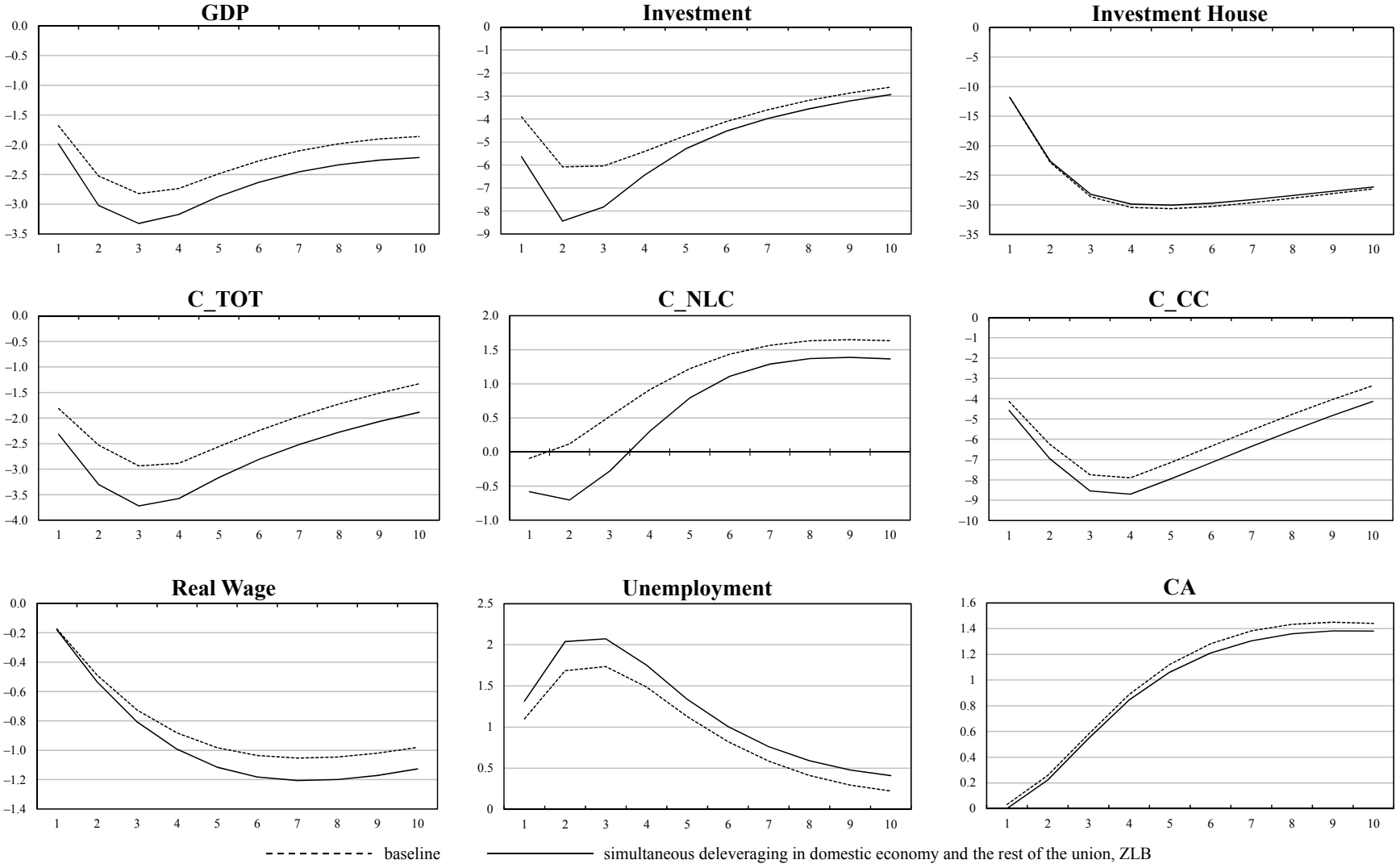
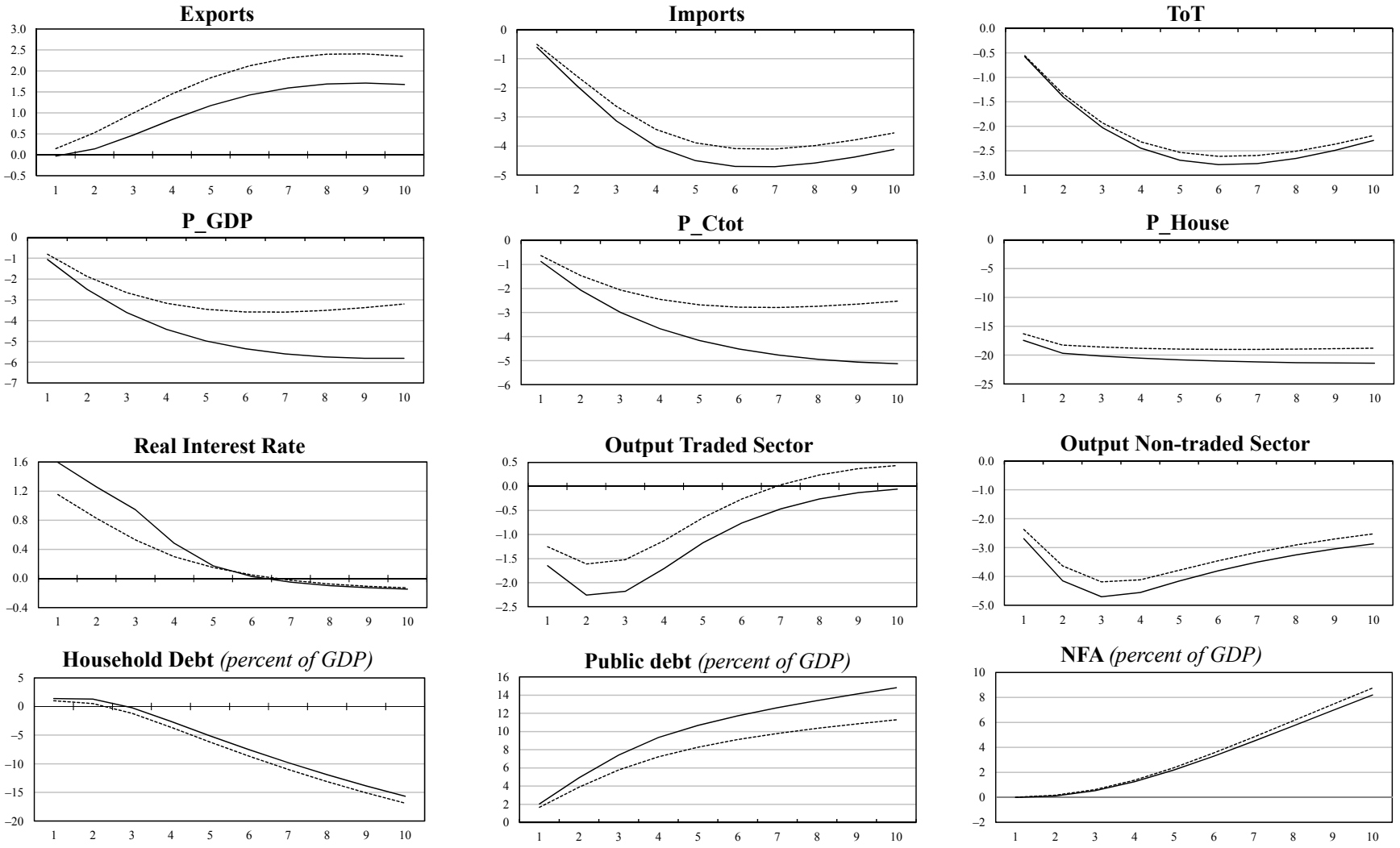


Figure 38 (continued)

Simultaneous Deleveraging in Domestic Economy and the Rest of the Union, ZLB



REFERENCES

Arcand, J., E. Berkes and U. Panizza (2012), "Too Much Finance?", IMF, Working Paper, No. 161.

Arrow, K., P. Dasgupta, L. Goulder, G. Daily, P. Ehrlich, G. Heal, S. Levin, K. Maler, S. Schneider, D. Starrett and B. Walker (2004), "Are We Consuming Too Much?", *Journal of Economic Perspectives*, Vol. 18, No. 3, pp. 147-72.

Bakk-Simon, K., S. Borgioli, C. Giron, H. Hempell, A. Maddaloni, F. Recine and S. Rosati (2012), "Shadow Banking in the Euro Area: an Overview", ECB, Occasional Paper, No. 133/2012.

Barclays (2012), "Bank Deleveraging in Europe, Not Done Yet", available at: www.barclays.com

Bê Duc, L., G. de Bondt, A. Calza, D. Marqués Ibáñez, A. van Rixtel and S. Scopel (2005), "Financing Conditions in the Euro Area", ECB, Occasional Paper, No. 37/2005.

Bernanke, B. and C. Lown (1991), "The Credit Crunch", Brookings Papers on Economic Activity, No. 2, pp. 205-47.

Bouis, R., B. Cournède and A.K. Christensen (2013), "Deleveraging: Challenges, Progress and Policies", OECD, Economics Department, Working Paper, forthcoming.

Cecchetti, S., M. Mohanty and F. Zampoli (2011), "The Real Effects of Debt", BIS, Working Paper, No. 352.

Crowe, C.W., G. Dell'Ariccia, D. Igan and P. Rabanal (2011), "How to Deal with Real Estate Booms: Lessons from Country Experiences", IMF, Working Paper, No. 11/91.

De Bondt, G., A. Maddaloni, J.L. Peydró and S. Scopel (2010), "The Euro Area Bank Lending Survey Matters: Empirical Evidence for Credit", ECB, Working Paper, No. 1160.

Easterly, W., R. Islam and J. Stiglitz (2000), "Shaken and Stirred: Explaining Growth Volatility", paper presented at the *Annual Bank Conference on Development Economics*, World Bank, Washington (D.C.).

Eggertsson, G.B. and P. Krugman (2012), "Debt, Deleveraging, and the Liquidity Trap: A Fisher-Minsky-Koo Approach", *The Quarterly Journal of Economics*, Vol. 127, No. 3, pp. 1469-513.

European Central Bank (2011), "Ensuring Fiscal Sustainability in the Euro Area", *Monthly Bulletin*, pp. 61-77, April.

Gambacorta, L. and D. Marques-Ibáñez (2012), "The Bank Lending Channel: Lessons from the Crisis", BIS, Working Paper, No. 345.

Gourinchas, P.O. and M. Obstfeld (2012), "Stories of the Twentieth Century for the Twenty-first", *American Economic Journal: Macroeconomics*, American Economic Association, Vol. 4, No. 1, pp. 226-65.

IMF (2012), "World Economic Outlook: Growth Resuming, Dangers Remain", World Economic and Financial Surveys, April.

Jordà, Ò., M. Schularick and A.M. Taylor (2010), "Financial Crises, Credit Booms, and External Imbalances: 140 Years of Lessons", NBER, Working Paper, No. 16567.

Nicoletti, G., S. Scarpetta and O. Boylaud (2000), "Summary Indicators of Product Market Regulation with an Extension to Employment Protection Legislation", OECD, Economics Department, Working Paper, No. 226.

OECD (2008), *Handbook on Constructing Composite Indicators: Methodology and User Guide*, OECD Publications.

Ostri, J.D., A.R. Ghosh, J.I. Kim and M.S. Qureshi (2010), "Fiscal Space", IMF, Staff Position Note, No. 10/11.

Praet, P. (2012), "Deleveraging and the Role of Central Banks", speech at the conference *The Effect of Tighter Regulatory Requirements on Bank Profitability and Risk-taking Incentives*, 26 October.

Ratto, M., W. Roeger and J. in 't Veld (2009) , "QUEST III: An Estimated Open-Economy DSGE Model of the Euro Area with Fiscal and Monetary Policy", *Economic Modelling*, No. 26, pp. 222-33.

Rinaldi, L. and A. Sanchis-Arellano (2006), "Household Debt Sustainability: What Explains Household Non-performing Loans? An Empirical Analysis", ECB, Working Paper, No. 570.

Roeger, W. and J. in 't Veld (2010), "Fiscal Stimulus and Exit Strategies in the EU: A Model-based Analysis", *European Economy*, Economic Paper, No. 426.

Roxburgh, C., S. Lund, T. Daruvala, J. Manyika, R. Dobbs, R. Forn and K. Croxson (2012), "Debt and Deleveraging: Uneven Progress on the Path to Growth", McKinsey Global Institute.

Ruscher, E. and G. Wolff (2012), "Corporate Balance Sheet Adjustment: Stylised Facts, Causes and Consequences", *European Economy*, Economic Paper, No. 449.

Stiglitz, J.E. and A. Weiss (1981), "Credit Rationing in Markets with Imperfect Information", *American Economic Review*, Vol. 71, No. 3, pp. 393-410.

Tang, G. and C. Upper (2010), "Debt Reduction After Crises", BIS, *Quarterly Review*, pp. 25-38, September.

Woo, D. (1999), "In Search of Capital Crunch: Supply Factors Behind the Credit Slowdown in Japan", IMF, Working Paper, No. 99/3.

Wyplosz, C. (2007), "Debt Sustainability Assessment: The IMF Approach and Alternatives", HEI, Working Paper, No. 03/2007.

FISCAL POLICY INTERACTIONS AND IMBALANCES IN A MONETARY UNION

Ida Hjortsø[*]

Are there important economic consequences from conducting fiscal policy at the national level within a monetary union? This paper investigates the consequences of strategic fiscal policy interactions in a two-country DSGE model of a monetary union with nominal rigidities and international financial frictions. I show that the fiscal policy makers in this framework face an incentive to set fiscal policy such as to switch the terms of trade in their favour. This incentive, the terms of trade externality, results in a Nash equilibrium where inflation differentials across countries and intra-union imbalances may be significantly larger than if the fiscal policy makers had cooperated. Indeed, the main results of the analysis is that strategic interactions between national fiscal policy makers can lead to excessive inflation differentials across countries as well as sub-optimally high current account imbalances within the monetary union. When this is the case, there are non-negligeable welfare losses associated with strategic national fiscal policy making in a monetary union.

1 Introduction

Are there important economic consequences from conducting fiscal policy at the national level within a monetary union? This question was first addressed in the 1960s in the framework of the theory of optimal currency areas, then regained interest with the construction of the Economic and Monetary Union (EMU) in the 1990s. Recently, the eurozone crisis has put the question into the spotlight once again. This paper aims at assessing the effects of strategic fiscal policy interactions between countries taking part in a monetary union. Specifically, I investigate the consequences for imbalances and price misalignments across countries.

The investigation is based on a two-country DSGE model of a monetary union in which there are international financial frictions. Furthermore, firms are monopolistically competitive and set prices sluggishly. These features imply inefficiencies in the face of country-specific shocks, and ensure a potential stabilization role for fiscal policies. The inefficiencies arising in this monetary union framework can be illustrated by imbalances, price misalignments, and output misallocations. I show that the importance of these inefficiencies depend on the strategic interaction of fiscal policy makers.

The analysis carried out in this paper contributes to the strand of the New Open Economy Macroeconomic literature dealing with the consequences of strategic interactions between policy makers.This literature first focused on monetary policy interactions; Obstfeld and Rogoff (2002) as well as Corsetti and Pesenti (2001) are part of that earlier literature. Corsetti and Pesenti (2001) show that national policy makers face an incentive to attempt to manipulate the terms of trade in their favor – they face a terms of trade externality. This terms of trade externality implies that inward-looking monetary policies are welfare-deteriorating, due to increased inflation volatility – unless the benchmark case of no spillovers across countries figuring in Obstfeld and Rogoff (2002) is considered.

---

[*] Bank of England and European University Institute.

I would like to thank Giancarlo Corsetti, Evi Pappa, Gianluca Benigno, and Henrik Jensen as well as seminar participants at the European University Institute and at the Bank of England for helpful comments.

The views expressed herein are those of the author and not those of the Bank of England. All errors are my responsibility only.

The strategic interaction of fiscal policy makers in open economies has been considered inter alia by Lombardo and Sutherland (2004), as well as by Benigno and Paoli (2010). My analysis departs from theirs in that I consider a monetary union with international financial frictions which affect misalignments and imbalances across countries and shape the fiscal policies. Indeed, the presence of internationally incomplete markets imply deviations from perfect risk sharing which affect not only the transmission of shocks, but also the optimal behavior of fiscal policy makers. The incentive to engage in strategic fiscal policy making and the consequences thus also depend on international financial markets.

The inclusion of international financial frictions is motivated by the empirical evidence on relatively low risk sharing across countries, also within the EMU, indicating that there are international financial frictions which prevent international risk sharing from taking place, see, e.g., Demyanyk, Ostergaard, and Sorensen (2008). Though the presence of international financial frictions and the resulting deviations from perfect risk sharing might have important consequences for welfare, optimal policy making and the transmission of shocks across countries, they have not been introduced into the literature on fiscal policy making in open economies.[1] I contribute to the literature by pointing out the potential importance of market incompleteness in a monetary union with independent fiscal policy makers.

I analyse strategic fiscal policy interactions in a two-country DSGE model of a monetary union with nominal rigidities and international financial frictions. I show that the fiscal policy makers in this framework face an incentive to switch the terms of trade in their favor. This incentive, the terms of trade externality, results in a Nash equilibrium where inflation differentials across countries and intra-union imbalances may be significantly larger than if the fiscal policy makers had cooperated. Indeed, the main results of the analysis is that strategic interactions between national fiscal policy makers can lead to excessive inflation differentials across countries as well as sub-optimally high current account imbalances within the monetary union. When this is the case, there are non-negligeable welfare losses associated with conducting national fiscal policies strategically.

These results seem important in the context of the current eurozone crisis. Indeed, they indicate that part of the excessive inflation differentials and current account imbalances observed between the core and the periphery of the zone could potentially be explained by the strategic conduct of fiscal policies. In the light of this analysis, it might be beneficial to reconsider the potential gains from fiscal policy cooperation within the EMU, since fiscal cooperation might lower imbalances arising in the face of country-specific shocks. Especially, if these imbalances have negative effects not considered here, e.g., through their effects on risk in the banking sector, fiscal cooperation could imply even larger benefits than those found here.

The next section presents the framework used for the investigation of strategic interactions between fiscal policy makers in a monetary union. The subsequent section derives analytical characterizations of optimal fiscal policy making under cooperation and non-cooperation. In Section 4 figures a numerical analysis emphasizing the effects of fiscal policy interactions on price misalignments, international imbalances, and welfare. Section 5 then concludes the paper.

---

[1] In the monetary policy literature, inter alia, Corsetti, Dedola and Leduc (2010) have emphasized the importance of international financial markets for optimal policy making.

2 Model

2.1 Households

The world is composed of two countries, denoted H (Home) and F (Foreign). There are respectively n and $1-n$ households in each of these countries. In the following, I will focus on the agents in the Home country.[2]

Households get utility from private consumption and government expenditures (respectively c and G), but disutility from work (l), and therefore a household's utility is given by:

$$v = \mathrm{E}_0 \sum_{t=0}^{\infty} \beta^t \left[U^C(c_t) + U^G(G_t) - U^L(l_t) \right] \tag{1}$$

where E_t denotes the expectations at time t, and β is the discount factor. The functional forms are as follows:

$$U^C(c_t) = \frac{c_t^{1-\sigma} - 1}{1-\sigma}$$
$$U^G(G_t) = \chi \frac{G_t^{1-\sigma} - 1}{1-\sigma}$$
$$U^L(l_t) = \frac{l_t^{1+\eta}}{1+\eta}$$

where $\sigma > 0$ is the inverse of the intertemporal elasticity of substitution and the relative risk aversion coefficient, $\eta > 0$ is the inverse of the Frisch labor-supply elasticity, and χ is the weight given to public consumption relative to private consumption.

The differentiated goods produced by firms h and f in country H and F respectively, $c_t(h)$ and $c_t(f)$, are assembled by a Dixit-Stiglitz aggregator into the composite goods denoted respectively $C_{H,t}$ and $C_{F,t}$:

$$C_{H,t} = \left[\int_0^n c_t(h)^{\frac{\theta-1}{\theta}} dh \right]^{\frac{\theta}{\theta-1}}, \qquad C_{F,t} = \left[\int_n^1 c_t(f)^{\frac{\theta-1}{\theta}} df \right]^{\frac{\theta}{\theta-1}}$$

such that θ denotes the elasticity of substitution between the differentiated goods produced within a country.

Consumption is a CES index of consumption of the goods produced at Home and the goods produced in the Foreign country

$$C_t = \left[a_H^{\frac{1}{\phi}} C_{H,t}^{\frac{\phi-1}{\phi}} + (1-a_H)^{\frac{1}{\phi}} C_{F,t}^{\frac{\phi-1}{\phi}} \right]^{\frac{\phi}{\phi-1}}, \qquad 0 < a_H < 1, \quad \phi > 0, \tag{2}$$

where the constant elasticity of substitution between the home and foreign goods, also called the trade elasticity, is denoted ϕ. The trade elasticity is an important determinant of the transmission of shocks and policies across countries. It therefore plays a crucial role in determining optimal fiscal policy. I will assume, in the benchmark case, that the internationally traded goods are complements in utility, meaning that the marginal utility of consumption of the Foreign good is positively related to the marginal utility of consumption of the Home good.[3] a_H is the weight given to consumption of

---

[2] Analogous relations hold for the agents in the Foreign country, unless otherwise specified.

[3] See discussion in Section 4.1.

the Home goods, whereas $1 - a_H$ is the weight attached to consumption of the Foreign goods. If $a_H > n$, then a home bias in consumption is present. The presence of home bias results in deviations from purchasing power parity, even when the law of one price holds.

Given that households choose their relative consumption demand such as to maximize utility for given expenditures, the domestic demand for respectively Home and Foreign goods are:

$$C_{H,t} = a_H \left(\frac{P_{H,t}}{P_t} \right)^{-\phi} C_t, \tag{3}$$

$$C_{F,t} = (1 - a_H) \left(\frac{P_{F,t}}{P_t} \right)^{-\phi} C_t. \tag{4}$$

where P_H and P_F respectively denote the price of the domestically produced generic good C_H and the foreign good C_F, whereas P and P^* denote the respective prices of the domestic and foreign consumption baskets C and C^*. The consumption-based price indices are defined analogously to the consumption bundles:

$$P_t = \left[a_H P_{H,t}^{1-\phi} + (1 - a_H) P_{F,t}^{1-\phi} \right]^{\frac{1}{1-\phi}}, \tag{5}$$

$$P_t^* = \left[(1 - a_H) P_{H,t}^{*\,1-\phi} + a_H P_{F,t}^{*\,1-\phi} \right]^{\frac{1}{1-\phi}}. \tag{6}$$

where:

$$P_{H,t} = \left[\int_0^n p_t(h)^{1-\theta} dh \right]^{\frac{1}{1-\theta}}, \qquad P_{F,t} = \left[\int_n^1 p_t(f)^{1-\theta} df \right]^{\frac{1}{1-\theta}}$$

The terms of trade are defined as the ratio between the price of imports and exports: $TOT_t \equiv \frac{P_{F,t}}{P_{H,t}^*}$, whereas the real exchange rate is defined as the price of the Foreign consumption bundlein terms of the Home consumption good:

$$Q_t \equiv \frac{P_t^*}{P_t} \tag{7}$$

Households face complete financial markets at the domestic level, and firms' profits are equally distributed among domestic households (because they all hold an equal share of each domestic firm) such that a representative household exists within each country. However, households are subject to frictions at the international level: only nominal one-period bonds with debt-elastic yields are traded across countries. The yields of the bonds are higher the higher is a country's external debt relative to the steady state level, as in Schmitt-Grohe and Uribe (2003). Apart from implying stationarity of the steady state, modelling financial frictions through a debt-elastic yield on bonds allows for yield differences across countries which mimic those recently observed across countries in the EMU.

In order to model the debt-dependent interest rates, I assume that bonds can only be traded internationally through intermediaries. These intermediaries demand a higher yield on bonds which are issued by countries with high external debt levels, for example because of an underlying risk of

default that is increasing in debt.[4] For technical simplicity, the additional rent thus extracted by the intermediaries when lending to indebted countries (*i.e.*, countries with a current account deficit) is assumed to be distributed to households within the current account surplus country as lump-sum transfers.[5]

To illustrate the mechanism of the debt-elastic yield, consider the situation in which Home real bond holdings, denoted $\frac{B_{H,t}}{P_t}$, are above their steady state level, *i.e.*: $\frac{B_{H,t}}{P_t} > \frac{\bar{B}_H}{P}$ that is, the Foreign country has issued (excessive) debt: $\frac{B_{F,t}}{P_t^*} > \frac{\bar{B}_F}{P^*}$. In that case, the Foreign yield is multiplied by a function $\Phi(B_{F,t}/P_t^*) > 1$ (the premium), and the domestic interest rate is decreased, since it is multiplied by $\Phi(B_{H,t}/P_t^*) < 1$. The function Φ is assumed to depend positively on the deviation of debt from its steady state level ($\Phi'(.) < 0$), and satisfies $\Phi\left(\frac{\bar{B}_F}{P^*}\right) = \Phi\left(\frac{\bar{B}_H}{P}\right) = 1$. Hence, a yield spread across the countries arise, and it is increasing in the difference between the countries' external debt levels, or current accounts. The yield premium associated with holding bonds is assumed to be linear in the excessive borrowing/lending (in deviations from the steady state value). An example of a function satisfying the requirements above is $\Phi(b_t) = 1 - \delta(b_t - \frac{\bar{B}}{P})$, with $\delta \geq 0$ and $\frac{\bar{B}_F}{P^*} \equiv \frac{\bar{B}_H}{P} \equiv \frac{\bar{B}}{P}$.

Labor is immobile between countries but perfectly mobile within countries such that wages are identical across households within a country. It follows that labor supply and consumption decisions are identical for all households within each country. Every period, the representative household uses its labor income, its wealth accumulated in bonds, profits of firms in the domestic economy, and the lump-sum transfers resulting from intermediation activities, to purchase consumption and bonds and pay lump-sum taxes. I assume that individual households do not internalize the effect of changes in their own bond holdings on the yield, *i.e.*, they take the function $\Phi'(.)$ as given.

In the Home country, the household budget constraint thus amounts to:

$$c_t + \frac{b_t}{P_t(1+i_t)\Phi(B_{H,t}/P_t)} + T_t = \frac{w_t}{P_t} l_t + \frac{b_{t-1}}{P_t} + [\frac{1}{\Phi(B_{F,t}/P_t^*)} - 1]\frac{B_{F,t}}{(1+i_t)P_t} + pr_t \tag{8}$$

where c_t is consumption of the household considered such that $C_t \equiv \int_0^n c_t dh$, P_t is the CPI, i_t is the nominal interest set by the common central bank in period t, w_t is the wage rate, and l_t is the hours worked by the household, pr_t denote the profits, T_t denotes lump-sum taxes paid by the household, and b_t is the nominal bond holdings of a Home household such that $B_{H,t} \equiv \int_0^n b_t dh$, and similarly $B_{F,t} \equiv \int_n^1 b_t^* df$. The first-order conditions of the representative domestic household can be aggredated to yield:

$$\beta E_t[\frac{C_{t+1}^{-\sigma}}{C_t^{-\sigma}} \frac{1+i_t}{\pi_{t+1}}] = \frac{1}{\Phi(B_{H,t}/P_t)} \tag{9}$$

$$\frac{L_t^{\eta}}{{C_t}^{-\sigma}} = \frac{W_t}{P_t} \tag{10}$$

The first equation is the Euler equation, determining the intertemporal allocation of consumption. The second equation is the labor supply equation stating that in equilibrium, the

---

4 This risk is not modelled explicitly, and in equilibrium default never occurs.

5 This assumption could easily be replaced by the assumption of equal distribution of the rent across the whole union. The qualitative results would be unchanged by this alternative assumption.

marginal utility of consumption obtained from an extra hour of work must equal the marginal disutility of working that extra hour.

2.2 *Firms*

Firms are monopolistically competitive and set prices in a staggered fashion *à la* Calvo-Yun. That is, they reset their price at a time-independent random frequency. More specifically, each firm faces the probability $1-\alpha$ of getting the possibility to reset their price every period.

Firms are owned by domestic households, and all firms within a country are identical in that their technology is such that output is linear in labor, and depends on a country-specific productivity shock denoted *A*: $y_t(h) = A_t l_t(h)$, where *h* refers to a country H firm.

The optimisation problem of the firm producing good h and getting the opportunity to reset its price at time *t* consists in choosing a price $p_t(h)$ such as to maximize expected discounted future profits:

$$\max_{p_t(h)} E_t \sum_{s=0}^{\infty} \alpha^s \mu_{t,t+s}[((1-\tau)p_t(h) - \frac{W_{t+s}}{A_{t+s}})y_{t,t+s}(h)]$$

subject to demand:

$$y_{t,t+s}(h) = (\frac{p_t(h)}{P_{H,t+s}})^{-\theta}(C_{H,t+s} + G_{t+s}) + (\frac{p_t(h)}{P_{H,t+s}})^{-\theta} C^*_{H,t+s}$$

where $\mu_{t,t+s}$ is the stochastic discount factor of the firm, and τ is a tax on production. Given that the firms are owned by the households their discount factor is identical to the discount factor of the representative household: $\mu_{t,t+s} = \beta^s \frac{U_{C,t+s}}{P_{t+s}} \frac{P_t}{U_{C,t}}$.

The resulting first order conditions imply that prices are set according to expectations of future marginal costs and demand in the following way:

$$p_t(h) = \frac{\theta}{(\theta-1)(1-\tau)} \frac{\sum_{s=0}^{\infty}(\alpha\beta)^s \frac{C_{t+s}^{-\sigma}}{P_{t+s}} \frac{W_{t+s}}{A_{t+s}} y_{t,t+s}(h)}{\sum_{s=0}^{\infty}(\alpha\beta)^s \frac{C_{t+s}^{-\sigma}}{P_{t+s}} y_{t,t+s}(h)} \tag{11}$$

Because all firms that get to reset their price in a given period face the same expectations of marginal costs and demand, they all set the same price. Hence the following condition holds:

$$P_{H,t} = [\alpha P_{H,t-1}^{1-\theta} + (1-\alpha)p_t(h)^{1-\theta}]^{\frac{1}{1-\theta}} \Leftrightarrow (\frac{p_t(h)}{P_{H,t}})^{1-\theta} = \frac{1-\alpha\pi_{H,t}^{\theta-1}}{1-\alpha} \tag{12}$$

where $\pi_{H,t} \equiv \frac{P_{H,t}}{P_{H,t-1}}$.

Aggregating oputput across firms yields $Disp_t Y_{H,t} = A_t L_t$ where $Disp_t \equiv \int_0^n (\frac{p_t(h)}{P_{H,t}})^{-\theta} dh$ is a measure of the degree of price dispersion. This term is always larger or equal to unity.[6] The

---

[6] Proof: Let $v_t(h) = (\frac{P_{t,h}}{P_{H,t}})^{1-\theta}$, such that $Disp_t = \int_0^n (\frac{P_{t,h}}{P_{H,t}})^{-\theta} dh = \int_0^n v_t(h)^{\frac{\theta}{\theta-1}} dh$.

(continues)

evolution of price dispersion is dependent on inflation in the following way:

$$Disp_t = (1-\alpha)[\frac{1-\alpha\pi_{H,t}^{\theta-1}}{1-\alpha}]^{\frac{-\theta}{(1-\theta)}} + \alpha\pi_{H,t}^{\theta} Disp_{t-1} \tag{13}$$

The price setting process of firms thus introduces a distortion in that price dispersion among firms with identical technologies result.

Note that if firms operate in an environment with perfectly flexible prices, the representative domestic firm sets its price to equal a constant markup over marginal costs illustrated by the real wage rate adjusted for productivity:

$$\frac{P_{H,t}}{P_t} = \frac{\theta}{(\theta-1)(1-\tau)} \frac{1}{A_t} \frac{W_t}{P_t}$$

2.3 Monetary and fiscal policies

In this paper, I study the interaction of constrained optimal fiscal policy in a monetary union. Within each country, a policy maker sets a path for the fiscal policy instrument, government expenditure, such as to maximize the welfare of its own households, given the private sector's first order conditions, the government budget constraint as well as given the other country's policy.

2.3.1 Fiscal policy

Fiscal policy is defined as the path of government expenditures. These are assumed to be financed by lump-sum taxation and (non state-contingent) bond issuance.[7] That is, I focus on the effects of government spending rather than on its financing in the present paper.[8]

Government demand is entirely directed towards domestically produced goods[9] which are assembled by the government into a composite public good denoted *G*:

$$G_t = \left[\int_0^n y_t(h)^{\frac{\theta-1}{\theta}} dh\right]^{\frac{\theta}{\theta-1}}$$

The fiscal authorities impose a subsidy on production which eliminates monopolistic distortions in the steady state: $\tau = \frac{1}{1-\theta}$. Hence, under appropriately chosen government expenditure levels and zero inflation, the steady state will be efficient. Note that the subsidy is fixed: though it does constitute an expenditure for the government, it does not constitute a policy instrument that can be changed in the face of shocks.

Recall that $P_{H,t} = [\int_0^n p_t(h)^{1-\theta}]^{\frac{1}{1-\theta}} dh$. It follows that $\int_0^n (\frac{p_t(h)}{P_{H,y}})^{1-\theta} dh = 1 \Leftrightarrow [\int_0^n (\frac{p_t(h)}{P_{H,t}})^{1-\theta} dh]^{\frac{\theta}{\theta-1}} = 1$, or, equivalently that $[\int_0^n v_t(h) dh]^{\frac{\theta}{\theta-1}} = 1$. Noting that $f(v(h)) = v(h)^{\frac{\theta}{\theta-1}}$ is a convex function we can apply Jensen's inequality, and thereby conclude that $Disp_t = \int_0^n v_t(h)^{\frac{\theta}{\theta-1}} dh \geq [\int_0^n v_t(h) dh]^{\frac{\theta}{\theta-1}} = 1$.

7 I abstract from any implications of fiscal policy that relates to distortionary taxation issues. This is reasonable if the path of government expenditures can be considered as independent of the financing of it.

8 See, e.g., Ferrero (2009) for the role played by distortionary taxation and government debt.

9 This assumption is not crucial per se. The important feature is that the degree of home bias in government spending is larger than the degree of home bias in private consumption.

Imposing that in equilibrium, the bonds market must clear meaning that $nB_{H,t} + (1-n)B_{F,t} = 0 \; \forall t$, and using that $\int_0^n p_t(h)\, y_t(h) dh = P_{H,t} Y_{H,t}$ renders the government budget constraint:

$$\tau Y_{H,t} + T_t = G_t \tag{14}$$

A similar budget constraint holds for the Foreign government:

$$\tau^* Y_{F,t} + T_t^* = G_t^* \tag{15}$$

I restrict fiscal policy to follow certain functional rules, which will be specified later. Moreover, I consider two different set-ups for fiscal policy making: one in which the fiscal policy makers cooperate in that they set government spending such as to maximize union-wide welfare; and another in which each fiscal authority decides on its own government spending level, taking monetary policy and the other country's fiscal policy as given. The latter results in a Nash equilibrium.[10]

2.3.2 Monetary policy

Within the monetary union, the nominal exchange rate is normalized to unity and does therefore not constitute a policy instrument. The monetary policy instrument is the union-wide nominal interest rate paid on one-period bonds to the intermediaries, denoted i.[11]

I abstract from monetary frictions and can thus consider a "cashless economy" as in Woodford (2003). Hence, whereas monetary policy is neutral under flexible prices within the described framework, it affects the real economy in the presence of nominal rigidities, and through its effect on the debt burden of countries.

The common monetary policy instrument, the nominal interest rate, is set according to a simple Taylor-type rule. Indeed, I assume that the nominal interest rate i is set according to the rule

$$\log i_t = \phi_\pi [n \log \pi_{H,t} + (1-n) \log \pi_{F,t}] \tag{16}$$

where π_H and π_F denote respectively Home and Foreign producer price inflation, and n and $1-n$ are the respective sizes of the countries. $\phi\pi$ is a policy parameter determining the interest sensitivity to union-wide inflation. Since monetary policy cannot accommodate country-specific shocks, the precise form of the Taylor rule is not crucial for the results. Among other things, it would not change the results much if I would allow the Taylor rule to incorporate a response to output as well.

2.4 Market clearing and aggregation

Given the mentioned private and public demand, aggregate demand facing domestic producers amounts to:

---

[10] The computation of the Nash policies is explained in Section 4.

[11] As explained in Woodford (2003) (p. 239, footnote 4), "In a cashless economy the central bank achieves its operating target for i_t by adjusting the interest rate i_t^m paid on the monetary base; an arbitrage relation then requires that $i_t = i_t^m$ in any equilibrium, given a positive supply of base money at all times. Here I simplify by supposing that the central bank can directly control the short-term market rate i_t...".

$$Y_{H,t} = a_H \left(\frac{P_{H,t}}{P_t}\right)^{-\phi} C_t + \frac{1-n}{n} a_H^* \left(\frac{P_{H,t}^*}{P_t^*}\right)^{-\phi} C_t^* + G_t \tag{17}$$

and aggregate demand for the foreign good amounts to:

$$Y_{F,t} = \frac{n}{1-n}(1-a_H)\left(\frac{P_{F,t}}{P_t}\right)^{-\phi} C_t + a_H \left(\frac{P_{F,t}^*}{P_t^*}\right)^{-\phi} C_t^* + G_t \tag{18}$$

Output is demand-determined in equilibrium, and, hence, the above equation can also be viewed as a goods market clearing condition.

Equilibrium on the financial markets requires that bonds and assets are in zero net supply:

$$nB_{H,t} + (1-n)B_{F,t} = 0 \tag{19}$$

Because there is not complete trade in assets across countries, consumption risk is not fully shared across countries. It is thus necessary to keep track of the evolution of the current account under incomplete markets. By combining the household's budget constraint and the government's budget constraint we obtain an aggregate resource constraint, characterizing the evolution of the current account. The Home aggregate resource constraint is:

$$C_t + \frac{B_{H,t}}{P_t(1+i_t)\Phi(B_{H,t}/P_t)} = \frac{P_{H,t}}{P_t}(Y_{H,t} - G_t) + \frac{1}{\pi_t}\frac{B_{H,t-1}}{P_{t-1}} + [\frac{1}{\Phi(B_{F,t}/P_t^*)} - 1]\frac{B_{F,t}}{P_t^*(1+i_t)}Q_t \tag{20}$$

The model might exhibit inefficiencies in the face of country-specific shocks because of distortions arising due to monopolistic competition, staggered price setting, and internationally incomplete markets. When these inefficiencies arise, policy makers face an incentive to reduce them by using the instruments available. Doing so, policy makers might face a trade-off between reducing the different inefficiencies.

As explained previously, an increase in government spending shifts demand towards the domestically produced goods. Through such a shift in demand government spending is capable of affecting relative prices, output, and consumption. Fiscal policy can thus potentially reduce some of the inefficiencies arising in the face of shocks. However, there is a cost to using government spending to stabilize the economies. Because government spending enters the utility function of households the first-best allocation implies a particular spending composition, relating government spending to private spending and prices. That is, any deviations from the optimal spending composition level in order to stabilize the economies introduces another inefficiency. Hence, the fiscal policy maker has to trade-off the welfare gains of reducing inefficiencies arising due to monopolistic power, staggered price setting, and internationally incomplete markets with the implied welfare loss associated with deviating from the optimal spending composition.

3 Cooperative and non-cooperative policies

In the following, I illustrate the policy problem facing respectively the cooperative and the non- cooperative policy makers by their quadratic loss functions. Indeed, I derive the cooperative and the non-cooperative loss functions under incomplete markets by approximating the relevant welfare function; the resulting quadratic loss function is correct up to second-order. The details of the derivation figure in the Technical Appendix. For simplicity I will here focus on the case where $\chi \to 0$, implying that government spending is wasteful. This simplification will allow me to point out the objectives of the policy maker, whatever the available instruments. I also restrict the results to the case of perfectly flexible prices, for clarity

and without consequences for the main findings. First, the cooperative and non-cooperative loss functions under complete markets will be compared. Then, I will introduce international financial frictions and point out how these affect the objectives of the policy makers according to their strategic behaviour.

3.1 Complete markets

Under complete markets, the cooperative loss function illustrating the objectives, or targets, of the cooperative policy maker can be written as:

$$\begin{aligned}\mathcal{L}^C = E_0 \sum_{t=0}^{\infty} \{ & (\sigma+\eta)[(\hat{Y}_{H,t} - \tilde{Y}_{H,t})^2 + (\hat{Y}_{F,t} - \tilde{Y}_{F,t})^2] \\ & + 2a_H(1-a_H)\frac{(\phi\sigma - 1)}{\sigma}[4a_H(1-a_H)\phi\sigma + (2a_H-1)^2]\hat{T}_t^2 \\ & - 4a_H(1-a_H)(\phi\sigma - 1)\hat{T}_t(\hat{Y}_{H,t} - \hat{Y}_{F,t})\} + t.i.p.\end{aligned} \tag{21}$$

where *t.i.p.* denotes terms independent of policy making, such as exogenous shocks, and a variable with a tilde denotes the efficient deviation of that variable from steady state. The loss function can alternatively be expressed in the following way:

$$\begin{aligned}\mathcal{L}^C = E_0 \sum_{t=0}^{\infty} \{ & [\frac{a_H(1-a_H)}{\sigma^2}[4a_H(1-a_H)\eta(\phi\sigma-1)^2 + \phi\sigma(\sigma+2\eta) - 2\sigma - 3\eta] + \frac{\sigma+\eta}{2\sigma^2}](\hat{T}_t - \tilde{T}_t)^2 \\ & + (\sigma+\eta)(\hat{C}_t - \tilde{C}_t)^2 - \frac{(2a_H-1)(\eta+\sigma)}{2\sigma}\hat{T}_t\hat{C}_t\} + t.i.p.\end{aligned} \tag{22}$$

These loss functions show that the policy maker aims at minimising deviations from the efficient level of consumption (or, equivalently output gaps) as well as deviations from the efficient relative prices (terms of trade). The relative weights put on the different objectives, or targets, are illustrated by the coefficients in front of the different targets. They depend on the structural parameters of the model.

The non-cooperative loss function of the Home policy maker, instead, can be written as:

$$\begin{aligned}\mathcal{L}^{NC} = E_0 \sum_{t=0}^{\infty} \{ & \frac{(1-a_H)}{\sigma^2}[(2a_H-1)^2(1+(1-a_H)\eta) - 2\phi\sigma a_H(2a_H-1)(1+2(1-a_H)\eta) + \\ & a_H\phi\sigma^2(1+4(1-a_H)a_H\eta\phi)](\hat{T}_t - \tilde{T}_t)^2 \\ & + (\sigma+\eta)(\hat{C}_t - \tilde{C}_t)^2 + \frac{(1-a_H)(1+\eta)(1+2a_H(\phi\sigma-1))}{\sigma}\hat{T}_t\hat{C}_t\} + t.i.p.\end{aligned} \tag{23}$$

When home bias in consumption is present, then the weights differ across the two strategies. Notably, the weight put on avoiding deviations of the terms of trade from its efficient level relative to avoiding a domestic consumption gap, or equivalently, output gap is lower when no cooperation takes place. This is stated in Proposition 2.1.

Proposition 1 – *Under complete markets, flexible prices, and wasteful government spending, the relative weight attached to the terms of trade objective relative to the output gap objective in the quadratic approximation to the Ramsey policy maker's loss function is higher under cooperation than in the case where the policy makers are inward-looking, for* $\frac{1}{2} < a_H < 1$ *and* $\sigma > 1$.

Under complete markets and flexible prices, the efficient allocation ensuring zero output gaps (or consumption gap) and a zero terms of trade gap can be obtained under cooperation. At this

efficient allocation, both countries' welfare is maximized, and the Nash policy maker will thus not have an incentive to deviate from the cooperative allocation. Hence, the difference in weights associated with the different objectives would not be observed. However, the loss function does illustrate the terms of trade externality facing Nash policy makers which implies a lower weight attached to reducing international price inefficiencies rather than reducing domestic output gaps. As a result, in the face of distortions such as staggered price setting or market incompleteness, larger price variations would arise under inward-looking policy making.

3.2 Incomplete markets

Under internationally incomplete markets, the loss function of the cooperative policy maker can be expressed as:

$$\begin{aligned}\mathcal{L}^{C} = E_0 \sum_{t=0}^{\infty} \{ & 2a_H(1-a_H)\frac{(\phi\sigma-1)}{\sigma}[4a_H(1-a_H)\phi\sigma + (2a_H-1)^2](\hat{T}_t - \tilde{T}_t)^2 \\ & + (\sigma+\eta)[(\hat{Y}_{H,t} - \tilde{Y}_{H,t})^2 + (\hat{Y}_{F,t} - \tilde{Y}_{F,t})^2] + \frac{2a_H(1-a_H)}{\sigma}\widehat{Dgap_t}^2 \\ & - 4a_H(1-a_H)(\phi\sigma-1)(\hat{T}_t - \tilde{T}_t)[(\hat{Y}_{H,t} - \tilde{Y}_{H,t}) - (\hat{Y}_{F,t} - \tilde{Y}_{F,t})]\}\end{aligned} \tag{24}$$

The loss function is exactly similar to the one derived under the assumption of complete markets, (22), except for the introduction of demand imbalances into the loss function.

The non-cooperative loss function of the Home policy maker can be written in a similar way.

$$\begin{aligned}\mathcal{L}^{NC} = E_0 \sum_{t=0}^{\infty} \{ & \lambda_T^{NC}(\hat{T}_t - \tilde{T}_t)^2 + \lambda_{Y,H}^{NC}(\hat{Y}_{H,t} - \tilde{Y}_{H,t})^2 + \lambda_{Y,F}^{NC}(\hat{Y}_{F,t} - \tilde{Y}_{F,t})^2 \\ & + \lambda_D^{NC}\widehat{Dgap_t}^2 + \lambda_{TY,H}^{NC}(\hat{T}_t - \tilde{T}_t)(\hat{Y}_{H,t} - \tilde{Y}_{H,t}) + \lambda_{TY,F}^{NC}(\hat{T}_t - \tilde{T}_t)(\hat{Y}_{F,t} - \tilde{Y}_{F,t}) + \lambda_{CA}^{NC}\widehat{CA}_t\}\end{aligned} \tag{25}$$

Because the coefficients are rather complex, they are not stated here, but can be obtained from the author. The loss function under non-cooperation departs from the cooperative loss function in several ways: not only deviations of the current account matter, but the sign of the deviations does too for $a_H > 1/2$. Furthermore, we can, by comparing the coefficients of the above stated loss functions, deduct the following:

Proposition 2 – *The relative importance of reducing international demand imbalances, as illustrated by the Dgap, as opposed to reducing the national output gap is higher under cooperative policy making than under non-cooperative policy-making:* $\frac{\lambda_D^C}{\lambda_{Y,H}^C} > \frac{\lambda_D^{NC}}{\lambda_{Y,H}^{NC}}$ *for any* $\phi \notin [\phi^l; \phi^h]$ *where* $\phi^l = f^l(a_H, \eta, \sigma)$ *and* $\phi^h = f^h(a_H, \eta, \sigma)$.

Given the fact that the relative weights put on the different objectives according to the strategic interaction of the policy makers is a function of the structural parameters of the model, I engage in a numerical investigation in the next section. In the numerical example chosen in the next section of this chapter, the Proposition 2.1 holds for all $\phi \in [0.37; 0.40]$ implying that for the benchmark of $\phi = 0.5$, $\frac{\lambda_D^C}{\lambda_{Y,H}^C} > \frac{\lambda_D^{NC}}{\lambda_{Y,H}^{NC}}$ holds. We shall see how the cooperative equilibrium differs from the non-cooperative equilibrium.

4 A numerical investigation of fiscal policy interactions

4.1 Solution method and parameterization

The recursive solution to the model described in Section 2 consists in policy functions describing the response of variables to shocks and initial conditions, given the specified form of the rules for monetary and fiscal policies. Given that no closed-form solution to the model exists, I approximate the solution around a specified steady state, for given policy strategies. Indeed, by using the method of undetermined coefficients (perturbation methods), based on the knowledge of the derivatives of the equilibrium equations at the steady state, the model is solved by approximating the solution around the symmetric zero-inflation steady state in which monopolistic distortions are eliminated through appropriate subsidies.[12] Given the solution, I can compute the optimal parameters of the fiscal rules depending on the strategic behaviour of fiscal policy makers, thus specifying the constrained optimal fiscal policies. This computation is discussed in further details later.

The parameter values used throughout this section figure in the Table 1. Most of them are quite standard in the business cycle literature, and realistic for the EMU.[13]

The population of each of the countries are assumed to be identical. The discount factor is set such that the steady state annual real interest rate is 4 per cent. The Frisch elasticity of labor is set equal to 0.5. The inverse of the intertemporal elasticity of substitution, the risk aversion coefficient, is set to 1.5 in the benchmark calibration following Smets and Wouters (2003). χ is equal to 1/5 such that in steady state private consumption is three times larger than government consumption.

The degree of home bias is set to 0.8, implying that the steady state import ratio is 20 per cent. The elasticity of substitution between goods produced within a country is set equal to 7.66, such as to ensure a mark-up of 15 per cent. On average prices are sticky for a year: $\alpha = 0.75$. This value is in line with the GMM-estimates found by both Galí, Gertler and Lopez-Salido (2001) and the Bayesian DSGE estimations carried out by Smets and Wouters (2003).

The international trade elasticity is a particularly important determinant of the equilibrium dynamics of the model presented in Section 2, and thus of the trade-off faced by the policy maker. My benchmark parameterization figures a relatively low trade elasticity of 0.5, corresponding to the estimates found in the international macroeconomic literature, see, e.g., Hooper, Johnson and Márquez (2000) or Corsetti, Dedola and Leduc (2008). The low trade elasticity is crucial in ensuring complementarity of the internationally traded goods, a realistic feature for advanced, relatively specialised countries such as the countries within the EMU.

In the incomplete markets model, δ, the sensitivity of the bond yield to debt is set such as to roughly mimic the observed yield differences across the EMU before the debt crisis: the benchmark value of δ is such that for every ten percentage points increase in debt,[14] the annual interest increases by 0.5 percentage points.

---

[12] I used Dynare to solve the model by second-order approximation given monetary and fiscal policies. I then used those solutions to compute the constrained Ramsey optimal policies. I also used code developed by Schmitt-Grohe and Uribe (2004) to check that results are identical across the two packages.

[13] The parameter values used are within the range of estimates found by Smets and Wouters (2003) by engaging in Bayesian estimation of a DSGE model of the euro area, or follow Benigno (2004) who calibrates his model to the EMU. See also Galí and Monacelli (2008).

[14] This corresponds approximately to a similar increase in debt-to-steady state GDP.

Table 1

Parameter Values in Benchmark Case

Population in country *H*	n	0.5
Discount factor	β	$1.04^{-1/4}$
Inverse of the elasticity of labor supply	η	2
Risk aversion coefficient	σ	1.5
Degree of home bias	a_H	0.8
Price stickiness coefficient	α	0.75
Weight on government expenditures	χ	1/5
Intratemporal elasticity of substitution	θ	7.66
Trade elasticity	ϕ	0.5
Yield sensitivity to debt	δ	0.05
Taylor-rule coefficient on inflation	ϕ_π	1.5

Monetary policy is characterized by a Taylor-type rule, with a coefficient of 1.5 on population-weighted inflation.

The following process is assumed for the technology shocks:

$$\begin{bmatrix} \log A_t \\ \log A_t^* \end{bmatrix} = \begin{bmatrix} 0.95 & 0 \\ 0 & 0.95 \end{bmatrix} \begin{bmatrix} \log A_{t-1} \\ \log A_{t-1}^* \end{bmatrix} + \begin{bmatrix} v_t \\ v_t^* \end{bmatrix} \tag{26}$$

where v^t and v_t^* are white noise processes with standard deviations 0.01.

In the following, the parameter values listed above are used in order to investigate the effects of strategic behaviour of fiscal policy makers. The constrained optimal fiscal responses to a country- specific shock are computed, and the consequences of having independent fiscal policies rather than cooperative fiscal policies are put forward.

4.2 Constrained optimal fiscal policy

Fiscal rules – I restrict cooperative and non-cooperative fiscal policies to follow fiscal rules. In particular, I specify government spending to follow rules which ensure that government spending levels satisfy the optimal spending composition, unless shocks hit the economies. Moreover, I only consider rules which are easily implementable. Specifically, this analysis focuses on two types of rules: rules which allow government spending to deviate from the optimal spending composition in the presence of deviations of output from steady state; and rules which imply a response of government spending to national inflation.

The specific forms of the fiscal rules to which I restrict my analysis are thus:

- rules in deviations from steady state output:

$$\log G_t = \log G_t^{OSC} + \alpha_Y \log(\frac{Y_{H,t}}{\bar{Y}_H})$$
$$\log G_t^* = \log G_t^{*OSC} + \alpha_Y^* \log(\frac{Y_{F,t}}{\bar{Y}_F}) \quad (27)$$

- rules in inflation:

$$\log G_t = \log G_t^{OSC} + \alpha_\pi \log(\frac{\pi_{H,t}}{\bar{\pi}_H})$$
$$\log G_t^* = \log G_t^{*OSC} + \alpha_\pi^* \log(\frac{\pi_{F,t}}{\bar{\pi}_F}) \quad (28)$$

The computation of constrained optimal policies consist in deriving the optimal policy parameters of the imposed rules. In this computation, I restrict the analysis to parameter values which ensure the existence of a unique equilibrium.

I consider two scenarios for strategic interaction of fiscal policy makers: One in which there is a unique fiscal policy maker who chooses the parameters of the rules $\{a_Y^C, a_Y^{*C}\}$ or $\{a_\pi^C, a_\pi^{*C}\}$, such as to maximize union-wide welfare, corresponding to the cooperative case; The other in which there are independent fiscal policy makers who may act strategically such as to maximize their own agents' welfare. The resulting $\{a_Y^{NC}, a_Y^{*NC}\}$ or $\{a_\pi^{NC}, a_\pi^{*NC}\}$ will differ from the ones obtained under cooperation if the national fiscal policy makers fail to internalize the result of their choice on the other policy maker's choice of parameters. The extent to which fiscal policies differ between these two scenarios, the consequences, and the welfare implications constitute the object of the analysis carried out in the following.

Cooperative and non-cooperative fiscal policies – The cooperative fiscal policy maker chooses the policy parameters such as to maximize union-wide welfare. On the contrary, the strategically competitive fiscal policy makers maximize national welfare, given the other country's fiscal policy. The computation procedure for this case consists in the following steps:

1. An initial guess for the policy parameters is chosen, for example the cooperative policy parameters.
2. Home country fiscal authority chooses the policy parameter which, given the initial guess for the Foreign policy parameter and the specification of monetary policy, yields the highest welfare for his agents.
3. Given those optimal Home parameters, the Foreign fiscal policy maker optimizes his agents' welfare by choosing a parameter to his rule.
4. This procedure continues until the policy makers arrive to a point in which they have chosen the same parameter values. At this point, they have no incentive to deviate from the chosen parameter of the rules.

The resulting optimal policy parameter values, in the benchmark case, figure here: The rules show that the cooperative policies respond more aggressively to changes in output or inflation than the non-cooperative fiscal policies do. This has relatively large welfare consequences: around 0.20 per cent of consumption every quarter under output rules, and 0.06 per cent under inflation targeting rules. It is interesting to notice that the welfare losses are 3 times larger when government spending reacts to deviations from the steady state output rather than inflation.

Table 2

Optimal Policy Parameters Under Complementarity

$\phi = 0.5$	Cooperation	Non-cooperation	Welfare loss from non-cooperation
$a_Y = a_Y^*$	2.66	0.74	0.20
$a_\pi = a_\pi^*$	–54.27	–11.89	0.06

The welfare loss is computed in percent of steady state consumption.

The lack of response under non-cooperation can be explained by the "terms of trade externality" facing policy makers in open economies. This externality has been put forward for the conduct of monetary policy by authors such as Obstfeld and Rogoff (2002) and Corsetti and Pesenti (2001), and for the conduct of fiscal policy by Benigno and Paoli (2010).[15] The terms of trade externality is indeed inherent to open economies, and results from the incentive which national policy makers might face to tilt the terms of trade in their favour. By doing so, policy makers attempt to increase national welfare by allowing their households to consume more without higher labor effort. In the framework presented here, by varying government spending, the fiscal policy makers can exploit the terms of trade externality. To understand the trade-off faced by the policy makers, and the effects of the terms of trade externality, it is useful to consider the constrained optimal response to a country-specific shock.

Consider first the cooperative response. The optimal policy parameters under cooperation implies a rise in domestic government spending in the face of a positive Home technology shock which raises output above its steady state level and reduces inflation. This ensures that the fall in Home prices induced by the technology shock is dampened. Given the domination of the income effect over the substitution effect under complementarity of the goods, this fiscal policy increases Home output further. As a result, the Home current account deficit, originating in the technology shock which temporarily reduces Home income through its negative effect on the price of the Home good, is reduced. That is, the cooperative fiscal policy consists in reducing the distortionary international demand imbalances while raising the output gaps. This is very much in line with the results of the unconstrained Ramsey policy analysed in Hjortsø (2012): optimal cooperative fiscal policy reduces international imbalances at the expense of larger output gaps.

Consider now the non-cooperative response obtained in a Nash equilibrium. When the national fiscal authorities do not cooperate, the optimal policy parameters differ from the cooperative parameters. Indeed, the national fiscal authorities do not internalize the outcome of their policy on the other country's policy. Hence, they face an incentive to deviate from the cooperative solution. By deviating slightly from the cooperative solution, policy makers can affect the terms of trade such as to reduce production and thus disutility from labor effort without an equivalent decrease in the utility of consumption (in the aftermath of a positive technology shock). This can be achieved by reducing government spending in the Home country, thereby reducing relative prices and thus, through the income effect, reducing demand and labor effort. These deviations from the cooperative fiscal policy arise because the national fiscal policy

[15] The latter authors consider the desirability of distortionary taxation in a small open economy, *i.e.*, in the presence of the terms of trade externality. This paper departs from the analysis of Benigno and Paoli (2010) in several aspects: I do not assume perfect risk sharing takes place; I consider a two-country model with strategic interactions between policy makers rather than a small open economy; the fiscal policy instrument is government spending rather than taxation.

makers do not internalize the effect of their policy on foreign policy and thereby on the equilibrium levels of inflation, output, and demand imbalances. As a result the Nash equilibrium illustrates the well-known terms of trade externality: the national fiscal policy maker attempts to increase the purchasing power of its agents without taking into account the effect on the other country's welfare and thus on its policy response, an effect transmitted through changes in the terms of trade.

The difference between the cooperative fiscal response to a Home productivity shock, and the Nash equilibrium response is illustrated below. In Figure 1 the optimal response under the rule (27) is illustrated, whereas the optimal response under the rule (28) figures in Figure 2. Though the rules differ in their quantitative optimal fiscal response to a country-specific shock, their qualitative response is similar. The Nash policies result in lower output gaps than those resulting under cooperation, but these are obtained at the expense of higher inflation as well as higher demand imbalances.

The terms of trade externality present under strategically competitive fiscal policy making has important consequences, both for welfare and for the volatility of variables such as inflation and current account imbalances. These implications are spelled out in the next subsection.

4.3 The consequences of non-cooperation

The strategic interaction of fiscal policy makers in open economies implies optimal policies which differ substantially from the optimal cooperative policies, as illustrated in Figure 1 and in Figure 2. This implies different equilibrium dynamics, and has consequences for union-wide welfare. Here, I discuss the effects of the strategic behaviour of fiscal policy makers on the volatility of certain variables such as output, inflation and imbalances. Indeed, in the context of the current eurozone crisis, many economists have emphasized the crucial role played by current account imbalances and inflation differentials between the Northern countries and the Southern countries in the eurozone. This subsection suggests that fiscal policy cooperation within a monetary union can contribute to lower the imbalances and price misalignments across countries.[16]

Inflation differentials – In the benchmark case, strategically competitive policy making results in excessive inflation differentials across countries when a country-specific shock hits. A technology shock to country *H* of one standard deviation results in an immediate producer price deflation of 0.25 per cent in *H*, and a similar rise of producer prices in country *F*. This is almost five times as high an inflation differential as the one which would prevail under fiscal cooperation, see Figure 3.

This inflation differential is distortionary due to staggered price setting, and is therefore costly in terms of welfare. It is an inefficiency which could be partly eliminated through cooperation in fiscal policy. Moreover, not only does this excessive inflation differential arising under Nash fiscal policy making imply direct welfare costs in terms of inflation. It could also capture or result in other inefficiencies which are not captured in this model. For example, it could affect productivity if there are frictions in the labor market.

The excessive inflation differentials arising because of non-cooperative fiscal policies in a monetary union is quite robust to most parameters conditional on the trade elasticity being relatively low as in the benchmark case. Even when the countries are completely open and

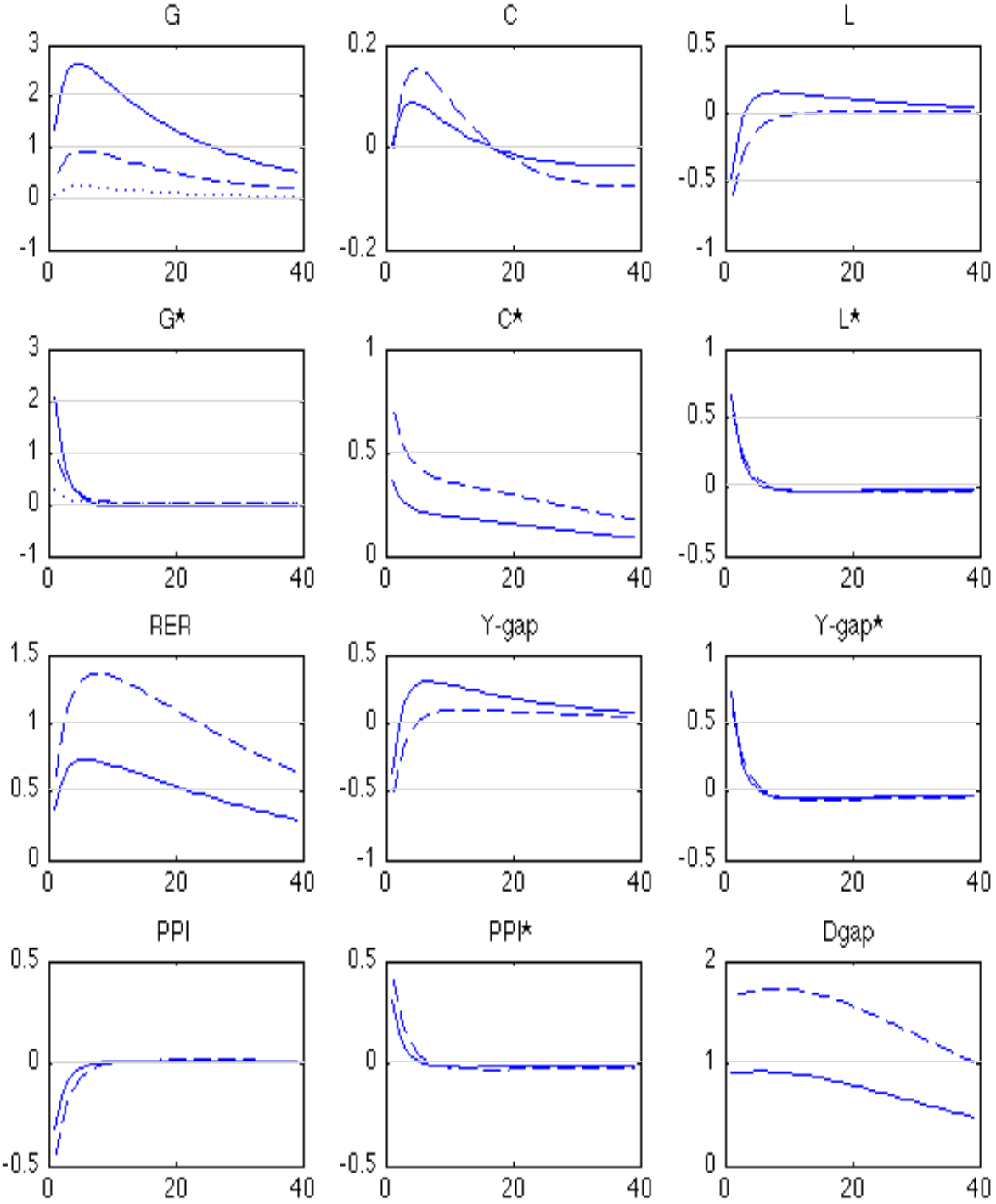
---

[16] The analysis carried out here is constrained by the fiscal rule being of the form (28), *i.e.*, dependent on inflation. This is not of importance for the qualitative results, but nevertheless for the quantitative results.

Figure 1

Impulse Responses Following a Home Technology Shock

(output rule)

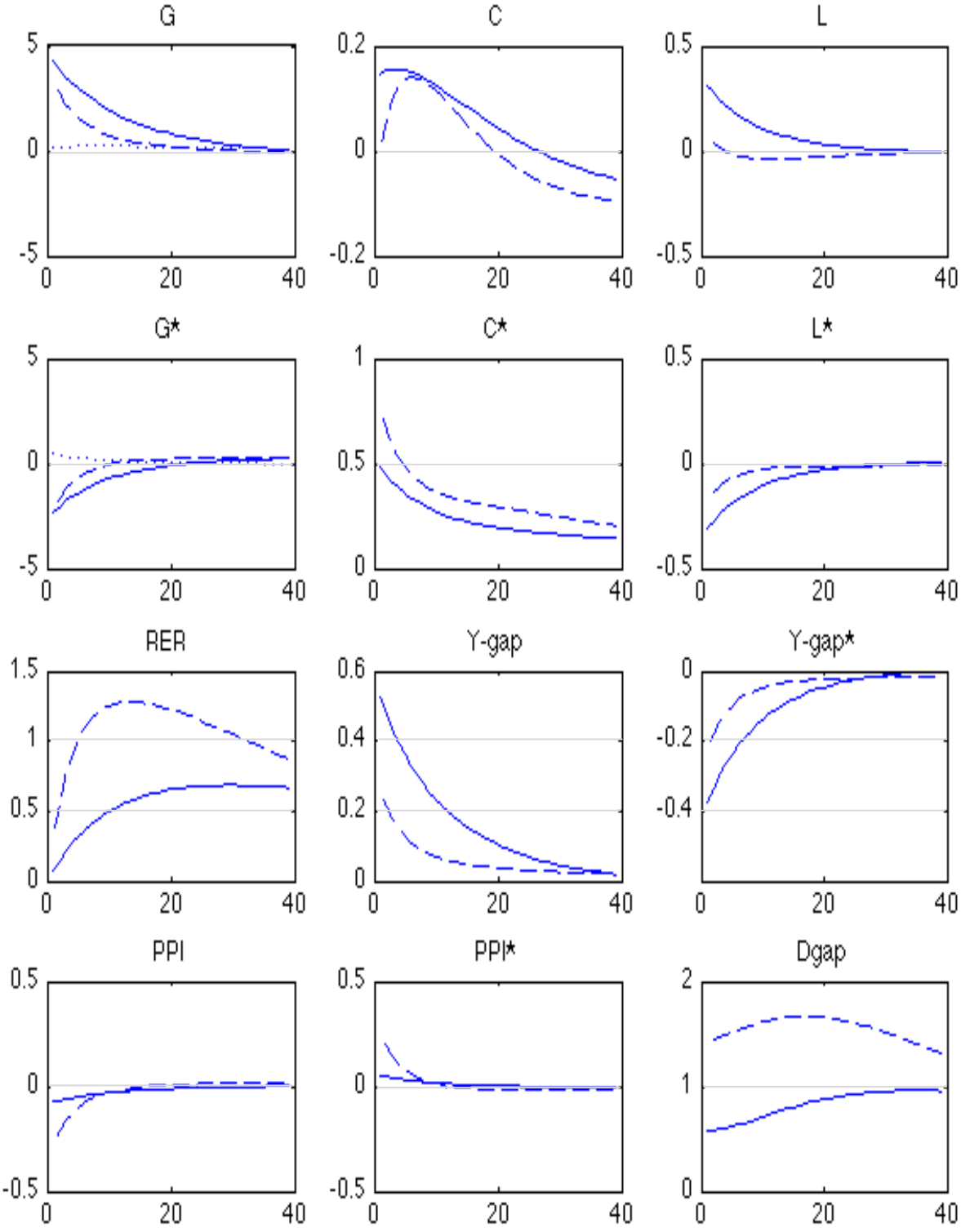


This figure depicts the impulse response functions following a positive one standard deviation shock to Home productivity. Percentage deviations from the steady state are on the y-axes. On the x-axes figure the time periods (quarters) after the shock. The impulse responses are depicted for the case where the constrained optimal fiscal policy is cooperative (the solid line), and the case where each of the fiscal policy makers engage in non-cooperative fiscal policy making leading to a Nash equilibrium (the dashed line). The dotted line represents the government spending level satisfying the optimal spending composition under cooperative fiscal policies.

Figure 2

Impulse Responses Following a Home Technology Shock

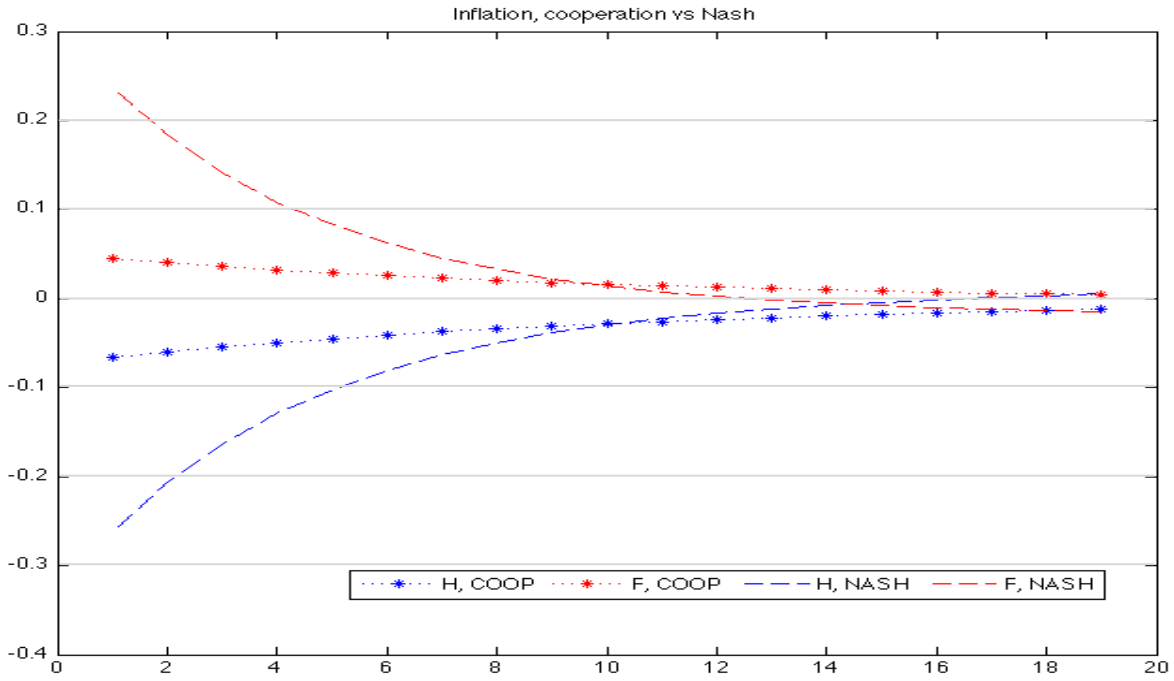
(inflation rule)



See footnote for Figure 1.

Figure 3

Inflation Following Home Technology Shock



Home producer price inflation dynamics following a positive one standard deviation shock to Home productivity, under constrained optimal fiscal policies following rule (28). The solid line depicts the outcome under cooperative fiscal policies, whereas the dashed line illustrates the outcome in the Nash equilibrium.

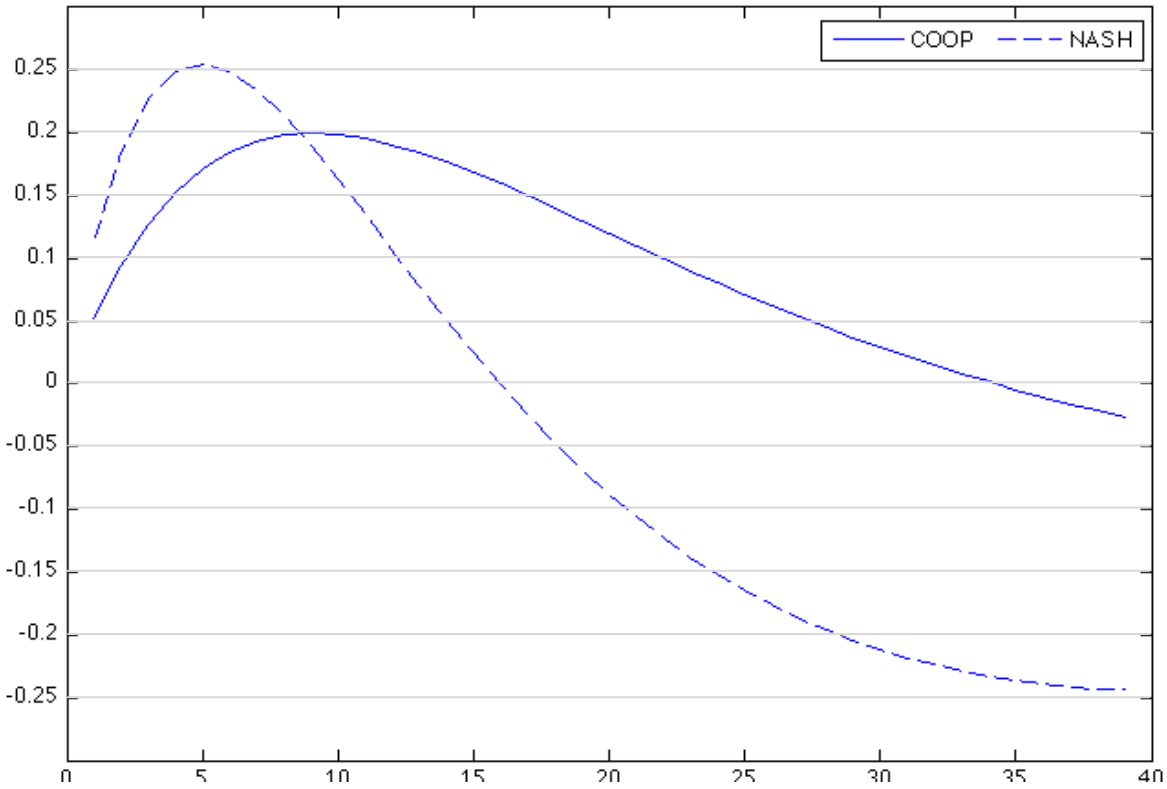
households exhibit no home bias in consumption preferences, does the initial inflation differential between the Nash equilibrium and the cooperative equilibrium persist. Similarly, the excessive inflation resulting from Nash fiscal policy making persists for different risk aversion degrees as well. Concerning the sensitivity of the results to the degree of price stickiness, we can notice that the higher the stickiness, the less do prices in general vary. However, at the same time, the more sticky are prices, the higher is the inflation differential between the cooperative case and the non-cooperative case.

Current account imbalances – The strategic interaction of fiscal policies not only shapes inflation differentials across countries but also affects the volatility of current account imbalances significantly. Indeed, following a country-specific productivity shock, the current account imbalances are more pronounced and volatile when the fiscal policy makers act strategically such as to maximize their own country's welfare. This is apparent in Figure 4.

This results from the terms of trade externality which implies larger inflation differentials and thus larger income differentials under non-cooperation when the internationally traded goods are complements. Hence, in line with the sensitivity of inflation differentials, is the volatility of current account imbalances increasing in the degree of home bias, and also remains excessive even when there is no home bias in consumption present. Moreover, the presence of excessive imbalances is robust to the coefficient of relative risk aversion, and increasing in the degree of price stickiness. It is interesting to note that the structure of fiscal policies can lead to large excessive current account imbalances within the monetary union.

Figure 4

Current Account Following Home Technology Shock



This figure depicts the deviations of the current account from its steady state value in percent of steady state output. The solid line depicts the outcome under cooperative fiscal policies, whereas the dashed line illustrates the outcome in the Nash equilibrium.

Indeed, Figure 4 shows that the current account imbalances not only are twice as large as under fiscal cooperation - they are also much more volatile. Given the importance attributed to the role of current account imbalances in the current eurozone crisis, it is interesting to note this point. Indeed, if current account imbalances affect risk in a way not modelled here, e.g., through the banking sector, these excessive imbalances might have other consequences than those appearing in this model. Indeed, this model indicates that if this is so, then fiscal cooperation could proof particularly beneficial.

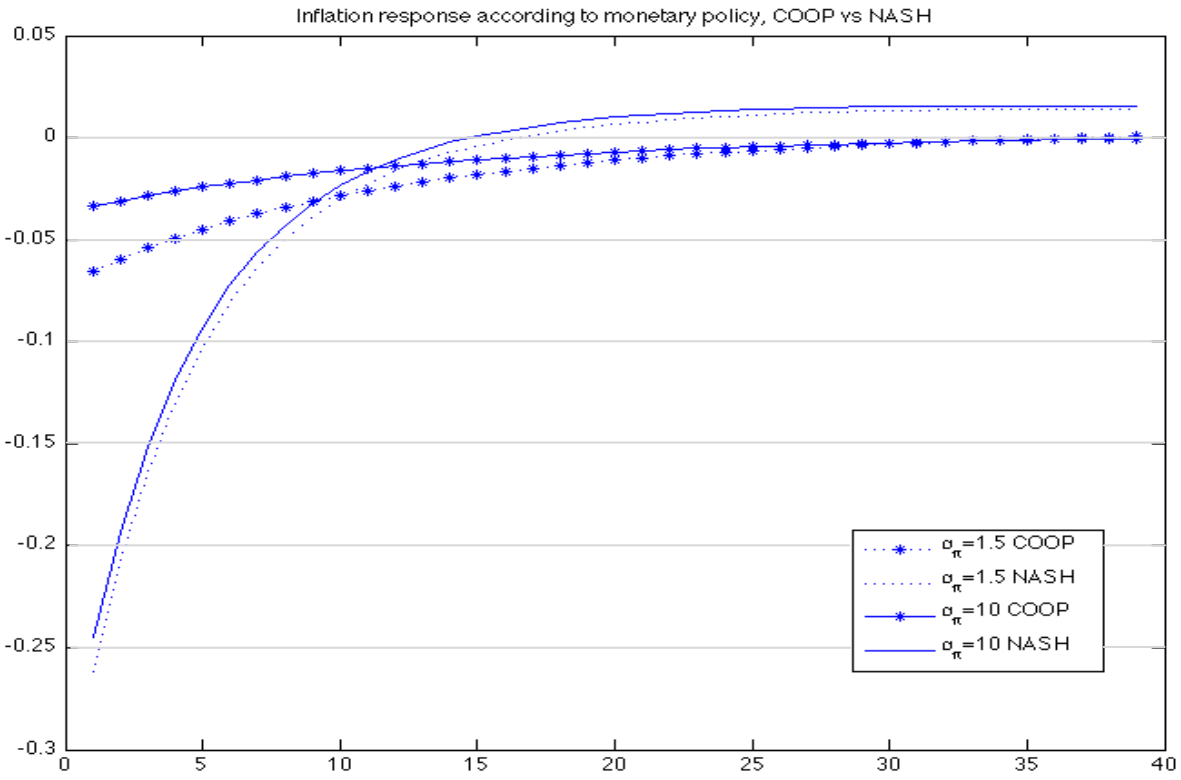
The role of monetary policy – Can monetary policy play a role in affecting the strategic behaviour of policy makers and the resulting imbalances and misalignments?

Figure 5 shows that the aggressiveness of monetary policy does not have much influence on the volatility or level of inflation arising in the face of country-specific shocks when fiscal policies are set in a strategically competitive way. Only under cooperation does the aggressiveness of monetary policy play a significant role in reducing price volatility.

The effect of monetary policy on the current account imbalances is also dampened by strategic competition of fiscal policy makers. The more hard-nosed is the common central bank, the lower is the volatility of imbalances under fiscal cooperation. However, when the fiscal authorities do not cooperate, then the effect on the volatility is quasi inexistent, see Figure 6.

Figure 5

Inflation Dynamics Following Home Technology Shock



In other words: the power of the common central bank in reducing cross-country imbalances and inflation differentials is hampered by the strategic behaviour of fiscal policy makers!

Sensitivity to the trade elasticity – While the results are rather robust to different parameter values, there is one exception: the trade elasticity. The importance of this parameter is evident in that it governs the interaction between the two countries, and thus the incentive to deviate from the cooperative solution. It thus plays a crucial role in determining the inflation differentials arising due to strategically competitive fiscal policy making. When the internationally traded goods are complements, then strategic competition in fiscal policy implies excessive inflation differentials. As a result, when the internationally traded goods are complements, then the current account imbalances are always excessive when fiscal policies are set strategically.

However, when the trade elasticity is so large that the internationally traded goods are substitutes, then the terms of trade externality becomes insignificant for fiscal policy making. As a result, the non-cooperative and the cooperative constrained optimal fiscal policies are almost identical, as shown in Table 3 for a value of the trade elasticity of 4.

Welfare effects of non-cooperation in a monetary union – The previous paragraphs have shown that when fiscal authorities in a monetary union engage in strategic policy making, then excessive inflation differentials and sub-optimally high imbalances across countries may arise. These inefficiencies have welfare implications which have already been pointed out in Table 2. The welfare losses associated with non-cooperative fiscal policies are higher the more hard-nosed is the central banker, that is the higher is the Taylor coefficient. This is illustrated in Figure 7.

Figure 6

Current Account Dynamics Following Home Technology Shock

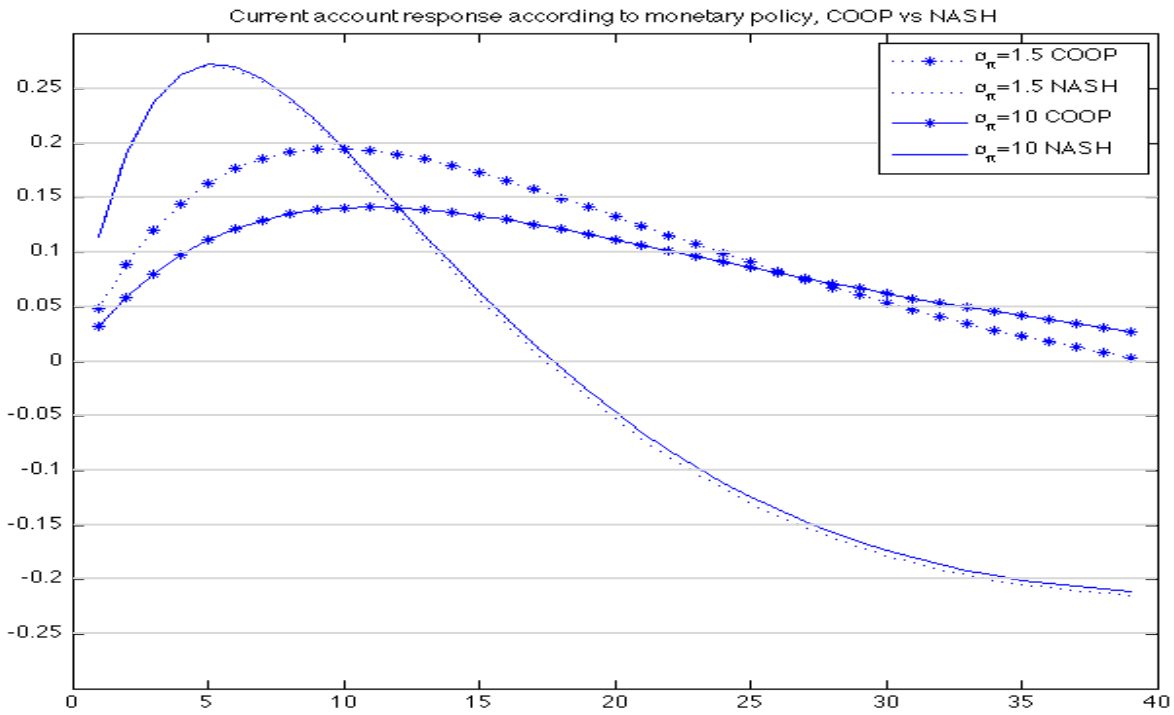


Table 3

Optimal Policy Parameters Under Substitutability

$\phi = 4$	Cooperation	Non-cooperation	Welfare Loss from Non-cooperation
$a_Y = a_Y^*$	0.07	0.05	9×10^{-6}
$a_\pi = a_\pi^*$	–4.82	–5.80	2×10^{-5}

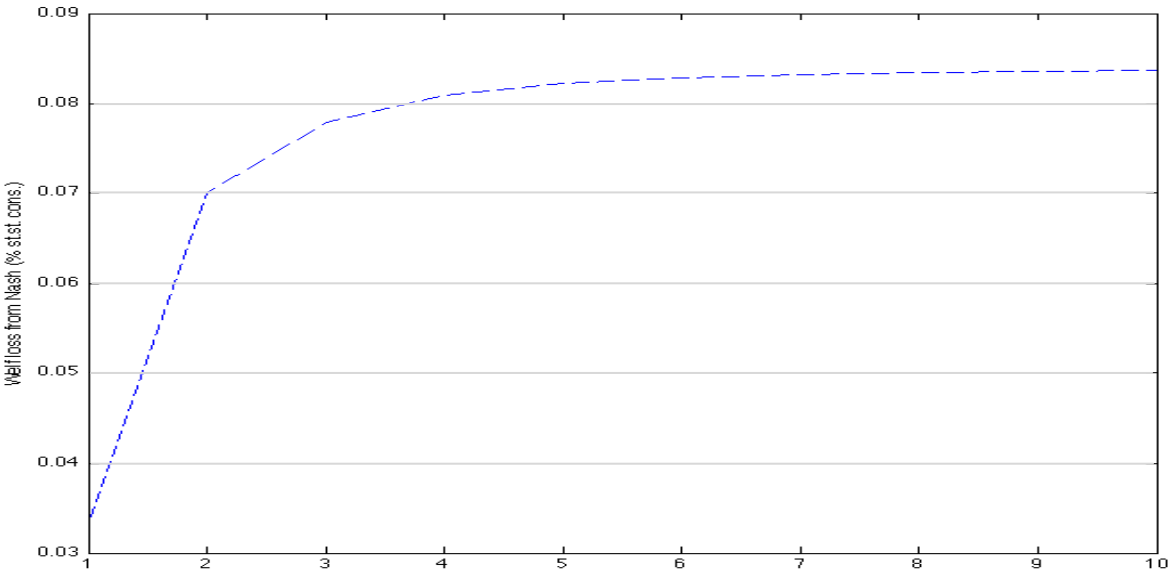
The welfare loss is computed in percent of steady state consumption.

Moreover, we can note that the welfare loss associated with non-cooperative fiscal policy making is increasing in the degree of home bias in consumption, as Figure 8 shows.

This section has provided a numerical analysis of the implications of strategic fiscal policy interactions within a monetary union. I have shown that the consequences can be non-negligeable for rather realistic values of the trade elasticity: current account imbalances and inflation differentials are excessively large under non-cooperation of the fiscal authorities. This implies that there are relatively important welfare gains from engaging in fiscal policy cooperation within the monetary union framework analysed.

Figure 7

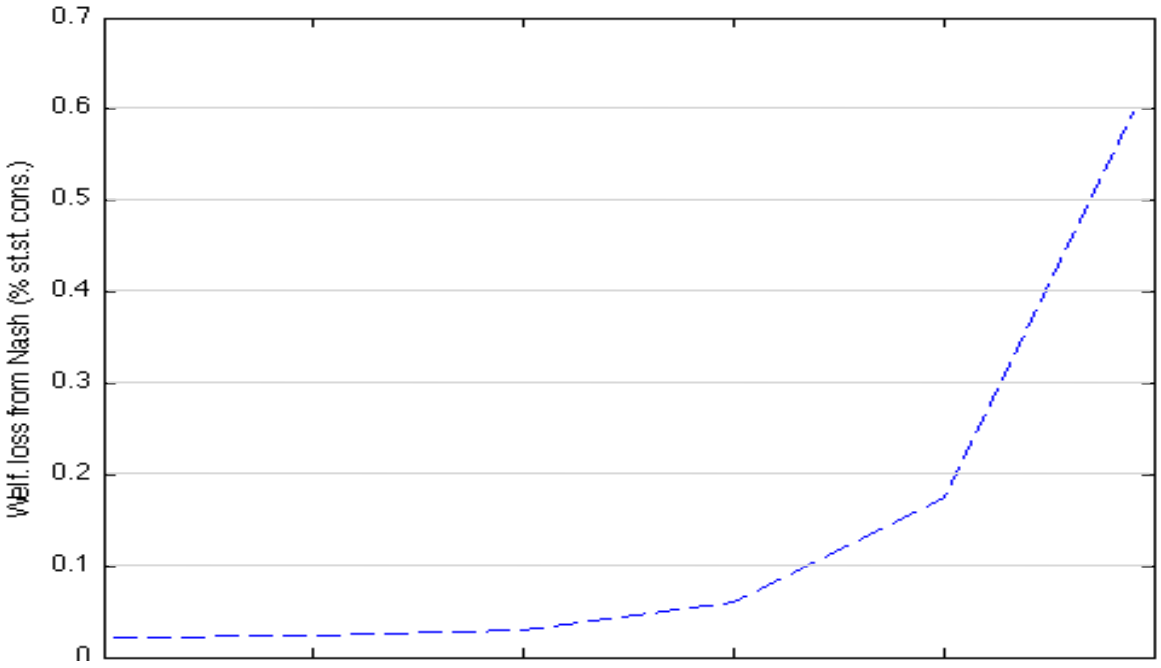
Welfare Loss According to Monetary Policy



The welfare loss from non-cooperative fiscal policies is illustrated in percent of steady state consumption, as a function of the parameter α_π figuring in the Taylor rule of the monetary authority.

Figure 8

Welfare Sensitivity to Home Bias



The welfare loss from non-cooperative fiscal policies is illustrated in percent of steady state consumption, as a function of the degree of home bias in consumption, a_H.

5 Conclusion

This paper sheds light on the potential implications of strategic fiscal policy interactions in a monetary union with international financial frictions. I have shown that the objective of the policy maker differs according to whether it aims a maximizing union-wide welfare or national welfare. More specifically, I have pointed out that, for most parameter combinations, is the relative importance of international demand imbalances lower under non-cooperation than when the fiscal authorities cooperate. I have also shown, by engaging in a numerical analysis, that strategic fiscal policy making results in a Nash equilibrium which exhibits excessive inflation differentials across countries as well as sub-optimally high volatility of the current account. These characteristics of the Nash equilibrium implies that there might be important welfare gains associated with fiscal policy cooperation in a monetary union.

By pointing out the importance of fiscal policy cooperation within a monetary union, this paper underlines the fact that the best outcome for the monetary union as a whole cannot be achieved by conducting strategically competitive fiscal policies. This, of course, raises questions concerning the optimal conduct of fiscal policies within monetary unions such as the EMU, and more specifically, it points out the welfare improvements which might arise from fiscal policy cooperation.

REFERENCES

Benigno, G. and B.D. Paoli (2010), "On the International Dimension of Fiscal Policy", *Journal of Money, Credit and Banking*, Vol. 42, No. 8, pp. 1523-42.

Benigno, P. (2004), "Optimal Monetary Policy in a Currency Area", *Journal of International Economics*, Vol. 63, No. 2, pp. 293-320.

Corsetti, G., L. Dedola and S. Leduc (2008), "International Risk Sharing and the Transmission of Productivity Shocks", *Review of Economic Studies*, Vol. 75, No. 2, pp. 443-73.

——————(2010), "Optimal Monetary Policy in Open Economies", in B.M. Friedman and M. Woodford (eds.), *Handbook of Monetary Economics*, Vol. 3, chap. 16, pp. 861-933.

Corsetti, G. and P. Pesenti (2001), "Welfare And Macroeconomic Interdependence", *The Quarterly Journal of Economics*, Vol. 116, No. 2, pp. 421-45.

Demyanyk, Y., C. Ostergaard and B.E. Sorensen (2008), "Risk Sharing and Portfolio Allocation in EMU", *European Economy*, Economic Papers, No. 334, Directorate General Economic and Monetary Affairs, European Commission.

Ferrero, A. (2009), "Fiscal and Monetary Rules for a Currency Union", *Journal of International Economics*, Vol. 77, No. 1, pp. 1-10.

Galí, J., M. Gertler and J.D. López-Salido (2001), "European Inflation Dynamics", *European Economic Review*, Vol. 45, No. 7, pp. 1237-70.

Galí, J. and T. Monacelli (2008), "Optimal Monetary and Fiscal Policy in a Currency Union", *Journal of International Economics*, Vol. 76, No. 1, pp. 116-32.

Hjortsø, I. (2012), "Imbalances and Fiscal Policy in a Monetary Union", European University Institute, mimeo.

Hooper, P., K. Johnson and J. Márquez (2000), "Trade Elasticities for the G-7 Countries", Princeton Studies in International Economics, No. 87.

Lombardo, G. and A. Sutherland (2004), "Monetary and Fiscal Interactions in Open Economies", *Journal of Macroeconomics*, Vol. 26, No. 2, pp. 319-47.

Obstfeld, M. and K. Rogoff (2002), "Global Implications of Self-oriented National Monetary Rules", *The Quarterly Journal of Economics*, Vol. 117, No. 2, pp. 503-35.

Schmitt-Grohe, S. and M. Uribe (2003), "Closing Small Open Economy Models", *Journal of International Economics*, Vol. 61, No. 1, pp. 163-85.

——————(2004), "Solving Dynamic General Equilibrium Models Using a Second-order Approximation to the Policy Function", *Journal of Economic Dynamics and Control*, Vol. 28, No. 4, pp. 755-75.

Smets, F. and R. Wouters (2003), "An Estimated Dynamic Stochastic General Equilibrium Model of the Euro Area", *Journal of the European Economic Association*, Vol. 1, No. 5, pp. 1123-75.

Woodford, M. (2003), *Interest and Prices*, Princeton University Press.

EMPIRICAL ANALYSIS OF CURRENT ACCOUNT ADJUSTMENTS AT FIXED EXCHANGE RATES

Jean J. Le Pavec[*]

Current account imbalances of euro area member countries widened during the period 2000-08 and remain at a very high level today, despite some improvements after 2008. High current account deficits usually reflect an overvalued real effective exchange rate which undermines competitiveness. For countries with floating exchange rates, competitiveness can be improved through a depreciation of the nominal exchange rate. Countries with pegged exchange rate can decide to devaluate their currencies. On the contrary, for countries belonging to monetary unions or countries with pegged currency that do not want to devaluate their currency, the adjustment process has to rely mostly on an internal devaluation (depreciation of domestic prices). In this paper, we devise a methodology to identify current account adjustment episodes for countries under fixed exchange rates. We apply our methodology to a large set of 191 economies between 1980 and 2010, which enables us to identify 38 current account adjustment episodes during this period. We then classify these episodes into three categories labeled "forced adjustment", "autonomous adjustment" and "supported adjustment" depending on the relative role of external factors (market pressure, external demand, evolution of the terms of trade) and the type of domestic policies implemented to foster current account adjustment (policy mix and structural adjustments). Our work offers some conclusions for the current Euro area crisis. Regarding structural reforms in peripheral Europe, product market regulation seems to be in line with the OECD average (except for Greece), whereas employment regulation is more protective in these countries. In our sample, successful current account adjustments, driven by gains in competitiveness through wage moderation policies, are typically of long duration. These results call for international coordination to lengthen the period for adjustment in peripheral Europe in order to allow structural reforms to gradually bear fruit and to result in a more progressive rebalancing. Such cooperation would reduce the need for short-term policy actions, in response to financial stress, and the pertaining social costs.

1 Introduction

During 2000-08, current account imbalances in the euro area largely widened, notably due to the increasing gaps in competitiveness among member states. After 2008, current account imbalances began to decrease as demand shrank in countries running current account deficits but no reversals has occurred yet. Current account imbalances usually spring from misalignments in real effective exchange rates[1] and rebalancing may be driven by a depreciation of the nominal exchange rate, a reduction in domestic prices with respect to competitors', or a change in the trade structure. For countries under floating exchange rate regimes, rebalancing may occur spontaneously through a depreciation of nominal exchange rates, under the effects of market forces. Countries with pegged currencies may also adjust by depreciating their nominal exchange rates *vis-à-vis* the anchor. However, as shown in Bénassy-Quéré (1995), depreciation may erase the

---

[*] Directorate-General of the Treasury, France.

[1] The real effective exchange rate of country x is: $REER_x = \Pi_i [N_{x/i} \frac{P_x}{P_i}]^{\omega_i}$.

N_{xi} denotes the nominal bilateral exchange rate between country *i* and country *x*.

P_x denotes the consumer price index of country *x*.

ω_i denotes the trade structure of country *i*.

benefits of the peg in terms of credibility for the monetary authorities and low inflation for the private sector. Countries belonging to monetary unions can theoretically not depreciate the nominal exchange rate (assuming that monetary policy is fully determined by the supranational institutions)[2] – unless they decide to leave the union and to assume the pertaining costs. In order to gain competitiveness, countries which decide to avoid nominal depreciation have no choice but to reduce their price level with respect to competitors' or to change their trade structures so as to increase trade linkages with countries *vis-à-vis* which they are more competitive.

The impact of exchange rate variations on current account reversals has been widely studied. From a theoretical point of view, many authors (Obstfeld and Rogoff, 2000 and 2004; O'Neill and Hatzious, 2002 and 2004) find that depreciations of the real exchange rates facilitate the adjustment and mitigate the impact of the adjustment on growth. Several empirical studies confirm these theoretical findings for samples that contain industrialized countries (Freund and Warnock, 2005), Debelle and Galati, 2005), emerging economies (Milesi-Ferretti and Razin, 2000), and both (Edwards, 2002 and 2005b; Guidotti, Sturzenegger and Villar, 2004). In particular, building on a large sample ranging from 1974 to 2002, Guidotti, Sturzenegger and Villar (2004) find that recovery is more quickly with floating exchange rates. Edwards (2004) observes that countries with rigid exchange rates are less able to accommodate the shocks linked to current account reversals and Debelle and Galati (2005) find that current account reversals were typically associated with large exchange rate depreciations over the past 30 years. Conversely, under fixed exchange rate regimes, current account reversals in deficit countries are considered as a long and difficult process. In this vein, Lane and Milesi-Ferretti (2011) find that the largest external adjustments in deficit countries, in the aftermath of the crisis, were primarily driven by demand contraction, with a negative impact on growth and employment. To illustrate the difficulty of the process, Piton and Barra (2012) suggest that the implementation of internal devaluations in Latvia and Ireland, in the aftermath of the 2008 crisis, despite their high social costs, had only limited effects on competitiveness, because the reduction in public sector wages did not lead to substantial decreases in private sector wages and consumer prices (customer prices fell by 2.1 per cent in Ireland and surged by 6 per cent in Latvia during 2008-11). Compared to Ireland and Latvia, Darvas (2011) finds that Iceland, which allowed a great depreciation of its currency, exited to the crisis with a smallest fall in employment despite the greatest shock on the financial system.

While many of these studies underscore the role of exchange rate depreciation to facilitate the current account adjustment process, few empirical surveys, to our knowledge, review the past episodes of current account adjustment in fixed exchange rate regimes (pegged currencies and monetary unions) and document their practical feasibility. Building on the principles used to define current account adjustments, we devise a method to identify current account adjustment episodes, for countries with pegged currencies and members of monetary unions, and identify 38 cases for current account adjustments of more than 5 points GDP during 1980-2010.

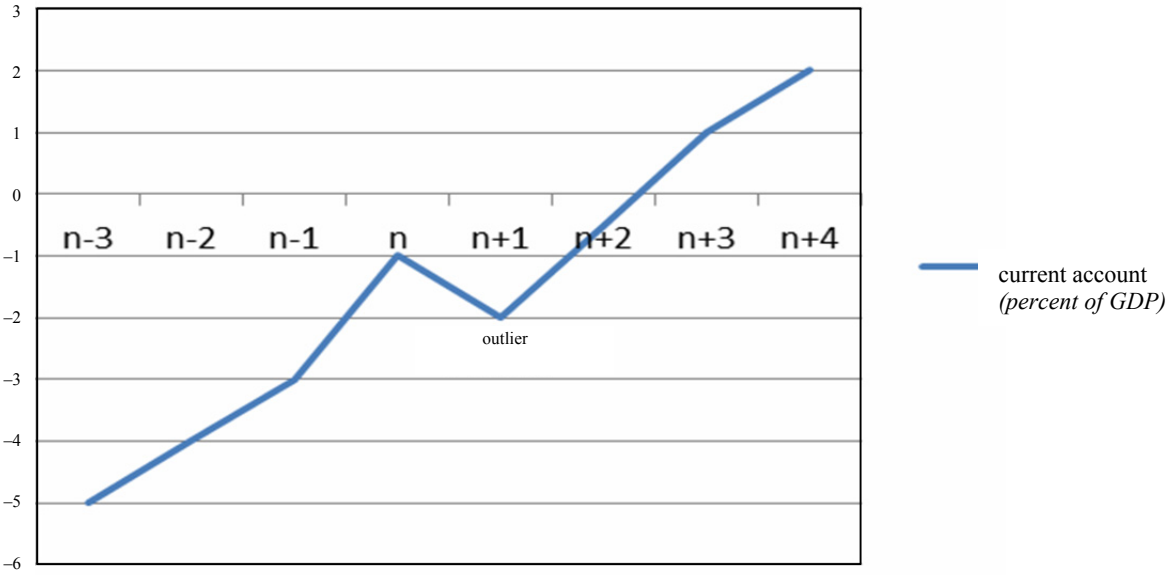
Following the assessment of Milesi-Ferretti and Razin (1997), who observed that the probability of current account reversals depends on both external and domestic factors, we suggest a classification for current account adjustment cases, based on the relative role of external factors (market pressure, external demand, evolution of the terms of trade) and the type of domestic policies implemented to foster current account adjustment (short term and long term policies). Basically, we identified three types of adjustments, which we labeled "forced adjustment" – largely driven by financial stress and market pressures, "autonomous adjustment" – which were mostly based on structural reforms and gains in competitiveness in the long term, and "supported adjustment" in which external factors, transfers and commodity exports played a large part.

---

[2] However, financial turmoil in one country in a monetary area may have an impact on the whole monetary area – for example, the fiscal situation in Ivory Coast had an impact on the exchange rate policy of the WAEMU in 1993.

Figure 1

An Example of Outlier in Year *n*+1
Current Account
(percent of GDP)



Concerning the definition of outliers, we required two conditions in order to ensure that the outliers do not change the trend for current account adjustment.
- *CA(n+1) > CA(n–1)*, where *CA(n)* is the "current account"/"growth domestic product" ratio in year *n*.
- *CA(n+2)>CA(n)*.
These conditions require that, for adjustments that last more than six years, outliers cannot be consecutive.

Our work offers some conclusions for the current Euro-area crisis regarding the reforms that should be undertaken in peripheral Europe to gain competitiveness and what results seems reasonable to expect in terms of duration and social costs.

2 Methodology

2.1 Identification of "current account adjustments"

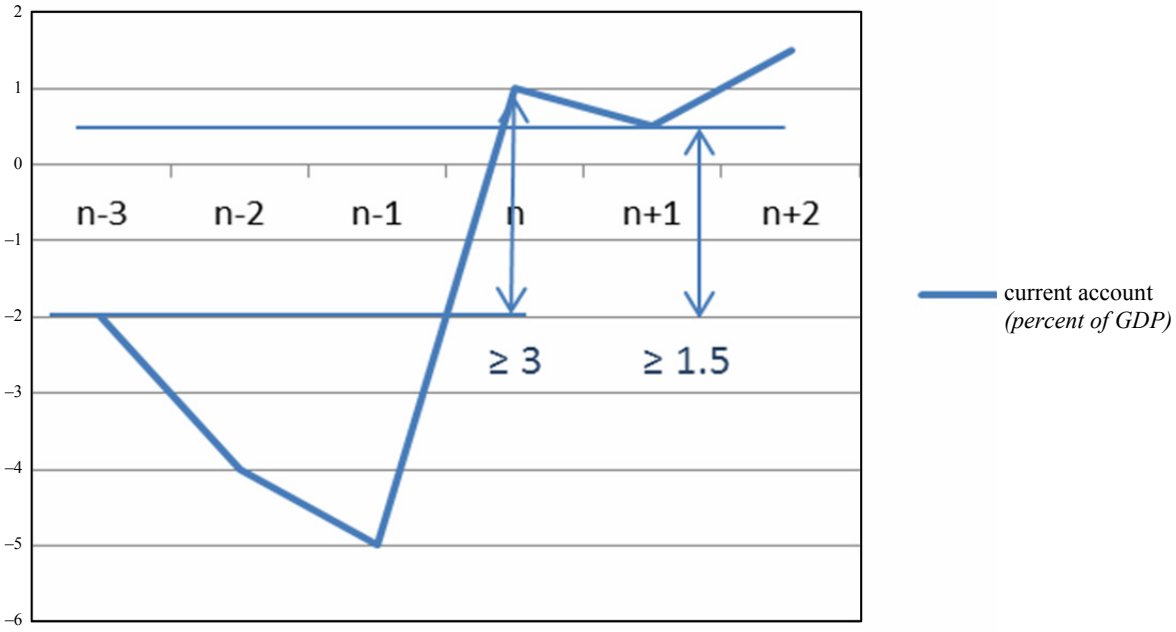
We define a current account adjustment as an increase in the current account balance of at least 5 points of GDP, to ensure that only the most significant ones are included in the sample. We do not require the current account to change sign (from deficit to surplus) during the event (therefore, the episodes are called "adjustment" and not "reversal"). One reason for this is that we try to find out the drivers of sizable increases in current accounts and the policy actions that induced them, even if current accounts remained in deficit or surplus.

In order to capture the diversity of the process, we introduce two definitions of current account adjustments in order to take into account the ones that are "gradual" (small improvements in the current account balance year after year) and the ones that are "ample" and not necessarily long.

Specifically, "Gradual adjustments" are continuous improvements in the current account balance for a period of at least four years. In order not to exclude cases for which there was a clear

Figure 2

An Example of "Ample Current Account Adjustment"
Current Account
(percent of GDP)



The period of the adjustment was the period in which the current account continuously improved including the adjustment year [n–1, n] and the size of the adjustment was the difference between CA(n) and CA(n–1), hence is equal to 6. The duration was 1 year.

trend for current account adjustment but whose process was temporarily thwarted (notably due to external factors), we also include in the sample episodes for which the current account balance deteriorated once during the process – an event which we call *outlier* (Figure 1) – if the adjustment lasted five years or more. We also include current account adjustment episodes that contain two outliers if the duration of the process was six years or more.

We define the *period* of the gradual adjustment as the years in which the current account/GDP ratio increased (including outliers if any).

"Ample adjustments" (Figure 2) are adjustment for which *(i)* the current account improved for at least 3 per cent of GDP in one year (n) and is greater in year (n) than in all of the three previous years (n–1, n–2, n–3) by more than 3 per cent GDP. In order to ensure that the process was durable, we also require that *(ii)* the current account balances are at least 1.5 per cent of GDP higher during the two next years (n+1, n+2) compared to the current account values in years n–1, n–2 and n–3. Since we worked with data between 1980 and 2010, we only include in the sample adjustments that happened in 1984 and after, in order to satisfy condition *(i)*. Condition *(ii)* was abandoned for countries which adjusted in 2008 and after in order to include in the sample adjustments that started after the recent crisis but which are not finished yet.

We define the *period* of the ample adjustment as the years around the year of adjustment (n) during which the current account continuously improved.

For gradual as well as ample adjustments, we define the *size* of the adjustment as the difference between the current account/GDP ratio at the end of the adjustment period and the

current account/GDP ratio at the beginning the adjustment period. The *duration* of the adjustment is the number of years of the period.

These choices are in line with the identification methodologies used in other studies, in particular regarding the minimal size of adjustments (5 per cent GDP). For example Edwards (2004) defined two types of adjustment: a shorter one (4 per cent GDP in one year) and a longer one (6 per cent GDP in three-years) and Edwards (2005a) requires that all adjustments should exceed 5 per cent GDP in three years and distinguishes adjustments that are more front-loaded (at least 4 per cent GDP of deficit reduction in one year) from those that are more evenly distributed in time (at least 2 per cent GDP of deficit reduction in one year). Milesi-Ferretti and Razin (1998) considered an average reduction of 3 per cent GDP and 5 per cent GDP, while Freund (2000) selected current account adjustments with a minimal size of only 2 per cent GDP – both studies used stronger conditions for large current account deficits. Similarly to the present paper, Milesi-Ferretti and Razin (1998) and Freund (2000) required current account improvements to be sustained, *i.e.*, not be immediately followed by a large deterioration. Moreover, in order not to select episodes in which the degradation of current accounts was due to temporary factors, the improvements in current accounts were computed with respect to the average current account value during the three years preceding the adjustment. However, contrary to the present study, only episodes for which there were current account deficits, in the first year, were taken into account.

2.2 Fixed exchange rate regimes

The identification of exchange rates regime is based on Reinhart and Rogoff classification (see Appendix 1). We consider fixed exchange rate regimes as the ones for which there is no separate legal tenders, a pre announced peg or a currency board arrangement, a pre announced horizontal band that is narrower than or equal to +/–2 per cent or a *de facto* peg. These exchange regimes are classified 1 in the coarse grid, and from 1 to 4 in the fine grid (Appendix 1).

For all current account adjustments, only countries whose exchange rate regimes remained fixed during the adjustment are taken into account. Countries which changed exchange rate regimes during the adjustment, those which depreciated their exchange rates during the adjustment or during the two years preceding the adjustment period are excluded from the sample.

2.3 Data

a) Data used for the identification of current account adjustments

Current account values are taken from the WEO. The data regarding fixed exchange rate regimes are those published by Ilzetski on the LSE website.[3] These data consist of 104 countries which have been classified for at least two consecutive years as fixed currencies.[4] This figure takes into account the removal of small countries, which are generally small open economies, sensitive to external factors, from the sample.[5] Other countries for which the statistical system has been

---

[3] http://personal.lse.ac.uk/ilzetzki/IRRBack.htm

[4] Certain countries have not been classified during the 1980-2010 period. Other countries have never had fixed exchange rate regimes during the period. Countries are kept in the sample only if they had fixed exchange rate regimes for two consecutive years. Certain countries in the sample have not been classified for the whole period.

[5] The limit was arbitrarily set to 300,000 inhabitants in 2010, which excluded Anguilla, Antigua, Barbados, Dominica, Grenada, Kiribati, Liechtenstein, Marshall Islands, Micronesia, Monaco, Palau, San Marino, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines.

questionable during the adjustment period have also been excluded from the sample.[6] Oman, whose exchange rate regime has not been classified between 1998 and 2000 by Ilzetzki, is added to the sample – the rial was pegged to the US dollar during this period. Latvia, which maintained a peg with the euro between 2006 and 2009, and Lithuania, which maintained a *peg* with the euro between 2007 and 2009, are also included in the sample.[7]

Within the 104 countries, 43 current account adjustment episodes have been identified, out of which 5 episodes have been excluded because there was a nominal depreciation of the currency shortly before or during the adjustment period.[8]

b) Qualitative sources and data used for the classification of current account adjustment

The classification was built on an analysis of the Article IV published by the IMF, when available. This source of information was complemented by a set of documents, notably concerning the African countries of the sample.[9] We also took into account the evolution of the economic environment during the process (world growth, WEO database) and some domestic parameters (domestic growth, unemployment rate, WEO database). Thereafter, some relevant information about countries may not have been included, notably when the current account adjustment process is not documented well in the literature or when the information has not been taken into account in the IMF Article IV.

In order to assess gains of competitiveness during the adjustment, for some industrialized countries, we used product market regulation, employment protection legislation, unit labor costs and labor productivity indicators published by the OECD. The evolution of public debt and structural balance during the adjustment are computed from the WEO database.

3 Identification of current account adjustments

Thirty-eight current account adjustments of more than five points of GDP have been identified in thirty-two countries between 1980 and 2010 (Appendix 2). Saudi Arabia, Bahrain, Ivory Coast, Gabon, Lithuania and Swaziland all conducted two current account adjustments. This sample of thirty-eight current account adjustment episodes displays a great variety in terms of anchors, geographical areas, levels of development, adjustment features/policies and also in terms of international environments.

The sample contains countries from every continent, except Oceania. Africa, Europe and the Middle-East are the areas which contain the most cases of current account adjustments.

The sample contains cases of current account adjustments for both countries whose currencies are pegged to an anchor and countries which are members of monetary unions (Figure 3), the size of each group being relatively close, as shown in Figure 3.[10]

---

[6] These countries are Bhutan and Bosnia. The observed current account adjustment in Bosnia in 2005-06 could spring from improvements in the domestic statistical system and, notably, improvements in export accounting (IMF, article IV).

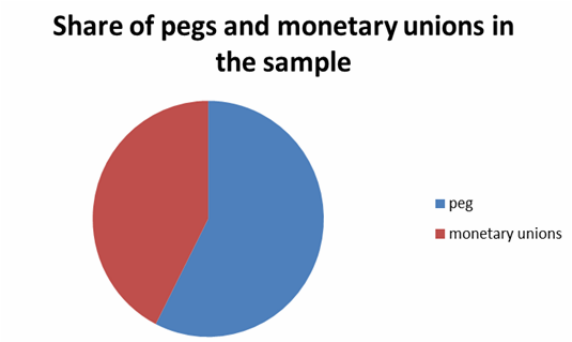
[7] These countries seem to have been misclassified during both periods of time.

[8] These episodes were Belgium 1981-86, Guinea Bissau 1998-2000, Iran 2004-07, Morocco 2000-01, and Solomon Islands 2000-04.

[9] *L'Economie ivoirienne, la fin du mirage* (Document de travail DIAL), *Les défis de la Centrafrique¸ Crise économique et ajustement structurel (1982-88) (Politiques africaines)*, *The Middle East and North Africa 2004 (Regional Surveys of the World).*

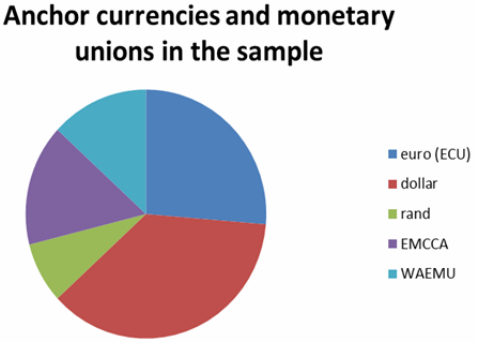
[10] Belgium and Austria are included in both groups because the currencies were pegged to the ECU at the beginning of the adjustment and the euro was legal tender in both countries at the end of the adjustment.

Figure 3



The sample contains approximately the same share of pegs and monetary unions.

Figure 4



The sample is balanced between the euro, the dollar and the CFA Franc (WAEMU and EMCCA).

- The sample contains examples of adjustments of countries using three different *pegs*: the euro (or ECU before 1999), the dollar and the South African rand.[11]
- The sample contains countries from three monetary areas: the euro area, the West African Economic and Monetary Union (WAEMU), the Economic and Monetary Community of Central Africa (EMCCA).

The share of each currency within the sample is displayed in Figure 4.[12] The CFA franc (WAEMU and EMCCA) have been pegged to the French franc until 1999, then to the euro. Lithuania was the only country which undertook two adjustments under two different pegs: the dollar during 1998-2001 and the euro during 2007-09.

Out of thirty-two countries, seven are advanced economies[13] (Germany, Austria, Belgium, Spain, Ireland, Hong Kong and the Netherlands). Nine countries are eligible to the Poverty Reduction and Growth Trust (PRGT)[14] (Burkina Faso, Central African Republic, Republic of Congo, Ivory Coast, Djibouti, Lesotho, Mali, Niger and Chad). Sixteen countries belong to the intermediary group (Saudi Arabia, Bahrain, Belize, Bulgaria, Equatorial Guinea, Estonia, Gabon, Jordan, Kuwait, Latvia, Lebanon, Lithuania, Malaysia, Oman, Qatar and Swaziland).The sample displays a great diversity in terms of size of adjustment (Figure 5, Table 1): the smallest adjustment was conducted in Spain (5.4 per cent of GDP in three years, still ongoing in 2010). The second smallest current account adjustment in Austria amounted to 5.5 per cent of GDP in seven years. The largest adjustment happened in Chad (108.4 per cent of GDP in 5 years). The average size was 20.9 per cent of GDP and the median value was 16.4 per cent of GDP in Bahrain during 2002-07 (if we exclude the current adjustments that were still ongoing in 2010, the average size reaches 22.1 per cent of GDP). The size of the adjustment was below 15 per cent GDP in 18 episodes and above 20 per cent GDP in 14 episodes (respectively 15 and 13 episodes if we exclude the adjustments that were still ongoing in 2010).

---

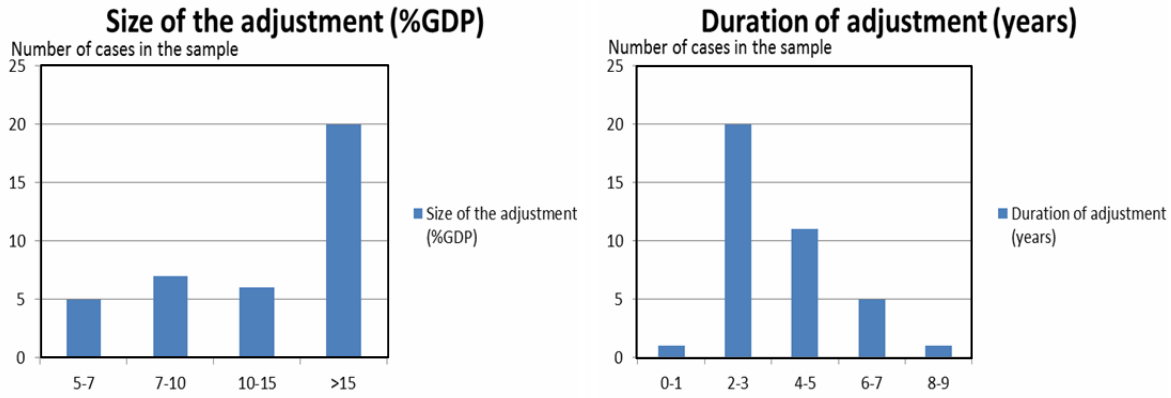
[11] While the South African rand is also legal tender in Lesotho and Swaziland, both countries issue their own currencies, which are pegged to the South African rand. Therefore, Lesotho and Swaziland are considered as countries issuing pegged currencies. They are members of the Multilateral Monetary Area (which replaced the Common Monetary Area in 1992) together with South Africa.

[12] Kuwait has been included in the group of dollar-pegged currencies, although the peg evolved to a basket of currencies during the adjustment.

[13] Under the classification published by the IMF in the WEO, September 2011, available at: http://www.imf.org/external/pubs/ft/wp/2011/wp1131.pdf

[14] The PRGT is a concessional assistance from the IMF.

Figure 5 **Figure 6**



Number of current account adjustment episodes in the sample in terms of size (Figure 5) and duration (Figure 6) of the adjustment. For example, in 5 cases, the size of the adjustment was between 5 and 7 per cent GDP. In 20 cases, the current account adjustment lasted between 2 and 3 years.

Table 1

Size and Duration of Current Account Adjustments Within the Sample

	Average Value	Min. Value	Max. Value	Median Value
Size *(percent of GDP)*	20.9	5.4	108.4	16.4
Duration *(years)*	3.6	1	9	3

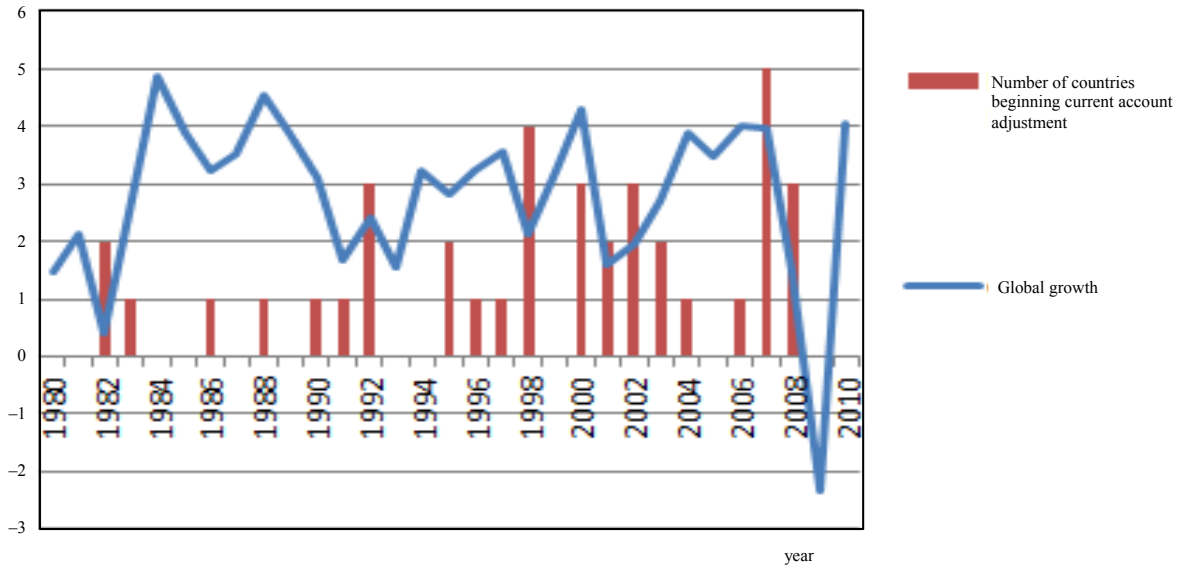
The duration of adjustment varied widely within the sample (Figure 6, Table 1): the minimal duration was 1 year (for Mali between 1986 and 1987). The maximal duration was nine years for Belgium between 1990 and 1999. The average duration was 3.6 years. The median duration was years. Thirteen adjustments lasted more than five years and sixteen adjustments lasted less than two years (thirteen if we exclude the current adjustments that were still ongoing in 2010 – in this case, the average duration was 3.8 years).

There was also diversity regarding the period of the adjustment. Figure 7 displays the annual global growth and the number of countries that undertook an adjustment process on a given year between 1980 and 2010. It seems that many countries began their adjustments when growth was about to fall or in periods where growth is relatively low: eight countries started their adjustment in 2009-10. 10 countries began their adjustment process in 2000-02. Four countries started to adjust in 1998. Three countries began to adjust in 1992. A lower global growth may be an indication of lower external demand, lower terms of trade for commodity producers and financial stress (eventually leading to flight-to-quality), which may foster current account adjustment. Conversely, a rebound in global growth in the following years is likely to facilitate the current account adjustment process.

Appendix 2 describes the thirty-eight cases for current account adjustment by alphabetical orders. Columns 2, 3 and 4 respectively describe the size, period and duration of the adjustment process computed following the methodology described in part II. Column 5 represents the anchor currency or the currency of the monetary union. Columns 6 and 7 in Appendix 2 describe features

Figure 7

Current Account Adjustment and Global Growth
(number of cases in the sample)



Number of countries beginning their current account adjustment process per year between 1980 and 2010.

from the economic environment and internal factors, which facilitated the adjustment or, conversely, which had an adverse effect on the adjustment process.

Thereafter, a case of current adjustment is referred to with the name of the country. Countries for which there was more than one case of current account adjustment are referred to with the name of the country followed by the period of adjustment. For example, the case for current adjustment in Saudi Arabia between 1991 and 1996 is denoted "Saudi Arabia 91-96".

4 A typology of current account adjustments – "forced, supported and autonomous current account adjustment"

The lack of numerical data for a large number of countries in the sample, the variety of factors which contributed to the adjustment and which may not be fully reflected in statistics (such as international pressures, structural reforms…), the difficulty to distinguish between the effects of domestic policies and the economic environment, when appropriate benchmarks are not readily available, make it arduous to express statistical relations between domestic policies and the current account adjustment process. Also, the quantitative effects of individual measures on growth and unemployment may be difficult to induce from the sample because of the differences of current account adjustment plans among the sample. Therefore, we made a more qualitative classification based on the drivers identified. Using the set of data (Section 2.2 b), we reviewed, for every episode, the factors that contributed to the adjustment and distinguished between external factors (external demand, global growth, real effective exchange rate, terms of trade, financial stress) and internal factors (fiscal consolidation, restrictive monetary policy, protectionism, structural reforms), which had a positive or negative impact on the adjustment process (Appendix 2, columns 6 and 7).

4.1 *Identification of three typical cases of current account adjustment – "forced, supported and autonomous current account adjustment"*

We classified the sample into three groups, which correspond to three typical cases. Situations in which the adjustment was largely due to external factors or internal factors that carried little policy actions by the government were classified as "supported adjustment". The remaining cases were classified into two groups: "forced adjustments" and "autonomous adjustments" depending on the financial constraints, during the adjustment process. Specifically:

- "*Supported adjustments*" are current account adjustments that were mainly due to external factors, such as transfers, improvements in the terms of trade or nominal depreciation of the anchor,[15] and internal factors that required little policy actions by the government, such as the exploitation of natural resources, better meteorological conditions in agricultural countries or recovery from political turmoil. We decided to classify as "supported adjustments" countries that benefitted substantially from external factors, even if there were some financial constraints or a political willingness to conduct a fiscal consolidation process. The "supported adjustment" group thus contains countries that conducted current account adjustment in times of crises, such as Burkina Faso, Central African Republic, Chad, Djibouti, Equatorial Guinea, Jordan, Lesotho, Mali, Niger, Republic of Congo, Swaziland and countries whose current account adjustment occurred outside crises such as Bahrain, Gabon, Kuwait, Malaysia, Oman, Qatar, Saudi Arabia. The "supported adjustment" group thus contains countries for which the adjustment process carried a high social cost (for example, GDP decreased by 20 per cent in Niger during the adjustment) and countries for which the adjustment provided social benefits due to exports of raw materials (for example, in Equatorial Guinea, GDP increased by 106 per cent during the adjustment).
- "*Forced adjustments*" are current account adjustments which were mainly driven by markets pressures and financial stress that forced countries to conduct policies facilitating the current account adjustment. For example, when interest rates were market-based, countries had to implement fiscal consolidation measures in response to higher interest rates. In countries whose currencies were pegged to an anchor, capital outflows and sudden stops of capital inflows often required the monetary authority to increase interest rates in order to maintain the peg and restrictive monetary policy often led to a contraction of domestic demand. From a theoretical point of view, the notion of "forced adjustment" does not mean that current account adjustment was the only response to market pressures. Countries can indeed default in response to higher interest rates and implement capital controls or exchange controls in order to maintain the peg. However, both options have side effects in terms of credibility that countries may prefer to avoid.
- "*Autonomous adjustments*" are current account adjustments which were the results of policy actions from the government, with little market pressures and little or no contribution from transfers and commodity exports. In most cases, the adjustment came from structural reforms (pension reforms, reform of the welfare system…), and also fiscal consolidation, persistently restrictive monetary policy to limit inflation, and fiscal devaluation. Productivity gains and price moderation, which were notably due to wage moderation, increases in competition, liberalization and deregulation, also facilitated current account adjustments.

Table 2 shows the classified current account adjustments of the sample.

---

[15] The nominal depreciation of the anchor is here considered as an external factor although turmoil in a single country can induce the depreciation of the currency of the union, such as the devaluation of the CFA franc *vis-à-vis* the French franc, which was largely due to the turmoil Ivory Coast faced in 1993.

Table 2

Classification of the Current Account Adjustments Identified During 1980-2010 and Evolution of Major Macroeconomic Parameters During the Adjustment[16]

Type of Adjustment	Forced Adjustments	Autonomous Adjustments	Supported Adjustments	Total Sample
List of countries	Bulgaria, Estonia, Hong Kong, Ireland, Latvia, Lebanon, Lithuania 98-01, Lithuania 07-09, Spain	Austria, Germany, Belgium, Netherlands	Belize, Bahrain 02-07, Bahrain 92-96, Burkina Faso, Central Republic, Chad, Djibouti, Equatorial Guinea, Gabon 88-90, Gabon 92-96, Ivory Coast 92-94, Ivory Coast 00-02, Jordan, Kowait, Lesotho, Malaysia, Mali, Niger, Oman, Qatar, Republic of Congo, Saudi Arabia 91-96, Saudi Arabia 01-05, Swaziland 82-88, Swaziland, 98-03	
Average size *(percent of GDP)*	15.6	7.2	25.1	20.9
Average duration *(years)*	2.4	7.3	3.5	3.6
Evolution of unemployment rate	7.9	2.3	–0.1	4.0
Increase in GDP *(percent)*	–5.0	15.8	24.9	15.9
Average speed of the adjustment *(percent of GDP/year)*: size/duration	6.4	1.0	7.2	5.8
Increase in GDP *(percent)*/Average duration of adjustment ratio	–2.1	2.2	7.2	4.4

The three typical cases listed above do not provide an exclusive grid, in which every country would perfectly match with one and only one typical case. Indeed, the adjustment processes in several countries may display features from more than one typical type.[17] For example, many episodes (such as Niger and Mali) display features from the "forced adjustment group" such as tight financing constraints at the beginning of the adjustment and also features from the "supported adjustment groups" such as transfers, a nominal depreciation of the anchor, or improvements in the terms of trade. Also, better crops or exports of raw materials substantially contributed to the current

---

[16] The evolution of the unemployment rate was computed only for countries for which data were available in the WEO database, *i.e.* Saudi Arabia 01-05, Jordan, Kuwait, Malaysia, Germany, Austria, Belgium, the Netherlands, Belize, Bulgaria, Spain, Estonia, Hong Kong, Ireland, Latvia, Lithuania 07-09. In particular, the statistic may not be significant for supported adjustments due to the lack of data for most cases. The evolution of the unemployment rate is computed as the difference between the peak in unemployment rate during the adjustment period and the unemployment rate the first year. When unemployment decreases during the adjustment, the evolution of unemployment is computed as the difference between the unemployment rate the last year and the first year of the adjustment.

[17] Specifically, the episodes in which the current account adjustment process matches features from several types are: Belize was classified as a "supported adjustment" because it benefitted largely from external factors (end of the veterinary crisis) whereas the decision to implement fiscal consolidation measures to forestall a current account crisis is a feature of an "autonomous adjustment". Although it received some financial assistance from the European Union, Latvia was classified as a "forced adjustment" because of the strong fiscal consolidation and internal devaluation conducted – the financial assistance from the EUR mostly consisted of loans.

account adjustment and to alleviate financing constraints in some countries, such as Mali and Central African Republic. Several (mostly African) countries undertook fiscal consolidation processes (and developed their open sectors), in a context of fiscal account deterioration or lenders' pressures. These countries were classified as "supported adjustment" when they benefitted from a substantial devaluation of the anchor (Ivory Coast 1992-94, Gabon 1992-96, Lesotho, Swaziland 1982-88, Swaziland 1998-03), better crops (Central African Republic, Mali), transfers or agreement on debt reduction (Ivory Coast 1992-94, Ivory Coast 2000-02, Gabon 1992-96, Jordan, Mali, Niger, Republic of Congo, Chad) and new resources from exports of raw materials. Most countries which benefited from a cessation of internal turmoil (Lesotho, Swaziland 1982-99, Ivory Coast 2000-02, and Republic of Congo) or recoveries from natural disasters (Belize, Burkina Faso, Mali, Niger) were classified as "supported adjustment".

Table 2 indicates that the three types of adjustments on average display a great variability in terms of size, duration, evolution in employment rates and GDP.

Countries that conducted a "supported current account adjustment" managed to improve their current account by 25.1 per cent GDP during the adjustment period. The adjustment was accompanied by increases in GDP by 24.4 per cent on average throughout the adjustment period and diminutions in unemployment (–0.1 point) on average.

Countries that conducted a "forced current account adjustment" managed to adjust by 15.6 per cent GDP on average and the duration was shorter on average than for the total sample average (2.4 years compared to 3.6 years). The adjustment was generally associated with high social costs: a decrease in GDP by 5 per cent on average and an increase in the unemployment rate by 7.9 points. Such result is coherent with Lane and Milesi-Ferretti (2011) who found that external adjustment in deficit countries was achieved mainly through demand compression in the aftermath of the crisis, inducing high social costs.

"Autonomous current account adjustments" were on average longer than the total sample average (7.2 years compared to 3.6 years) and their size was smaller (7.2 per cent of GDP compared to 20.9 per cent GDP). Compared to our study, Freund (2000) finds a shorter typical duration of 3 to 4 years for industrialized countries – one reason for this is that the minimal size of current account adjustments in our sample is larger (at least 5 per cent GDP) than in the definition chosen by Freund (2000) of at least 2 per cent GDP. The increase of the unemployment rate during the adjustment was smaller than for "forced adjustments" and smaller than for the total sample (2.3 points compared to 4.0 points). The increase in GDP was comparable to the total sample average (15.8 per cent compared to 15.9 per cent).

The longer duration for countries conducting an "autonomous current account adjustment" may be an indication that the reforms implemented gradually bore fruit and needed time to take effects on the current account balance. It may also indicate that the reforms undertaken were better accepted by the population and that the government had less market pressure to implement them than in "forced adjustment" cases.

The social cost and characteristics of the adjustment vary widely among the sample, which confirms that the adjustment process depends on a diversity of factors outside exchange rate regimes. In particular, Chinn and Wei (2008) found that the speed of current account adjustment does not depend on the exchange rate fixity. We observed that the speed for current account adjustment could vary widely among the fixed exchange rate groups: low average speed for autonomous adjustment (1.0 per cent GDP/year) and higher average speed for "forced adjustments" (6.4 per cent GDP/year) and "supported adjustments" (7.2 per cent GDP/year). It could be a point of interest to extend Chinn and Wei (2008) study and compare the speed of adjustment in each of the three groups to flexible exchange rate regimes. Actually, it seems that commodity exporters from the "supported adjustment" group benefit less from nominal depreciation, whereas gains in

competitiveness in the "autonomous adjustment" group, notably, could be facilitated by nominal depreciation.

The higher social costs carried by "forced adjustments" than by "autonomous adjustments" should be an incentive for countries to decide to undertake a current account adjustment in advance rather than let current account deficits aggravate and risk being forced to conduct current account adjustments under market pressures. However, few countries belong the "autonomous adjustment" group (4) which may indicate that most countries did not undertake a current account adjustment until they were forced by financial pressures – or benefited from external factors that made the current account adjustment less harmful.

We find that current account reversals did not always carry social costs, notably when countries benefited from a positive contribution of external factors, transfers and commodity exports – which is in line with previous findings, such as Milesi-Ferretti and Razin (1998), that current account adjustments do not always imply slowdowns in activity. Compared to Milesi-Ferretti and Razin (2000) who find that current account adjustments had negligible effects on short-term growth, we observe that, in fixed exchange rate regimes, there were some cases in which the negative impact on short-term growth could be sizeable, notably for countries conducting "forced adjustments". We find that the effect of current account adjustment on growth varied depending on the share of short-term policy actions implemented to foster the adjustment as well as the economic environment. The effects of current account adjustments on growth in emerging economies varied widely within the sample, notably depending on the role of commodity exports in the adjustment.

5 Role of external and internal factors in the current account adjustment process

5.1 Many current account adjustment were induced by external or domestic crises

In many cases, the beginning of the current account adjustment period coincided with the occurrence of a crisis and, as the economic environment improved during the adjustment period, the crisis factors disappeared. The sample contains different examples of crises, at a local, regional or global scale.

Specifically, a number of countries suffered from a deterioration of their credit conditions, which materialized by increases in sovereign rates, capital outflows and sudden stops of capital inflows or speculative attacks on the peg. In the context of the 2008 crisis, market conditions deteriorated for many, mostly European (Bulgaria, Spain, Estonia, Ireland, Latvia, Lithuania), countries. Market pressures induced increases in interest rates which triggered fiscal (and also private) consolidation processes. For many of these countries, local factors added to the financial turmoil, such as bursts of property bubbles in Ireland, Spain, Latvia and Lithuania or speculation against the lat in Latvia. In 2004, Lebanon suffered from capital outflows and speculative attacks on the peg. In 1998, Hong Kong faced speculative attacks on the peg, a deterioration of credit conditions and a loss in competitiveness due to the devaluation of the Yen, in the context of the Asian crisis. The same year, Lithuania suffered from strong capital outflows in the context of the Russian crisis.

Various countries in the sample suffered from natural disasters. In particular, many agricultural countries faced the consequences of bad meteorological conditions or the consequences of veterinary crises, for example Belize had to deal with the impact of a hurricane and a veterinary crisis at the beginning of the adjustment. Mali suffered from poor harvests at the beginning of the adjustment, due to grasshoppers. Niger and the Central African Republic suffered from the

consequences of a persistent drought at the beginning of the 1980s. Burkina Faso suffered from floods in 2008, at the beginning of the adjustment. Malaysia was also affected by SARS in 2001.

Many countries suffered from the consequences of political and military turmoil, which induced a contraction of private demand at the beginning of the adjustment, while public demand was often boosted by weapon purchases. Also, transfers happened to be temporarily stopped for countries facing internal turmoil. Republic of Congo and Ivory Coast suffered from strife, around year 2000. Saudi Arabia and Bahrain had large military spending during the Gulf War. Lebanon was the theater of political tensions after the murder of Rafic Hariri and suffered from a military conflict with Israel during the adjustment. Niger suffered from the conflict concerning the control of the resources of Lake Chad in the mid-1980s, which led a closure of the border with Nigeria in 1984. In Lesotho and Swaziland, there were internal disturbance in a context of political uncertainty.

While a number of countries in the sample suffered crises, more benign factors, such as losses in competitiveness, notably through terms of trade declines or increases in the real effective exchange rates, aggravated the current account deficits before the adjustments, in many countries.

5.2 Contribution of external factors and improvements in the economic environment to the current account adjustment

Most countries benefited from substantial improvements in their economic environment during the current account adjustment which naturally led to boost export value even with little action from economic agents.

a) Several external factors have contributed to the adjustment process

Among external factors, a rebound in external demand after a crisis often led to an increase in the volume of exports. The sample contains several cases of rebounds in exports after global crises, notably in Eastern Europe after the 2008 crisis, but also in Ireland and Spain, in Djibouti (higher demand for shipping), in Burkina Faso and in Jordan. Germany and the Netherlands benefited from an increase in external demand after the 2001 crisis. The sample also contains examples of countries which benefited from a rebound in external demand after a regional crisis (Hong Kong after the Asian crisis, Lithuania after the Russian crisis). There are also examples of local crisis, notably political and military turmoil, natural disasters or sanitary crisis, after which countries benefited from a rebound in external demand – when the effects of the crisis disappeared: Lebanon and Malaysia benefited from a rebound of tourism after the political crisis in Lebanon and after the SARS in Malaysia.

Improvements in the terms of trade substantially contributed to the adjustment in some countries, particularly in exporters of raw materials. Among noticeable examples, Burkina Faso benefited from increases in the price of gold. After, the 2001 crisis, many oil-exporting countries benefited from increases in the price of oil, such as Bahrain, Chad, Kuwait, Malaysia, Saudi Arabia. Agricultural countries such as Ivory Coast, Gabon and Mali benefited from improvements in the terms of trade at the end of the adjustment processes.

Depreciation of the real effective exchange rate due to external factors increased competitiveness in many countries – for example, through the depreciation of the anchor currency. Belize benefited from the depreciation of the US dollar between 2002 and 2006. Austria and Belgium benefited from the depreciation of the Deutsche Mark *vis-à-vis* the dollar at the end of the 1990s. Ivory Coast and Gabon benefited from the depreciation of the CFA franc *vis-à-vis* the French franc in 1993. In many cases, the peg contributed to anchor inflation expectations, for

example in Belgium and Austria in the context of the ECU. Last, changes in the trade structure could also play a role to foster current account adjustment: Austria and Lithuania benefited from high growth in Eastern Europe, Germany benefited from high demand in investment goods in Asia and the Middle East. Jordan benefitted from growth in the Middle East.

Many countries benefited from official transfers during the adjustment. Transfers could take the form of bilateral or multilateral financial supports, agreements on debt reduction in the Paris and London Club. The countries that benefitted from transfers were Belize, Burkina Faso, Chad, Ivory Coast, Gabon, Jordan, Lesotho, Mali, Niger, Niger, Republic of Congo and Swaziland. Many European countries benefited from the use of European structural funds during the crisis – but these funds were not specifically related to the crisis. Apart from subsidies, loans happened to alleviate financial constraints: for example, Latvia benefited from financial support from the European Union. Non official transfers and worker's remittances contributed to the adjustment in Jordan.

b) In some cases however, external factors did not all play a positive part in the adjustment process

In many cases, the adjustment had to be undertaken in a context of weak economic environment, sometimes due to crises. There are also cases in which the economic environment did not improve substantially during the adjustment. Niger, for example, did not benefit from a decisive surge in the demand for uranium or in uranium prices – and crops did not substantially improve. For countries which undertook current account adjustments in the aftermath of the 2008 crisis, external demand rebounded but remained sluggish, and many countries had to adjust in this context. Another example of adjustment in a weak external environment is that of Austria which was hurt by the effects of the 2001 crisis at the end of the adjustment.

The terms of trade had a negative contribution in some countries such as Belize and Djibouti. In many countries, the beginning of the adjustment coincides with a period of declining terms of trade (Ivory Coast, Gabon 92-96) – these countries benefited however from an improvement of the terms of trade during the adjustment.

For some countries the real effective exchange rate appreciated during the current account adjustment. In particular, some countries had to deal with an appreciation of the anchor currency *vis-à-vis* their trade partners. For example, in Germany and the Netherlands, the current account adjustment coincided with an appreciation of the euro *vis-à-vis* the dollar.

Last, transfers contributed negatively to the adjustments in some countries, for example Saudi Arabia.

5.3 Contribution of domestic policies to the current account adjustment

In most countries, external factors facilitated the current account adjustment process. However, even countries, which widely benefitted from an improvement of the economic environment, implemented policies that contributed to the adjustment. These measures can be classified into two groups: short-term policy measures and structural reforms – which were mostly oriented to the longer term even if they also had short-term effects. In most countries, the current account adjustment process was due to a combination of shorter-term and longer-term measures. The share of short-term policy measures and structural reforms notably depends on the time frame of the adjustment because the impact of structural reforms usually takes more time to be observed that short-term policy actions. In particular, countries under financial pressures, which implemented short-term policy actions to reduce the deficit, also implemented structural longer-term reforms.

a) Short term policy measures

In the sample, the short-term policy measures were often implemented in response to financial stress (as in the "forced adjustment" group, in general, and in some countries from the "supported adjustment" group with little access to markets) or by external parameters, such as the abidance by the Maastricht criteria (Austria, Belgium, Lithuania 1998-2001).

Countries with pegged currencies and members of monetary unions facing financial stress often had to implement measures to deal with capital outflows and/or increases in interest rates for public (and private) agents – when the interest rates were determined by market forces. Countries with sustained fiscal deficits and little access to financial markets had often no choice but to implement ambitious fiscal consolidation plans or request financial support from bilateral or multilateral institutions. In addition, some countries with pegged currencies sometimes faced speculative attacks on the peg and chose to react in order to maintain the level of the exchange rate.

Specifically,

(i) Increases in interest rates by monetary institutions to support the peg, as was the case in many Eastern European countries which were pegged to the euro after the 2008 crisis, in Lithuania during the Russia crisis, in Lebanon, in 2004, and in Hong Kong, in 1997, whose currencies were pegged to the dollar. In addition, the countries had to dip into their exchange reserves, eventually requesting financial assistance from abroad. Interestingly, most countries in the sample resisted the temptation to establish controls on capital outflows or exchange controls to limit downward pressure on the peg. Actually, whereas controls may provide countries with short-term gains, implementing such controls may threaten the credibility of countries and discourage investment.

(ii) Fiscal consolidation was conducted in most countries during the current account adjustment and consisted of a combination of tax hikes and spending cuts, whose respective shares vary largely among the sample. Countries under financial stress which conducted a "forced adjustment" notably had to restore fiscal sustainability rapidly. Countries which conducted an "autonomous adjustment" also implemented some short-term consolidation measures (in particular Belgium and Austria to abide by the Maastricht criteria), which complemented structural reforms. Among countries conducting a "supported adjustment" the need for fiscal consolidation varied widely. Some countries needed to implement ambitious consolidation plans in the short term to guarantee the sustainability of public debt, notably in Africa (Ivory Coast, Gabon 1992-96, Mali, Niger, Swaziland) or chose to implement adjustment policies even if they had more time (Belize) and other countries (mainly Gulf countries benefitted from large fiscal revenues from commodity exports). Among the short-term measures that were implemented, many countries increased the VAT rates, excise tax rates or sales tax (Burkina Faso, Djibouti, Spain, Estonia, Latvia, Lithuania 2007-09, Germany, the Netherlands, Ivory Coast 2000-02, Gabon 1992-96, Lesotho, Lebanon, Mali, Niger, Swaziland 1998-2003 among others). Among spending cuts, some countries reduced consumption expenses (Saudi Arabia 1991-96, Bahrain 1992-96, Ivory Coast) and investment expenses (Spain, Ivory Coast). Many countries applied wage moderation measures in the public sector to reduce public payroll through wage freezes, reductions in nominal wages or reduction in the number of civil servants (Germany, Austria, Bulgaria, Spain, Latvia, Ireland, Gabon 1992-96, Kuwait, Mali and Niger). Some countries reduced subsidies, notably to sectors that largely contributed to the current account imbalances, such as the energy sector (Jordan, Malaysia and Kuwait). The sample also contains examples of countries which did little consolidation during the adjustment. In certain cases, fiscal consolidation measures happened to be combined with tax cuts and increases in spending. Even countries undertaking a "forced adjustment process", such as Hong Kong and Lebanon, chose to alleviate the consequences of the financial tensions

through subsidies and fiscal deficit. Many exporters of raw materials increased public investment, notably to improve competitiveness and develop the open sector (see V 3 b).

(iii) Protectionist measures, such as increases in tariffs, were rarely applied among the sample, with the exception of Mali and Niger at the beginning of the 1980s. Both these countries increased taxes on imports. Niger also reduced taxation on cattle exports. Theoretically, increases in tariffs have short-term effects by reducing domestic prices and increasing the prices of imports but they may discourage investment in productivity. Thus, many countries in the sample reduced tariffs in order to increase competition (see V 3 b). Protectionist measures could also take the form of *fiscal devaluations* when increases in the sales tax or in the VAT were accompanied by other tax cuts.[18] Among the sample, Germany increased the VAT rate and decreased payroll tax and the Netherlands accompanied increases in the VAT rate by reductions in the income tax.

In general, short-term policy actions led to contractions in domestic demand on both the public and private sides. Another option for private agents, in countries conducting current account adjustment, was emigration with an uncertain effect on the current account: whereas emigration of low-skilled workers could reduce domestic unemployment and lead to an increase of remittances, emigration of high-skilled workers may have a negative impact on productivity.

b) Structural and longer-term policy actions

Along with short-term measures, many countries implemented policy actions and structural reforms that aimed at increasing competitiveness in the longer-term – whose benefits bore fruit after a longer period of time. Most countries, in all three groups, implemented structural reforms. However, the structural reforms were not necessarily the major drivers of the adjustment, notably for countries that implemented ambitious short-term policy actions or that benefited from substantial improvements of the economic environment.

Specifically, the structural reforms aimed at restoring competitiveness and boost exports:

(i) Prudential measures and persistent increases in interest rates were implemented in many countries in order to limit inflation, so as to avoid declines in price competitiveness or the formations of credit bubbles. For example, Malaysia increased its interest rates throughout the adjustment, Equatorial Guinea implemented a restrictive monetary policy, Oman limited credit (by restricting the volume of personal loans to 30 per cent of total loans), and Kuwait limited the loan/deposit ratio.

(ii) Many fiscal consolidation plans included pension reforms and reforms in social welfare, designed to improve or restore fiscal sustainability in the longer run, with a lower impact on short-term growth than the short-term policy measures (see V 3 a). Many of these reforms contributed to wage moderation notably by stimulating labor supply (cf. wage moderation).

Among the four countries that conducted "autonomous adjustment" processes (Table 3), public debt was substantially reduced in Belgium (–12 points of GDP) – public debt was very high at the beginning of the adjustment (126 points of GDP). Public debt also improved – to a lower extent – in the Netherlands and in Belgium (respectively by –6 points and –2 points of GDP), whereas it moderately deteriorated in Germany (5 points of GDP). The reduction in

---

[18] Strictly speaking an increase in the VAT rate does not necessarily correspond to a fiscal devaluation when it is not accompanied by tax cuts – this is why increases in the VAT rate were listed among other fiscal consolidation measures. However, in a scenario that establishes fiscal consolidation targets, an increase in the VAT rate can be considered as a policy actions to increase competitiveness: If the VAT rate had not been increased, Governments would have had to increase other taxes – or reduce public spending – to achieve the same consolidation targets.

Table 3

Evolution of Public Debt During the Current Account Adjustment for Germany, Austria, Belgium and the Netherlands

Country	Public Debt *(percent of GDP)*			Structural Balance *(percent of potential GDP)*		
	Beg. Ajust.	**End Ajust.**	**Variation**	**Beg. Ajust.**	**End Ajust.**	**Variation**
Germany	60	65	5	–1.6	–1.1	0.5
Austria	68	66	–2	–5.6	–1.3	4.3
Belgium	126	114	–12	–8.3	–1.0	7.3
Netherlands	54	47	–6	0.5	0.1	–0.4

public debt in Austria and Belgium was largely driven by the political commitment to abide by the Maastricht criteria.

The adjustment path varied widely among the sample and was largely due to structural reforms accompanied by some short-term policy actions (Table 3). Austria reduced public spending by 8 points of GDP between 1995 and 2002. Belgium increased public incomes by 4 points of GDP. Belgium and Austria made a high structural effort (respectively of 7.3 and 4.3 points of potential GDP) as structural deficit was high at the beginning of the adjustment (respectively of –8.3 and –5.6 points of potential GDP). In both cases, long rates decreased during the adjustment, which indicates that the policies, designed to ensure the sustainability of public debt, were judged credible by markets. The example of Belgium, notably, proves that debt reduction is feasible and can raise market confidence even if the debt level is very high at the beginning of the adjustment – depending on the implementation of adequate reforms, the sufficient duration of the consolidation path (the mean duration in the "autonomous adjustment" group exceeds seven years) and the external environment.

(iii) Increases in labor and capital productivity contributed to gains in competitiveness. Many countries invested in education/training (Belgium, Niger, Malaysia, Burkina Faso and Bulgaria) and in the building of infrastructures (Lithuania 1998-2001, Niger, Gabon 1988-90, Oman, Lithuania 2007-09, Bulgaria and Burkina Faso). Austria launched a program of industrial restructuring in 1990s to increase productivity. The Netherlands launched a platform to support innovation to reallocate investment to fast-growing sectors. Germany increased productivity in the goods and services sectors. Generally speaking, labor productivity increased in most cases in the sample, with some exceptions (for example, Lithuania between 2007 and 2009). Theoretically, increases in productivity can foster current adjustment but only if they are higher than productivity gains for competitors, which notably corroborates Obstfeld and Rogoff (2004) estimate that the US current account adjustment problem would be exacerbated if productivity growth were faster in tradable goods outside the US.

(iv) Reforms of the product market and the business environment led to gains in competitiveness. Many countries increased competition to encourage firms to improve productivity, gain market shares, and exert downward pressures on price levels. Several countries (Austria, Belgium, Lebanon and the Netherlands) strengthened the role of the competition authority during the adjustment process. Many countries decreased tariffs and trade barriers, often in

accordance with regional (Schengen Space, Greater Arab Free Trade Area, South African Customs Unions) or multilateral (World Trade Organization) agreements.

Increases in competition were often accompanied by deregulatory measures (Burkina Faso, Spain, Jordan, Germany, Austria, the Netherlands, Lebanon, Lithuania, Ivory Coast 2000-02, Lesotho, Gabon 1992-96, Mali, Niger, Saudi Arabia 2001-05, Bulgaria, Bahrain, Qatar and Chad), aiming at reducing barriers to entry and limit rent effects. Most countries applied deregulatory policies in the network industries (telecom, energy) and in, some cases, in the financial sector (Malaysia, Lesotho). Deregulation often led to reduce the administrative burden for the private sector (Germany, Austria, the Netherlands, Lebanon, Bulgaria and Lithuania) and to improve the business climate. Along with deregulatory measures, privatization programs were implemented and public monopolies removed by many countries in the sample, with a positive impact on public finances in the short term and a potentially negative impact in the longer run. Privatization programs concerned notably network industries and, in some cases, the financial sector.

The Product Market Regulation (PMR) indicators published by the OECD can be used to evaluate the size of administrative reforms and regulatory reforms undertaken by countries during the adjustment process. These indicators are available for OECD members at only a few dates (1998, 2003 and 2008); hence the study of these indicators is relevant only for countries the adjustment period of which is sufficiently long and close to these dates. We thus limit the field of study to Germany, the Netherlands and Austria and to dates which were close to the adjustment period, namely 1998-2008 for Germany and the Netherlands and 1998-2003 for Austria (Table 4).

Regarding product market regulation, Germany, the Netherlands and Austria (which all belong to the "autonomous adjustment" group) implemented deregulatory policy actions in order to increase their competitiveness with respect to the OECD average. Basically, these measures aimed at increasing competition, in order to exert a negative effect on prices.

The deregulatory measures implemented in Germany, the Netherlands and Austria had various components. Germany and the Netherlands succeeded in reducing the administrative regulation indicator (notably by reducing the administrative burden on firms) by respectively 1.25 and 1.44 between 1998 and 2008 (whereas the administrative regulation indicator was reduced by only 0.9 in the same period of time in the OECD average). Germany reduced the domestic economic regulation indicator by 0.97, notably by reducing the size of the public sector, and barriers to entry in the network sectors by 2.15 (whereas these two indicators decreased respectively by 0.90 and 1.93 in the OECD average). In the Netherlands, these two indicators decreased less than the OECD average – but the values of these indicators remained still largely below the OECD average in 2008. Austria reduced the domestic economic regulation by 1.20 (compared to 0.64 for OECD average), mostly by restricting the role of the public sector, reduced barriers to entry in the network sectors by 2.42 compared to 1.32 for OECD average. In Austria, the product market regulation indicators decreased by the same order of magnitude (0.57) as in the OECD average (0.54). Conversely, administrative regulation is an example of field where Austria deregulated less (0.01) than the OECD average (0.59), which did not prevent Austria from gaining in competitiveness, for deregulation was ample in other areas.

These indicators show that competitiveness can be greatly increased in countries which implemented adequate policy actions but the rather long adjustment period may indicate that measures to increase competitiveness were more effective in the longer run.

(v) Reforms of the labor market and wage moderation led to gains in competitiveness. Wage moderation was sometimes required by law or the result of negotiations between social partners. In some countries, periodical wage increases depended on branch negotiations,

Table 4

Product Market Regulation Indicators for Germany, the Netherlands and Austria

Country	1998	2003	2008	2008/1998	2003/1998
Germany	2.00	1.53	1.27	–0.73	–0.46
Netherlands	1.59	1.30	0.90	–0.69	–0.29
Austria	2.25	1.69	1.38	–0.87	–0.57
OECD average	2.12	1.57	1.35	–0.76	–0.54

Administrative Regulation

Country	1998	2003	2008	2008/1998	2003/1998
Germany	2.51	1.87	1.26	–1.25	–0.64
Netherlands	2.12	1.98	0.68	–1.44	–0.14
Austria	1.68	1.67	1.06	–0.62	–0.01
OECD average	2.24	1.65	1.34	–0.90	–0.59

Domestic Economic Regulation

Country	1998	2003	2008	2008/1998	2003/1998
Germany	2.76	2.00	1.78	–0.97	–0.75
Netherlands	2.28	1.71	1.56	–0.72	–0.57
Austria	3.60	2.40	1.81	–1.79	–1.20
OECD average	2.87	2.23	1.97	–0.90	–0.64

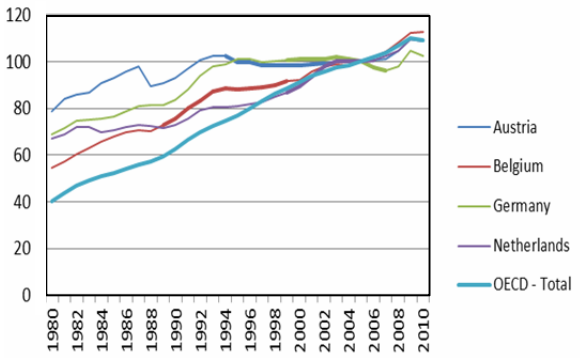
Barriers to Entry in Network Sectors

Country	1998	2003	2008	2008/1998	2003/1998
Germany	3.57	2.32	1.42	–2.15	–1.26
Netherlands	2.98	1.67	1.30	–1.69	–1.31
Austria	4.30	1.88	1.33	–2.98	–2.42
OECD average	3.90	2.58	1.97	–1.93	–1.32

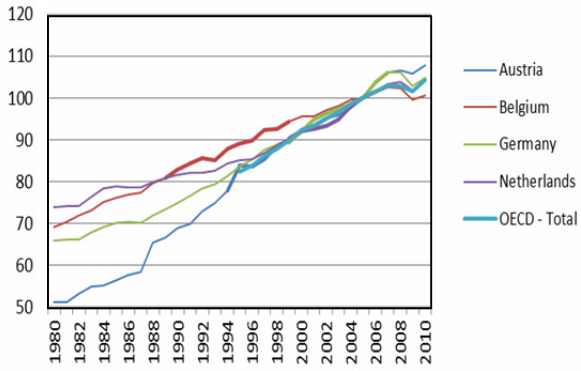
The blue cases refer to the relevant periods of adjustment for each country.
Source: OECD.

Figure 8 **Figure 9**

Unit Labor Costs



Labor Productivity



Unit labor costs (Figure 8) and labor productivity (Figure 9) in Germany, Austria, Belgium and the Netherlands during the adjustment. The thick lines correspond to adjustment periods for the "autonomous adjustment" group. Data for OECD –Total are available only after 1995. Unit labor costs are calculated as the ratio of total labor costs to real output. Labor productivity is calculated as the ratio of real output to work.

eventually leading to wage inflation loops: increases in inflation led to increases in wages, which, in return, tended to increase inflation. To break this loop, Belgium legislated in 1993 and 1996 to limit domestic wage increases based on wage increases in trade partners. Other measures aimed to reduce labor cost through cuts in payroll taxes (eventually by raising other taxes – as in Germany) were also implemented in the sample. It seems that wage moderation was more effective when it was implemented in the long run and resulted from consensual negotiations between social partners (Germany, Austria) than in certain countries in peripheral Europe in the aftermath of the 2008 crisis. In these countries, wage moderation in the public sector seemed to have little impact on the private sector as shown by Piton and Bara (2012).

Other reforms aimed at increasing labor supply so as to exert a negative pressure on wages, which could eventually lead to reduce real wages. The pension reforms implemented by many countries resulted in an increase in the workforce, by increasing the age of entitlement to pension, increasing the contribution period and disincentiving early retirement (Germany, the Netherlands). Also, modifying the system of unemployment compensations and social transfers, with a view to reducing the reservation salary may contribute to increase the workforce (Germany, the Netherlands and Ireland). The creation of unemployment agencies and improvements in educational programs to improve the skills of workers to help them meet new requirements may have contributed to increase the workforce in certain countries.

In the "autonomous adjustment" group, the decrease in unit labor costs compared to trade partners was mostly due to wage moderation. Unit labor costs increased less (or decreased) during the adjustment periods than the OECD average (Figure 8) in Germany (–5 per cent compared to +14 per cent in the OECD average), in Belgium (+21 per cent compared to +42 per cent) and in Austria (+0 per cent compared to +24 per cent) – the Netherlands are an exception as unit labor costs increased slightly more than the OECD average during the adjustment period (+13 per cent compared to 12 per cent). Labor productivity, in Germany, Austria, the Netherlands (Figure 9), increased by the same order of magnitude as the OECD average (data not available for Belgium). For these reasons, decreases in unit labor costs seem to be more due to wage moderation policies than to productivity gains. The decrease in unit labor costs compared to trade partners contributed to limit inflation.

Table 5

Employment Protection Legislation Indicators for Germany, the Netherlands and Austria, and Their Evolution During the Adjustment Periods

Country	Protection for Regular Employment			Protection for Temporary Employment		
	Beg. Ajust.	End Ajust.	Variation	Beg. Ajust	End Ajust.	Variation
Germany	2.68	3	0.32	2	1.25	–0.75
OECD av.	2.14	2.1	–0.04	1.85	1.79	–0.06
Netherlands	3.05	3.05	0	1.19	1.19	0
OECD av.	2.14	2.12	–0.02	1.85	1.78	–0.07
Austria (*)	2.92	2.92	0	1.5	1.5	0
OECD av.	2.13	2.14	0.01	1.9	1.79	–0.11

EPL *A decrease in the value indicates that employment protection legislation became less protective.*
(*) The beginning of the adjustment for Austria was taken in 1998 and not in 1995 because of the lack of available data.
Source: OECD.

Theoretically, the impact of wage moderation policies on nominal wages and unemployment mainly depends on wage rigidity. When employment legislation is protective, wage moderation tends to raise unemployment because of difficulties to adjust. If employment legislation is more flexible, wages tends to adjust more rapidly, with a positive impact on employment. Therefore, many countries in the sample increased labor flexibility during the current account adjustment process with a view to increase competitiveness (Estonia, Latvia, Bulgaria and Spain). Some countries tried to encourage teleworking (Bulgaria). The Employment Protection Legislation (EPL) indicators published by the OECD provide an indication of regarding the evolution of employment flexibility. These indicators have been published since 1998 for regular employment and for temporary employment for OECD members. We study here the evolution of these indicators during the adjustment period for Germany, Austria and the Netherlands (Table 5).

There did not seem to be a clear tendency towards more flexibility in Germany, Austria and the Netherlands during the adjustment period. Employment legislation (Table 5) became slightly less protective in the OECD average than in Austria and the Netherlands. In Germany, regular employment became more protective (0.32 compared to –0.04 for the OECD average), whereas temporary employment became less protective (–0.75 compared to –0.06 for the OECD average). Such evolution may indicate that the wage moderation policies in these countries did not lead to substantial decreases in nominal wages (for nominal wages have downward rigidities and employment legislation remained protective) – and wage moderation was largely due to inflation.

Wage moderation policies were not exempt from social costs, even when wage adjustments were driven by inflation in the long-run. In particular, Blanchard (2007) observes that the growth rate of Germany has been lower than that of the Euro area, after 1995, while nominal wages grew at a lower rate than productivity in Germany after 1992.

Table 6

Product Market Regulation and Employment Protection Legislation Indicators in 2008 in Peripheral Europe

2008		Greece	Ireland	Italy	Portugal	Spain	OECD av.
PMR	Product market regulation	2.30	0.86	1.32	1.35	0.96	1.35
	Administrative regulation	2.00	1.26	0.83	0.86	1.17	1.34
	Domestic economic regulation	3.18	1.17	2.08	2.36	1.50	1.97
	Barriers to entry in network	1.70	1.86	1.62	1.61	1.40	1.97
EPL	Regular employment	2.33	1.60	1.77	4.17	2.92	2.11
	Temporary employment	3.13	0.63	2.00	2.13	1.75	1.77

Source: OECD.

(vi) Many countries developed the open sector and trade – the impetus came from the public or private sector, with a positive impact on employment and growth. Outside the cases in which the contribution of exports to the adjustment was largely due to external factors (rebound of external demand, growth in trade partners), many countries developed the open sector where global demand was high – or growing, in fields where they had comparative advantages. Specifically, commodity exporters developed the production of natural resources, notably in the oil, mining or agricultural sectors. Many countries developed the production of natural resources, such as agriculture and forestry (Ivory Coast, Gabon and Chad), energy (Burkina Faso and Lesotho) or tourism (Lebanon and Oman) to adjust. Some commodity exporting countries also implemented programs to develop the non-commodity sector (Saudi Arabia, Bahrain 02-07, Oman, Qatar and Chad). Several countries developed the production of manufactured goods, notably where external demand was high. In the sample, Bulgaria developed exports of capital goods to Eastern Europe, Germany developed exports of investment goods to Asia and the Middle East. Several emerging and developing countries benefited from investment from abroad to develop the open sector – often to make the most of their low labor costs (Mali, Swaziland).

The sample contains various examples of options to finance the development of the open sector. Outside public funds and private sector investments, there are examples of alternative solutions, such as public-private partnerships (Saudi Arabia, Jordan) and support from multilateral or bilateral institutions, particularly in Africa.

6 Lessons for Europe

In order to gain insights into the necessary structural reforms to be implemented in Europe, we compare the product market regulation indicators and the employment regulation indicators in Portugal, Spain, Ireland and Greece to the OECD average. Outside Greece, product market regulation indicators in peripheral Europe were comparable to OECD in 2008 (Table 6). These indicators were even weaker in Ireland and Spain (0.86 and 0.96 respectively) than in the OECD average (1.35). In 2008, there did not seem to be any major weakness regarding administrative

regulation and barriers to entry in the network sectors for which indicators are generally lower than in the OECD average. However, in Greece, Italy, Portugal, the domestic economic regulation indicators were higher than in the OECD average which may reflect a stronger role of the public sector or barriers to competition.

Employment legislation was more protective in Southern Europe than in the OECD in 2008, which may have prevented nominal wage adjustments in the aftermath of the crisis (Table 6). The indicators however varied largely within countries of peripheral Europe. For regular jobs, employment legislation was more protective in Greece (2.33), in Portugal (4.17) and in Spain (2.92) compared to OECD average (2.11). For temporary jobs, it was more protective in Greece (3.13), in Italy (2.00) and in Portugal (2.13) than in the OECD average (1.77). It was less protective in Ireland. These indicators tend to reflect that wage moderation or downwards pressures on wages might hardly translate into decreases in nominal wages because of wage rigidity. Rather, it was likely to weigh on employment.

Zemanek, Belke and Schnabl (2009) underscore that public structural reforms and private sector restructuring are, rather than public transfers, the best way to preserve long-term economic stability in Europe. Such assessment may need to be specified. Structural reforms take time to take effects and countries under market pressures may not have a sufficient time frame for structural reforms to bear fruit and are forced to implement short-term policy actions with higher social costs. Therefore, structural reforms and public transfers should be considered as complementary options – not mutually exclusive options. While structural reforms are necessary, public transfers (which could take several forms: agreements on debt reduction, bilateral and multilateral transfers) and loans could alleviate the social impact of short-term policy measures.

7 Conclusion

The present paper assesses the feasibility of current account adjustment in countries that maintain a fixed exchange rate with an anchor currency or members of monetary unions. According to our own estimation, 38 current account adjustment cases occurred between 1980 and 2010 without any change in the exchange rate regime. The sample shows a great variety of anchor currencies, geographical areas, size, duration and period of the current account adjustment process and drivers of the adjustment.

Based on the drivers of the adjustment, three typical cases of current account adjustment have been identified: “forced adjustment” characterized by policy responses to financial stress, “autonomous adjustment” in which countries implemented policies to gain in competitiveness and “supported adjustment” for countries which largely benefitted from external factors (rebound in external demand, improvements in the terms of trade, transfers and depreciation of the anchor currency) or exports of commodities.

Some countries conducted their account adjustment without benefitting from a particularly strong external environment – as was the case for many countries in the “forced adjustment” group. Although many countries widely benefitted from exports of commodities or other external factors to adjust, there were often some external factors that contributed negatively to the adjustment – for example the appreciation of the euro in the 2000s for Germany and the Netherlands.

The drivers of the adjustment were rarely unique. Along with a generally positive contribution of the external environment, many countries applied a combination of short-term policy actions and structural measures to foster the current account adjustment process. On the one hand, short-term policy actions, which often included increases in interest rates or fiscal consolidation plans, had a negative effect on domestic demand to reduce imports and carried a generally high social cost. On the other hand, structural reforms, mostly designed to gain or restore

competitiveness seem to take time to be effective. In particular, the average duration of the current adjustment process in the "autonomous adjustment" group exceeds seven years.

Outside countries that benefited from agreements on public debt reduction, transfers or commodity exports, several countries managed to substantially reduce their public debt during the adjustment process. Compared to many countries from the "forced adjustment" group, notably in peripheral Europe, whose public debt largely increased during the adjustment despite the implementation of consolidation measures, this tends to show that consolidation is more effective when the timeframe is sufficiently long for structural reforms to bear fruit.

Many countries from the "forced adjustment" group implemented structural reforms along with short-term policy actions. However the effects of the structural reforms implemented on the current account deficit seem to have been moderate so far, in particular, deflationary measures and measures to gain in competitiveness had little impact on the price indexes in the short run. Actually, the lack of flexibility in nominal wages tended to reduce the scope of wage moderation policies. With this respect, current account adjustment was likely to be particularly long and difficult in the current context of generalized low inflation in industrialized countries. Also in the long term, wage moderation might carry a social cost through decreases in the power of purchase.

While product market regulation in peripheral Europe seems comparable to the OECD average in most countries (outside Greece), employment legislation seems more protective in Southern Europe than in the OECD average, which may limit the effects of wage moderation for rapid gains in competitiveness. Actually, many countries in peripheral Europe have managed to improve their current accounts through a contraction in domestic demand, because the structural reforms which they implemented need time to take full effects. This may call for future discussions on ways to alleviate the social costs of short-term policy actions in the short term in peripheral Europe, while ensuring that the necessary structural reforms are implemented.

APPENDIX 1
REINHART AND ROGOFF CLASSIFICATION OF EXCHANGE REGIMES

Fine and coarse classification of Reinhart and Rogoff regarding exchange regimes:

Natural Classification Bucket	**Number assigned to category in fine grid**	**Number assigned to category in coarse grid**
No separate legal tender	1	1
Pre announced peg or currency board arrangement	2	1
Pre announced horizontal band that is narrower than or equal to +/- 2%	3	1
De facto peg	4	1
Pre announced crawling peg	5	2
Pre announced crawling band that is narrower than or equal to +/- 2%	6	2
De facto crawling peg	7	2
De facto crawling band that is narrower than or equal to +/- 2%	8	2
Pre announced crawling band that is wide than or equal to +/- 2%	9	2
De facto crawling band that is narrower than or equal to +/- 5%	10	3
Moving band that is narrower than or equal to +/- 2% (*i.e.*, allows for both appreciation and depreciation over time)	11	3
Managed floating	12	3
Freely floating	13	4
Freely falling	14	5

APPENDIX 2
CHARACTERISTICS OF THE 38 CURRENT ACCOUNT ADJUSTMENTS IDENTIFIED

CB=current balance, beg=beginning, adjust=adjustment, auto = autonomous, forc = forced, supp = supported

Country	Adjustment							Typology	
	CB beg. ajust	CBend ajust	Size (% GDP)	Period	Duration	Peg (*)	Type	Economic Environment	Internal Factors
Austria	–2.9	2.6	5.5	1995-2002	7 years	ECU/ euro	auto.	High growth in trade partners, notably in Eastern Europe. Depreciation of the ECU/euro. Weakening economic environment at the end of the period (2001 crisis)	Strong fiscal consolidation in the context of euro integration. Increase in the taxable base. Wage moderation. Gains in competitiveness. Deregulation (gas, electricity, telecom, transports) and liberalization
Bahrain	–17.4	4.3	21.7	1992-96	4 years	dollar	supp.	Terms of trade weakened before a rebound at the end of the adjustment	Fiscal consolidation with decreasing imports (after the Gulf War). Development of the oil sector
Bahrain	–0.7	15.7	16.4	2002-07	5 years	dollar	supp.	Terms of trade improved, stronger external demand	Development of the oil and non-oil sector (carbohydrates, aluminium, tourism, financial services). Some prudential measures. Some fiscal consolidation measures, deregulation (in the aftermath of the GAFTA agreement). Privatizations

Country	Adjustment							Typology	
	CB beg. ajust	CBend ajust	Size (% GDP)	Period	Duration	Peg (*)	Type	Economic Environment	Internal Factors
Belgium	1.8	7.9	6.1	1990-99	9 years	ECU/ euro	auto.	Rebound in external demand after a deceleration during 1990-93. Depreciation of the REER. Decreasing interest rates after a surge at the beginning of the adjustment. Low inflation due to the peg	Strong fiscal consolidation in the context of integration into the euro, with tax hikes and spending moderation. Pension reform. Wage moderation. Productivity gains. Deregulation program in retailing, transport, electricity and telecom sectors. Increase in labour flexibility
Belize	–18.6	–2.5	16.1	2003-06	3 years	dollar	supp.	Weakening terms of trade. Higher external demand. Depreciation of the REER. Debt restructuration in 2006	Strong fiscal consolidation. Prudential measures. Recovery from the effect of a veterinary crisis and a hurricane at the beginning of the adjustment. Development of the open sector
Bulgaria	–30.2	–0.9	29.3	2007-…	en cours	euro	forc.	Weak economic environment (2008 crisis) then a rebound. Decreasing financial stress. Improving terms of trade. Appreciation of the REER. Use of EU funds	Strong contraction in public and private demand. Fiscal consolidation. Wage moderation notably in the public sector

Country	Adjustment							Typology	
	CB beg. ajust	CBend ajust	Size (% GDP)	Period	Duration	Peg (*)	Type	Economic Environment	Internal Factors
Burkina Faso	–11.2	–3.5	7.8	2008-…	en cours	WAEMU	supp.	Weak economic environment (2008 crisis), then a rebound. Improving terms of trade (gold). Transfers	Strong contraction in domestic demand in a context of crisis (flooding). Development of the mining sector. Good harvests. Construction of infrastructures. Improvement of education. VAT reform
Central African Republic	–12.8	–3.1	9.7	1983-85	2 years	EMCCA	supp.	Improving economic environment	Fiscal consolidation. Wage moderation in the public sector. Financial stabilization. Development of the open sector (notably agriculture). Better harvests after a drought at the beginning of the period. Development of education. Construction of infrastructures
Chad	–94.7	13.7	108.4	2002-07	5 years	EMCCA	supp.	Improving terms of trade, transfers (due to higher oil and cotton prices). Transfers (World Bank, African Development Bank)	Strong development of the oil sector and non-oil (cotton) sector. Better harvests. Fiscal consolidation. Trade liberalization. Construction of infrastructures
Djibouti	–24.3	–4.8	19.6	2008-…	ongoing	dollar	supp.	Contraction in global demand, notably shipping (2008 crisis) then a rebound. Decreasing terms of trade	Lower imports in response to lower investment. Low inflation. However credit grew and public expenses remained high. Growth in the construction sector sustained domestic demand

Country	Adjustment							Typology	
	CB beg. ajust	CBend ajust	Size (% GDP)	Period	Duration	Peg (*)	Type	Economic Environment	Internal Factors
Equatorial Guinea	–33.3	9.1	42.4	2003-08	5 years	EMCCA	supp.	Improving terms of trade	Strong development of the oil and gas sector (and derivatives). Reduction in public spendings. Restrictive monetary policy
Equatorial Guinea	–33.3	9.1	42.4	2003-08	5 years	EMCCA	supp.	Improving terms of trade	Strong development of the oil and gas sector (and derivatives). Reduction in public spendings. Restrictive monetary policy
Estonia	–17.2	4.5	21.7	2007-09	2 years	euro	forc.	Strong degradation (2008 crisis) then a rebound. Use of EU funds	Strong contraction of private and public domestic demand, after the burst in the property bubble. Wage moderation. Lower social welfare. Increase in VAT rate. Higher labour flexibility
Gabon	–15.7	2.5	18.2	1988-90	2 years	EMCCA	supp.	Improving terms of trade after a drop in oil prices	Fiscal consolidation, development of the oil (Rabi Kounga) and mining (phosphate) sectors. Development of infrastructures: a new ore harbour (Owendo) and the Transgabonais railway
Gabon	–4.0	15.6	19.6	1992-96	4 years	EMCCA	supp.	Weakening terms of trade at the beginning of the adjustment, then a rebound. Gains incompetitiveness after the depreciation of the CFA franc. Transfers. Agreement on debt reduction at the Paris and London club in 1994	Fiscal consolidation. Introduction of a VAT in 1995. Deflationary measures – which achieved little success before the devaluation of the CFA franc. Development of the non-oil sector. Increase in labor flexibility. Liberalization. Improvement of the business environment

Country	Adjustment							Typology	
	CB beg. ajust	CBend ajust	Size (% GDP)	Period	Duration	Peg (*)	Type	Economic Environment	Internal Factors
Germany	–1.7	7.5	9.2	2000-07	7 years	euro	auto.	Weak economic environment at the beginning (2001 crisis), then a rebound. High growth in trade partners, notably in Asia inducing stronger external demand	Wage moderation (Hartz reforms). Fiscal consolidation, notably through pension reforms. Gains in competitiveness. Low investment at the beginning of the period. Low credit growth following the impaired loan crisis at the beginning of the period. Fiscal devaluation
Hong Kong	–4.4	6.3	10.7	1997-99	2 years	dollar	forc.	Degradation (Asian crisis). Loss of competitiveness after the depreciation of the Yen. Speculative attack of the peg. Lower revenues from tourism, then a rebound	Strong contraction in private demand in response to financial stress, higher unemployment and drops in asset prices
Ireland	–5.7	0.4	6.1	2008-…	ongoing	euro	forc.	Strong degradation (2008 crisis), then a rebound. Financial stress	Contraction of public and private demand after the burst of the property bubble and due to higher interest rates. Support from non-cyclical industries (pharmaceutical...)

Country	Adjustment							Typology	
	CB beg. ajust	CBend ajust	Size (% GDP)	Period	Duration	Peg (*)	Type	Economic Environment	Internal Factors
Ivory Coast	–11.4	–0.9	10.4	1992-94	2 years	WAEMU	supp.	Weakening terms of trade then a rebound (of cocoa and coffee prices). Improving REER after the devaluation of the CFA Franc. Bilateral transfers and transfers from multilateral/ international institutions	Fiscal consolidation implying a strong reduction in domestic demand. Investment in agriculture (forestry)
Ivory Coast	–2.8	6.7	9.5	2000-02	2 years	WAEMU	supp.	Weakening terms of trade at the beginning of the period then a rebound. Weakening external demand then a rebound. Bilateral and multilateral transfers	Contraction in domestic demand (in a context of strife). Increase in VAT rate. Lower investment. Development of the oil sector from2002 onwards. Liberalization in agriculture and energy sectors. Some decrease in tariffs (in the context of WAEMU agreements)
Jordan	–17.2	–3.7	13.5	2007-09	2 years	dollar	supp.	Improving economic environment (after the Iraki war), then a degradation (2008 crisis).Improving terms of trade. Agreement at the Paris Club on debt reduction. High growth in trade partners in the Middle East and Asia. High non-official transfers	Contraction in public and private demand. Recovery and development of the open sector (after temporary stopovers in the mining industry). Higher interest rates and prudential measures to limit credit growth. Liberalization and privatization measures

Country	Adjustment							Typology	
	CB beg. ajust	CBend ajust	Size (% GDP)	Period	Duration	Peg (*)	Type	Economic Environment	Internal Factors
Kuwait	11.2	36.1	24.9	2002-06	4 years	MB (**)	supp.	Improving terms of trade	High inflation. Prudential measures to limit credit growth. Wage moderation. Development of the oil sector. Measures to increase the role of the private sector: deregulation (in the context of the GAFTA agreements) and increase in competition
Latvia	–22.5	8.6	31.1	2006-09	3 years	euro	forc.	Strong degradation (2008 crisis) then a rebound. Financial stress. Rebound in terms of trade before a decrease at the end of the period. Emigration to Western Europe. Support from international institutions to stabilize the peg	Strong contraction of public and private domestic demand. Internal devaluation with limited success of wage moderation. Increase in VAT rate. Development of the open sector
Lebanon	–15.3	–5.3	10.0	2004-06	2 years	dollar	forc.	Degradation (financial stress, capital outflows, speculative attack on the peg). Military conflict with Israel inducing a drop in revenues from tourism. REER depreciation	Contraction of domestic demand notably due to higher interest rates and a context of political (murder of R. Hariri) and financial tensions. Pension reform. Higher VAT rate. Deregulation and privatizations

Country	Adjustment							Typology	
	CB beg. ajust	CBend ajust	Size (% GDP)	Period	Duration	Peg (*)	Type	Economic Environment	Internal Factors
Lesotho	–37.9	6.1	44.0	1996-01	5 years	rand	supp.	Depreciation of the REER due to the depreciation of the rand. Transfers	Contraction of private demand (in the context of political turmoil). Development of the open sector with increased diversification. Introduction of a VAT. Privatizations. Deregulation
Lithuania	–11.5	–4.7	6.8	1998-01	3 years	dollar	forc.	Weakening competitiveness as the dollar appreciated *vis-à-vis* the euro. Improving terms of trade in 2001. Financial stress. Benefitted from growth in Western Europe during the Russian crisis, then from growth in Eastern Europe during the 2001 crisis	Contraction (recession in 1999) of domestic demand. Fiscal consolidation stimulated by the abidance to European criteria. Wage moderation. Improvement of the business environment. Deregulation and privatizations. Productivity gains
Lithuania	–14.6	4.4	19.0	2007-09	2 years	euro	forc.	Degradation (2008 crisis) then a rebound. Financial stress. Use of EU funds	Contraction in public and private domestic demand in response to financial stress and bank deleveraging. Reduction in public spendings. Increase in VAT rates. Development of the open sector (mining industry, pharmacy, transports, oil derivatives). Productivity gains. Improvement of education. Increase in labour productivity. Development of infrastructures

Country	Adjustment							Typology	
	CB beg. ajust	CBend ajust	Size (% GDP)	Period	Duration	Peg (*)	Type	Economic Environment	Internal Factors
Malaysia	7.9	16.5	8.6	2001-06	5 years	dollar	supp.	Degradation (in the aftermath of the Asian crisis, 2001 crisis and SARS), then a rebound, Improving terms of trade due to increasing oil prices	Contraction of domestic demand at the beginning of the period, then a rebound. Development of the oil (and non-oil sector – notably high valued added goods). Control of public expenditures. Liberalization (of financial instruments). Improvements in education
Mali	–4.9	2.8	7.7	1986-87	1 year	WAEMU	supp.	Improving terms of trade. High transfers	Fiscal consolidation. Increase in indirect taxes and tariffs. Poor harvests at the beginning of the period, then a rebound with large cereal surplus. Program of economic development financed by the US. Liberalization of agricultural commodity sector
Netherlands	1.9	9.7	7.8	2000-06	6 years	euro	auto.	Weak external demand (2001 crisis) then a rebound	Wage moderation. Gains in competitiveness. Fiscal consolidation at the beginning of the period. Low investment at the beginning of the period. Reforms in social welfare to widen the workforce. Pension reforms. Liberalization. Privatizations. Fiscal devaluation

Country	Adjustment							Typology	
	CB beg. ajust	CBend ajust	Size (% GDP)	Period	Duration	Peg (*)	Type	Economic Environment	Internal Factors
Niger	–11.6	–0.5	11.1	1982-84	2 years	WAEMU	supp.	Persistently weak demand in uranium. Closed border with Nigeria in 1984. Transfers	Strong fiscal consolidation with increase in (direct and indirect) tax rates and the taxable base. Restrictive monetary policy. Drop in the volume of credit. Lower investment. Higher tariffs. Persistently poor harvests due to drought. Development of the open sector. Improvement of education. Construction of infrastructures
Oman	–22.5	15.9	38.4	1998-2000	2 years	dollar	supp.	Improving terms of trade	Some policy measures to decrease domestic demand. Prudential measures. Reduction in public spendings. Development of the oil and non-oil sector (gas). Construction of infrastructures. Improvements in education. Privatization
Qatar	–31.0	27.3	58.4	1995-2001	6 years	dollar	supp.	Weakening terms of trade	Development of the export sector (oil, natural gas and related products, tourism). Fiscal adjustment notably through spending reductions. Wage moderation. Some prudential measures

Country	Adjustment							Typology	
	CB beg. ajust	CBend ajust	Size (% GDP)	Period	Duration	Peg (*)	Type	Economic Environment	Internal Factors
Republic of Congo	–28.5	13.5	42.1	1998-2000	2 years	EMCCA	supp.	Improving economic environment. IMF support	Contraction of private demand due to strifes at the beginning of the period. Recovery of the export sector, notably the non-oil sector
Saudi Arabia	–21.0	0.4	21.4	1991-96	5 years	dollar	supp.	Terms of trade weakened before a rebound at the end of the adjustment. High negative non-official transfers	Fiscal adjustment with decreasing imports (following Gulf War). Development of the oil sector. Development of trade following the signature of GATT agreements in 1993
Saudi Arabia	5.1	28.5	23.4	2001-05	4 years	dollar	supp.	Terms of trade improved. Quotas decreased in 2001 (OPEC)	Development of the oil (and non-oil) sector. Increasingly restrictive monetary policy. Some fiscal consolidation measures. Liberalization and deregulation (telecom). Privatizations. Lower protectionism (lower tariffs – Gulf Cooperation Council)
Spain	–10.0	–4.6	5.4	2007-…	ongoing	euro	forc.	Weakening economic environment. Financial stress (2008 crisis)	Strong contraction in domestic demand in a context of fiscal consolidation following the burst in the property bubble. Lower investment. (Limited) wage moderation. Deregulation. Increase in VAT rate

Country	Adjustment							Typology	
	CB beg. ajust	CBend ajust	Size (% GDP)	Period	Duration	Peg (*)	Type	Economic Environment	Internal Factors
Swaziland	–12.2	10.7	23.0	1982-88	6 years	rand	supp.	Depreciation of the REER due to the depreciation of the rand	Contraction of domestic demand in the context of political turmoil surrounding the succession of the king
Swaziland	–6.0	4.9	10.9	1998-2003	5 years	rand	supp.	Depreciation of the REER due to the depreciation of the rand. Weaker demand from South Africa. Lower transfers in 2001 then a rebound	Contraction of private demand due to higher consumption prices (inflation). Fiscal consolidation mostly based on higher taxes. Development of the open sector (African Growth and Opportunity Act). Productivity gains (agriculture). Increase in the sales tax. Lower tariffs in the context of the (South African Customs Union)

REFERENCES

Bénassy-Quéré, A. (1995), "Ni change fixe, ni change flexible", *La Lettre du CEPII*, No. 133.

Blanchard, O. (2007), "Adjustment Within the Euro Area: The Difficult Case of Portugal", *Portuguese Economic Journal*, Vol. 6, No. 1, pp. 1-21.

Chinn, M. and S.J. Wei (2008), "A Faith-based Initiative: Does a Flexible Exchange Rate Regime Really Facilitate Current Account Adjustment?", NBER, Working Paper, No. 14420, revised December 2011.

Darvas, Z. (2011) "A Tale of Three Countries: Recovery After Banking Crises", Bruegel Policy Contribution, No. 2011/19.

Debelle, G. and G. Galati (2005), "Current Account Adjustment and Capital Flows", BIS, Working Paper, No. 169.

Edwards, S. (2002), "Does the Current Account Matter?", in S. Edwards and J.A. Frankel (eds.), *Preventing Currency Crises in Emerging Markets*, The University of Chicago Press, pp. 21-69.

——————(2004), "Thirty Years of Current Account Imbalances, Current Account Reversals and Sudden Stops", NBER, Working Paper, No. 10276.

——————(2005a), "The End of Large Current Account Deficits, 1970-2002: Are There Lessons for the United States?", NBER, Working Paper, No. 11669.

——————(2005b), "Capital Controls, Sudden Stops and Current Account Reversals", NBER, Working Paper, No. 11170.

Freund, C.L. (2000), "Current Account Adjustment in Industrialized Countries", Board of Governors of the Federal Reserve System, International Finance Discussion Paper.

Freund, C.L. and F. Warnock (2005), "Current Account Deficits in Industrial Countries: The Bigger They Are, The Harder They Fall?", NBER, Working Paper, No. 11823.

Guidotti, P., F. Sturzenegger and A. Villar (2004), "On the Consequences of Sudden Stops", *Economia*, Vol. 4, No. 2, pp. 171-241, Brookings University Press.

Lane, P. and G.M. Milesi-Ferretti (2011), "External Adjustment and the Global Crisis", IMF, Working Paper, No. WP/11/197.

Milesi-Ferretti, G.M. and A. Razin (1997), "Sharp Reductions in Current Account Deficits: An Empirical Analysis", IMF, Working Paper, No. WP/97/168.

——————(1998), "Current Account Reversals and Currency Crises: Empirical Regularities", NBER, Working Paper, No. 6620.

——————(2000), "Current Account Reversals and Currency Crises: Empirical Regularities", in P. Krugman (ed.), *Currency Crises*, pp. 285-326.

Obstfeld, M. and K. Rogoff (2000), "Perspectives on OECD Capital Market Integration: Implications for U.S. Current Account Adjustment", in Federal Reserve Bank of Kansas City (ed.), *Global Economic Integration: Opportunities and Challenges*, pp. 169-208.

——————(2004), "The Unsustainable US Current Account Position Revisited", NBER, Working Paper, No. 10869.

O'Neill, J. and J. Hatzious (2002), "US Balance of Payments: Still Unsustainable", Global Economics Paper, No. 70, New York, Goldman-Sachs.

O'Neill, J. and J. Hatzious (2004), "US Balance of Payments. Unsustainable, But…", Global Economics Paper, No. 104, New York, Goldman and Sachs.

Piton, S. and Y.E. Bara (2012), "Internal Devaluation: Nothing but Sweat and Tears?", *La Lettre du CEPII*, No. 234.

Reinhart, C. and K. Rogoff (2004), "The Modern History of Exchange Rate Arrangements: A Reinpretation", *The Quarterly Journal of Economics*, Vol. 119, No. 1, pp.1-48.

Zemanek, H., A. Belke and G. Schnabl (2009), "Current Account Imbalances and Structural Adjustment in the Euro Area: How to Rebalance Competitiveness", German Institute for Economic Research, Discussion Paper, No. 895.

DEBT REDUCTION, FISCAL ADJUSTMENT AND GROWTH IN CREDIT-CONSTRAINED ECONOMIES

Emanuele Baldacci,[*] *Sanjeev Gupta*[**] *and Carlos Mulas-Granados*[**]

This paper assesses the effects of fiscal consolidations associated with public debt reduction on medium-term output growth during periods of private debt deleveraging. The analysis covers 107 countries and 79 episodes of public debt reduction driven by discretionary fiscal adjustments during 1980-2012. It shows that expenditure-based, front-loaded fiscal adjustments can dampen growth when there are credit supply restrictions. Instead, fiscal adjustments that are gradual and rely on a mix of revenue and expenditure measures can support output expansion, while reducing public debt. In this context, protecting public investment is critical for medium-term growth, as is the implementation of supply-side, productivity-enhancing reforms.

1 Introduction

The recent increase in the ratio of public debt to GDP in advanced economies has been accompanied by the assumption of banking sector liabilities by the public sector following the inception of the global crisis in 2007.[1] The average contribution of financial sector support to gross public debt has been over 10 per cent of GDP.[2] This has worsened public debt dynamics in some countries, raised market pressure on credit risk spreads and undermined output recovery. In addition, access to credit by the private sector has been hampered by the deterioration in balance sheets of the banking sector owing to accumulation of non-performing assets, funding pressures from credit markets, and poor quality of collateral. As a result, output has been shrinking or growing modestly in advanced economies, while fiscal and financial sector weaknesses remain to be addressed (IMF, 2012a).

Under these conditions, fiscal consolidations have not succeeded in lowering public debt in relation to GDP (IMF, 2012b). On the contrary, fiscal deficit-reducing measures in the presence of credit restrictions have dampened domestic demand, which has lowered revenues and worsened the budget position. The beneficial effect of fiscal adjustment on interest rates has been limited because of the perceived link between sovereign and financial sector credit risks. Furthermore, monetary policy effectiveness has been limited by impaired financial sector transmission channels.

This paper studies the effects of fiscal adjustment on output growth by focusing on credit conditions that typically follow financial crises. The center of analysis is episodes of public debt reduction arising from discretionary fiscal adjustment. In doing so, the paper departs from the existing literature on the nexus between fiscal adjustment and growth, which typically sidesteps the question of whether ultimately public debt was reduced in the process. By focusing on the medium term, the paper complements recent studies on short-term fiscal multipliers (Guajardo, Leigh and Pescatori, 2011; Corsetti and Muller, 2012).

---

[*] Italian Statistical Institute (ISTAT). E-mail address: baldacci@istat.it

[**] International Monetary Fund (IMF). E-mail addresses: sgupta@imf.org, cmulasgranados@imf.org

The paper has benefited from helpful comments by Emre Alper, Cristina Brandimarte, Daniel Leigh, Takuji Komatsuzaki, Jeta Menkulasi, Joanna Pereira, Tigran Poghosyan, Sergio Sola and by participants of two IMF and one Italian Treasury seminars and the 2013 Banca d'Italia conference on public finance in Perugia. The authors wish to thank Ibraheem Mehmood and Haoyu Wang for excellent research assistance.

The usual disclaimer applies.

[1] This has happened during other periods in history as well: see Rogoff and Reinhart (2009) and Laeven and Valencia (2008; 2012).

[2] It is 6 per cent if Ireland is excluded from the calculations. See Table 7 in IMF (2012).

The rest of the paper is organized as follows: Section 2 covers the literature review, Section 3 introduces a stylized framework to guide the empirical investigation and Section 4 presents data and methodology of the econometric analysis. Results from the empirical analysis are presented in Section 5, including some robustness tests, and the final section discusses their key policy implications.

2 What explains the link between fiscal adjustment and growth?

There is little consensus in the literature on the short-term output effects of deficit reduction.

This has recently been attributed to the way in which discretionary fiscal policy is measured (Guajardo, Leigh and Pescatori, 2011). It is contended that the "traditional" method[3] – which identifies discretionary adjustments on the basis of changes in the cyclically-adjusted primary balance (CAPB) – could be biased in favor of supporting expansionary fiscal contractions. Changes in cyclically-adjusted fiscal variables often include non-policy changes (such as a boom in the stock market that improves tax revenues or other developments that raise private consumption and investment).[4] An alternative is to identify episodes of fiscal adjustment on the basis of budget plans and government press releases to highlight true discretionary budget changes.[5] Empirical findings tend to differ depending on the method used to identify consolidation episodes: while some authors (Alesina and Perotti, 1996; Perotti, 1999; Alesina and Ardagna, 2010) find evidence of output growth three years after the end of a deficit-consolidation episode under the "traditional" approach, supporters of the "narrative" approach find that a 1 per cent reduction in the fiscal deficit dampens output by 0.75 per cent in the next two years (Devries and others, 2011; Guajardo, Leigh and Pescatori, 2012). In empirical papers with large sample of countries, where budget plans are not easily available, the "traditional" approach based on changes in the CAPB is still the most commonly used.

There is greater consensus in the literature on the medium-term effects of fiscal adjustment on output growth. If deficit cuts succeed in lowering public debt, they reduce the uncertainty about debt sustainability and expected tax pressure, thus stimulating private investment and consumption via lower interest rates, and higher labor force participation (IMF, 2012a). However, the relationship between public debt and growth is complex: in empirical studies countries with higher levels of public debt tend to experience more subdued growth (Reinhart and Rogoff, 2010), but low economic growth can increase public debt ratios even when fiscal adjustment is in place (Herndon, Ash and Pollin, 2013), thereby lowering output expansion.

The link between fiscal policy and medium-term output growth becomes even more complex when credit market conditions are taken into account. Shortage of credit and impaired financial channels can damage growth, while spillover of risks from financial sector to sovereigns can affect debt sustainability. However, studies that deal with the interaction between fiscal policy, financial markets and output growth are limited. The existing literature can be classified into three groups:

- Studies that focus on the reaction of financial markets to fiscal policy: most papers show that financial markets value fiscal discipline (Ardagna, 2004; Alesina and Ardagna, 2010; Cottarelli

---

[3] See Alesina and Ardagna (2010).

[4] As explained by Guajardo, Leigh and Pescatori (2011: 4): "For example, a boom in the stock market improves the CAPB by increasing capital gains and cyclically-adjusted tax revenues (…) Such measurement error is thus likely to bias the analysis towards downplaying contractionary effects of deliberate fiscal consolidation. Moreover, a rise in the CAPB may reflect a government's decision to raise taxes or cut spending to restrain domestic demand and reduce the risk of overheating. In this case, using the rise in the CAPB to measure the effect of fiscal consolidation on economic activity would suffer from reverse causality and bias the analysis towards supporting the expansionary fiscal contractions hypothesis."

[5] The alternative "narrative" approach to identifying fiscal adjustment episodes can be found in Romer and Romer (2010) and Devries *et al.* (2011).

and Jaramillo, 2012). Interest rates, particularly those on long-term government bonds, fall when fiscal conditions improve and rise in periods of budget deteriorations. Stock market prices surge around times of substantial fiscal tightening and plunge in periods of loose fiscal policy.

- Studies that focus on the effect of financial crises on fiscal conditions : recent empirical analyses have shown that financial crises worsen significantly countries' fiscal position, both in terms of government balance and public debt (Reinhart and Rogoff, 2009; Laeven and Valencia, 2008; 2012). In fact, the repair of the banking sector is found to be a pre-condition for a fiscal consolidation to succeed (Barrios and others, 2010).
- Studies that focus on the interaction between financial crises, fiscal multipliers and economic growth: Baldacci, Gupta, and Mulas-Granados (2009) show that expansionary fiscal policies are helpful in reducing recessions' length after a financial crisis, while expenditure-based fiscal consolidations are more likely to be successful in lowering public debt to sustainable levels. However, this is partially valid in a post-financial crisis environment (Baldacci, Gupta, and Mulas-Granados, 2012; IMF, 2012b). Output and consumption multipliers are unusually high during episodes of financial distress (Corsetti, Meier, and Mueller, 2012) The expansionary effects of expenditure-based deficit reductions start to dissipate when large public debt has been accumulated due to the financial crisis and there is a need for new revenue sources. Expansionary austerity is also more difficult when interest rates are close to the zero-bound and/or when countries cannot devaluate (Cottarelli and Jaramillo, 2012; Baum and others, 2012; Guajardo and others, 2012; IMF, 2012b; Blanchard and Leigh, 2013; IMF, 2013).

In parallel to this literature, the financial crisis and the subsequent accumulation of public debt in advanced economies has motivated new research on the factors that help shorten successful public debt reduction episodes (Baldacci, Gupta and Mulas-Granados, 2011, 2012; Eyraud and Weber, 2013), and on the relative contribution of growth and fiscal policy to reducing debt-to-GDP ratios (Escolano, 2010; Abbas *et al.*, 2013)

The present article builds on these studies and assesses fiscal policy contribution to medium-term economic growth in a context of private debt deleveraging and credit constraints,which typically arises after financial crises. The analysis focuses in particular on the fiscal mix that is more likely to lead to better output performance while reducing fiscal imbalances: a key challenge for policymakers in many countries in these days.

3 A Stylized Framework of Fiscal Policy and Growth During Financial Crises

In order to answer the question above, this section develops a simple framework to help underpin the econometric model tested in the paper. The framework describes an economy where the government collects taxes and engages in transfers to households who save to accumulate assets and consume out of wealth and income.

In this framework (discussed in detail in Annex 1), an increase in public debt above a risk-free threshold triggers higher interest rates via a non-zero credit risk premium (Laubach, 2009), which reduces output through both lower investment and income.

Higher public debt would also have an indirect (negative) effect on growth via tax rates, which need to rise to meet the budget constraint. In this context, fiscal consolidation can increase growth by reducing equilibrium tax rates and lowering the risk premium on interest rates. This outcome is consistent with the expansionary fiscal contraction case (Alesina and Ardagna, 2010).

If public debt reduction is achieved by increasing taxes, private consumption would fall and the capital stock would decline, reflecting lower savings owing to a fall in disposable income. This, in turn, would reduce labor income and output. When fiscal consolidation relies on the reduction in

government current expenditure, output can be affected negatively via lower government consumption and transfers to households. However, when public debt falls, risk premia on interest rates could decline, boosting private investment and stimulating private sector growth.

In a standard Keynesian model, expenditure cuts may be more harmful than tax increases as the fiscal multiplier of the former is higher. In the steady state solution of the model used in this paper, this depends on the propensity to consume, the level of tax rates and expenditure composition. For example, a reduction in public investment is more harmful to economic growth than a fall in government consumption as it decreases the stock of public capital and lowers productivity. In this Keynesian case, cuts in transfers are less damaging to growth as they impact private consumption only through the share of disposable income that is not saved.

The stylized model also shows that the impact of spending cuts is in general less harmful for economic growth when public debt is moderate and the tax rate is low. When adjustment needs are large and the equilibrium tax rate is high, the growth elasticity of expenditure cuts increases: a result consistent with the empirical findings in Baldacci, Gupta and Mulas-Granados (2012).

When fiscal consolidation is undertaken in a context of financial sector deleveraging, spending cuts could also lower output via another channel in the model: the interaction of the fiscal adjustment mix with capital accumulation.[6] This would call for a more balanced contribution of revenue increases and savings to deficit reduction, compared to the expansionary fiscal contraction approach. A balanced composition of fiscal adjustment in a context of private debt deleveraging is more likely to have a positive impact on economic growth, in the presence of credit restrictions, by limiting the negative effect of deficit reduction on private consumption. The next section will test this hypothesis empirically.

3.1 Data and methodology

The starting sample used in this paper comprises 160 episodes of public debt reduction in 107 advanced and emerging economies during 1980-2012. The episodes are defined as at least two consecutive years of reduction in the ratio of public debt to GDP.

In principle, the reduction in the debt-to-GDP ratio could stem from a decline in CAPB, a reduction in interest rates, output growth, and other adjustments to the stock of debt (such as privatizations and exchange rate movements). In our subsample, the key factor behind the reduction in the debt ratio was the improvement in the CAPB.

We excluded countries that benefitted from debt relief and selected the public debt reduction spells in which a discretionary fiscal adjustment had taken place.[7] This yielded a subsample of 79 episodes of public debt reduction through fiscal adjustment, with an average duration of about 3.5 years (Table 1).

---

[6] Public debt reductions that rely on higher tax rates reduce savings and lower the economy's capital stock. In normal times, a smaller capital stock would lower output by reducing capital intensity as well as total productivity. In the aftermath of a financial crisis, however, a reduced capital stock lowers the wealth effect of asset repricing, which is positive for growth. The intuition for this result is that in an economy with credit constraints, spending cuts further reduce resources available to consumers and investors, while tax rises tend to hit the share of income that is not saved. The opposite is true for spending-based fiscal consolidations.

[7] We followed the traditional approach (based on the change in the CAPB) to identify episodes of discretionary fiscal adjustment. We first selected episodes in which there were at least two consecutive years of public debt reduction. In the second step, we looked at spells with increases in the CAPB of at least 0.5 per cent of GDP per year, sustained for two years or more during the debt reduction episode. Only episodes of public debt reduction with at least one period of discretionary fiscal adjustment within that period were selected. If more than two fiscal adjustment periods occurred during the public debt reduction spell, average values for the fiscal adjustment variables were used. In the robustness section, we test the sensitivity of the results to these assumptions.

Table 1

Descriptive Statistics

Control Variables	**Obs.**	**Mean**	**Std. Dev.**	**Min.**	**Max.**
GDP growth (*n*+5) *(percentage points)*	532	2.9	2.2	–2.3	8.2
Initial distance from debt target *(percent of GDP)*	371	28.6	19.1	2.4	67.1
Duration of debt consolidation *(years)*	530	8.6	3.4	2	17
Duration of deficit cut *(years)*	537	3.5	1.6	1	7
Size of deficit cut *(percent of GDP)*	495	3.9	2.2	0.2	9.9
Size of debt cut *(percent of GDP)*	536	30.7	26.6	0.5	120.1
Contemporaneous growth *(percent of GDP)*	502	4.5	1.6	0.1	8.1
Quality of fiscal adjustment *(percent of total deficit reduction)*	537	53.3	23.8	0	100
Fiscal Variables	**Obs.**	**Mean**	**Std. Dev.**	**Min**	**Max**
Change in direct taxes[(1)]	351	4.8	7.4	–8.8	12.1
Change in taxes on goods and services[(1)]	330	2.6	9.6	–7.5	18.3
Change in transfers expenditures[(1)]	396	2.4	9.1	–16.0	13.4
Change in wage expenditures[(1)]	370	1.4	9.4	–14.5	14.3
Change in goods and services expenditures[(1)]	369	2.7	7.0	–6.0	10.2
Change in public investment expenditures[(1)]	384	3.6	8.1	–14.1	12.8

[(1)] Percent of total revenues or total expenditures excluding outliers.

The dataset used for the empirical analysis includes three groups of variables: (i) GDP growth and other macroeconomic variables from the IMF's World Economic Outlook database; (ii) a set of indicators measuring credit restrictions imposed on the private sector and bank

recapitalization needs from the IMF's International Financial Statistics,[8] and (iii) data on budget composition from the IMF's Government Finance Statistics.

The average distance of initial public debt from a reference (sustainable) target [9] was 28.6 percentage points of GDP. The average debt reduction during the episode amounted to 30 percentage points of GDP. In 45 per cent of the episodes the debt ratio was reduced to levels below the sustainable threshold. During the debt reduction episodes, the average increase in CAPB was 3.9 per cent of GDP, mostly owing to spending cuts (53 per cent of deficit reduction was achieved through cuts in non-productive spending); annual real GDP growth averaged 3 per cent in the five years after the end of the debt-reduction episode (Table 1).

A preliminary (bivariate) analysis of the data shows that after the debt consolidation spell, economic growth was negatively correlated with the fiscal adjustment size (Figure 1), but positively associated with the adjustment length (Figure 2) and contemporaneous GDP growth (Figure 3). Post-episode economic growth is also weakly associated with the quality of the fiscal adjustment (Figure 4),[10] except in the presence of credit constraints (Figure 5) and bank deleveraging (Figure 6).

The relationship between budgetary composition, fiscal adjustment, and economic growth is estimated by regressing the average real GDP growth 5-years after the consolidation episode has ended on a set of regressors, including fiscal and financial variables. The specification is consistent with earlier studies on fiscal consolidation and growth during crises (Baldacci, Gupta and Mulas-Granados, 2012). It is also consistent with the result of the illustrative model presented in Section 3. The estimation equation is specified as follows.

$$g_{i,t} = \alpha + \sum_{l=1}^{k} \beta_l CON_{ilt} + \sum_{h=1}^{q} \beta_h ADJ_{iht} + \sum_{j=1}^{m} \beta_j FIN_{ijt} + \delta\ FIN_{it} ADJ_{it} + \sum_{n=1}^{p} \beta_n BUD_{\text{int}} + u_{it} \qquad (1)$$

where $g_{i,t}$ is the average growth rate of real GDP (5 years after the episode of debt consolidation); CON_{ilt} is a vector of control variables (initial distance from the "sustainable" debt target;[11] average annual GDP growth during the episode;[12] ADJ_{iht} is a vector of variables that define the fiscal adjustment strategy (duration, size and quality of the fiscal adjustment(s) during the episode); FIN_{ijt} is a vector of financial dummy variables (domestic credit growth and bank deleveraging measured by the capital-to loans ratio); and BUD_{int} is a vector of variables that capture the relative composition of the budget (share of direct and indirect tax revenues in total public revenues; share

---

[8] We include the following variables: (i) domestic credit to private sector in percent of GDP. This variable refers to financial resources provided to the private sector, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries, these claims include credit to public enterprises; and (ii) bank recapitalization needs, using the change in the capital-to-assets ratio. This is the ratio of bank capital and reserves to total assets (in percent). Capital and reserves include funds contributed by owners, retained earnings, general and special reserves, provisions, and valuation adjustments. Total assets include all nonfinancial and financial assets.

[9] The debt distance variable measures the difference between public debt at the beginning of the episode and a target debt level of 60 per cent of GDP in advanced economies and 40 per cent of GDP in emerging economies.

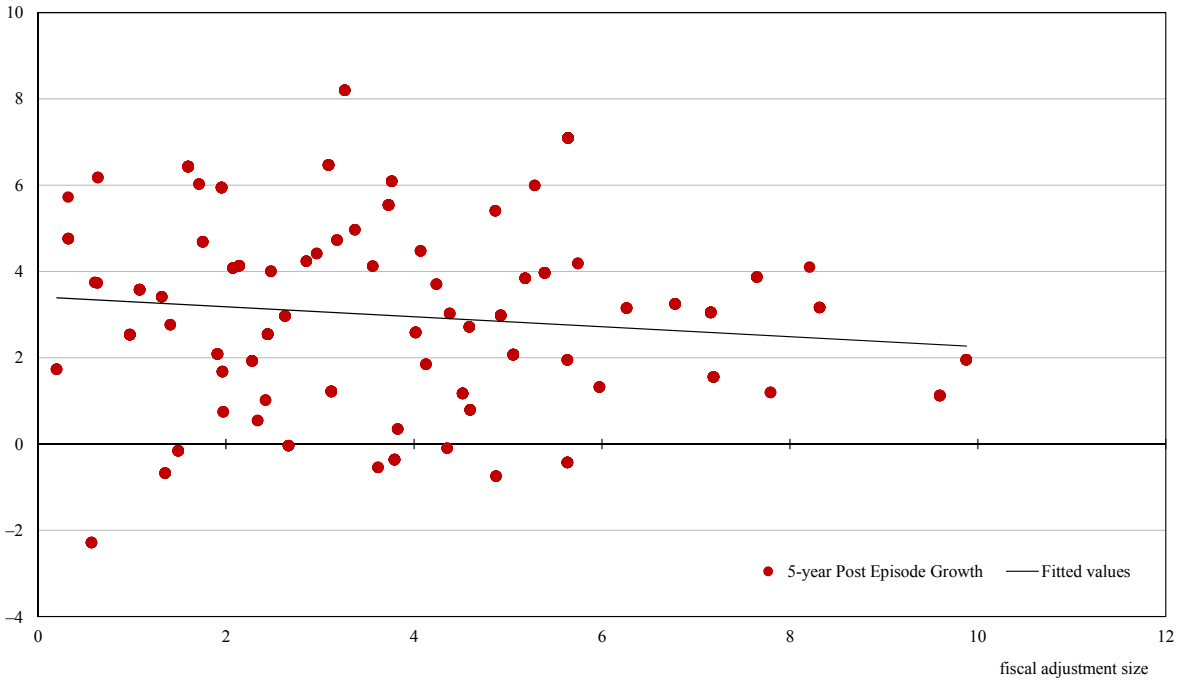
[10] The quality of fiscal adjustments is measured by the contribution of cyclically adjusted current primary expenditures in percent of GDP to the change in the fiscal deficit in percent of GDP (von Hagen, Hallett, and Strauch; 2001). This variable takes values between 0 and 1.

[11] Results do not vary if we use initial debt instead, but the fit worsens.

[12] The average economic growth variable controls for the effect of current output on future economic activity. In addition, we also looked at the potential effect of the business cycle by multiplying fiscal variables in the equation by the output gap. For reasons of space these results are not reported but are available from the authors upon request. In general, these tests confirm previous findings (Auerbach and Gorodnichenko, 2012), showing that expenditure-based adjustments have a more damaging impact on post-episode growth when the output gap is large.

Figure 1

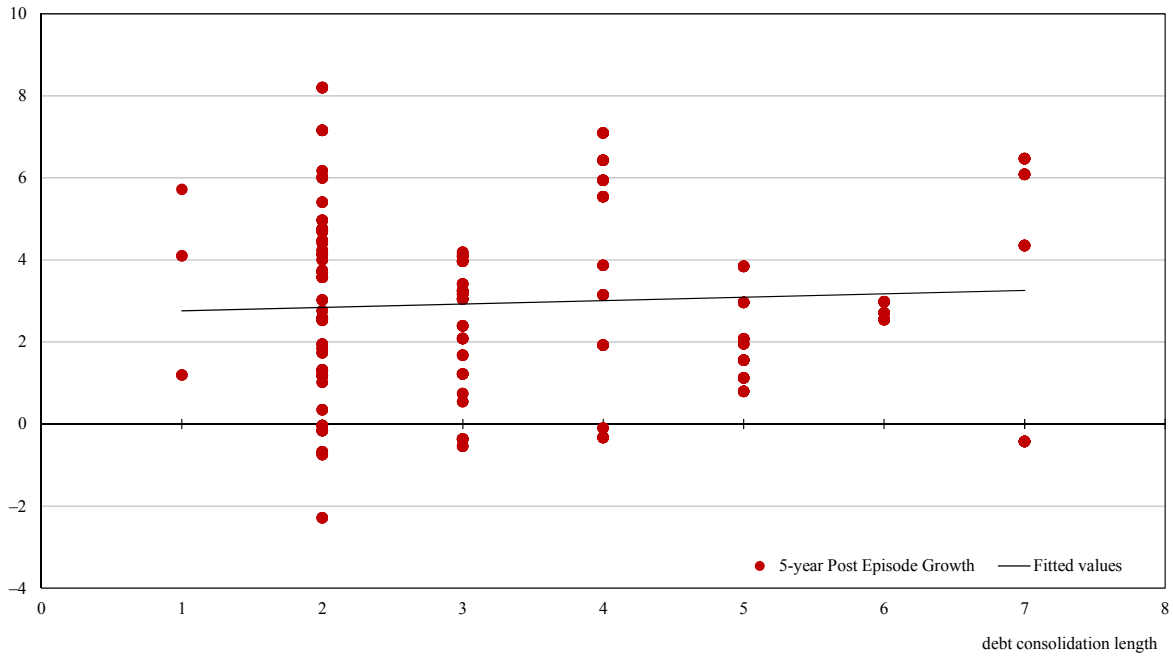
Fiscal Adjustment Size and Average Five-year Post-episode Growth



Source: Authors' own calculations.

Figure 2

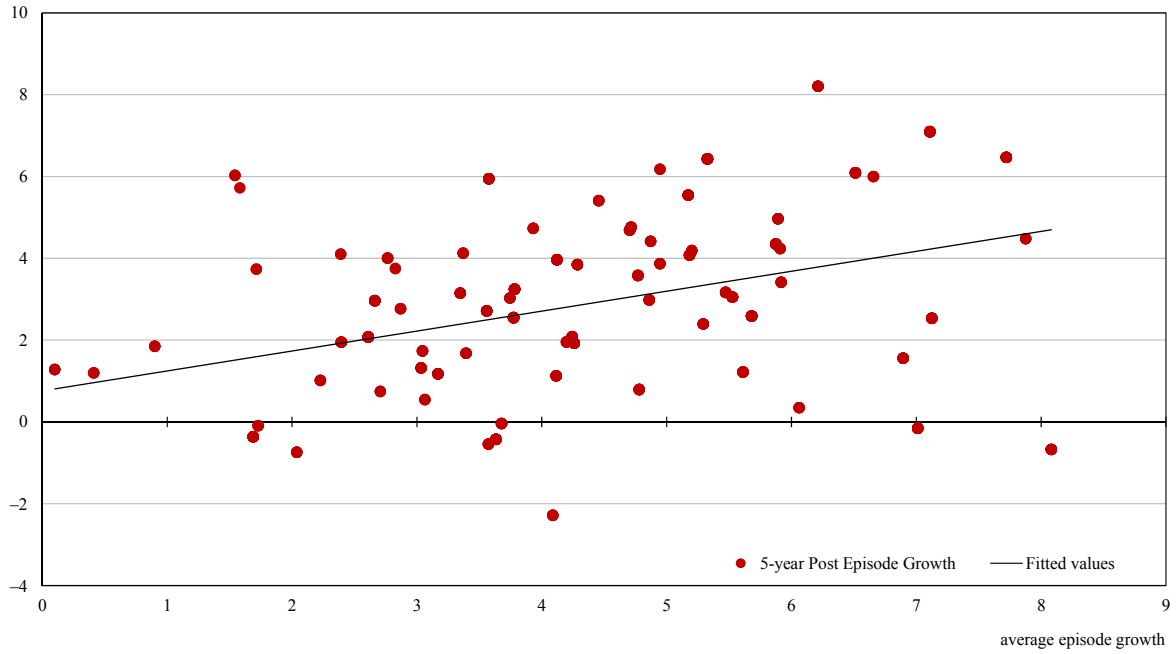
Debt Consolidation Length and Average Five-year Post-episode Growth



Source: Authors' own calculations.

Figure 3

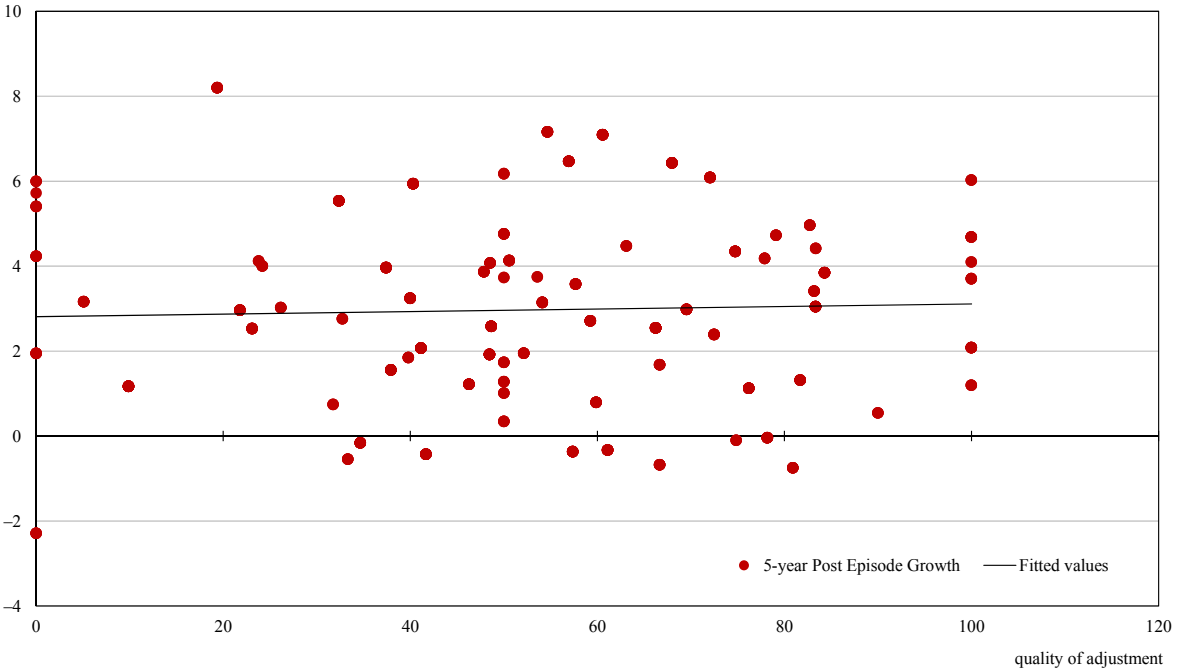
Average Episode Growth and Average Five-year Post-episode Growth



Source: Authors' own calculations.

Figure 4

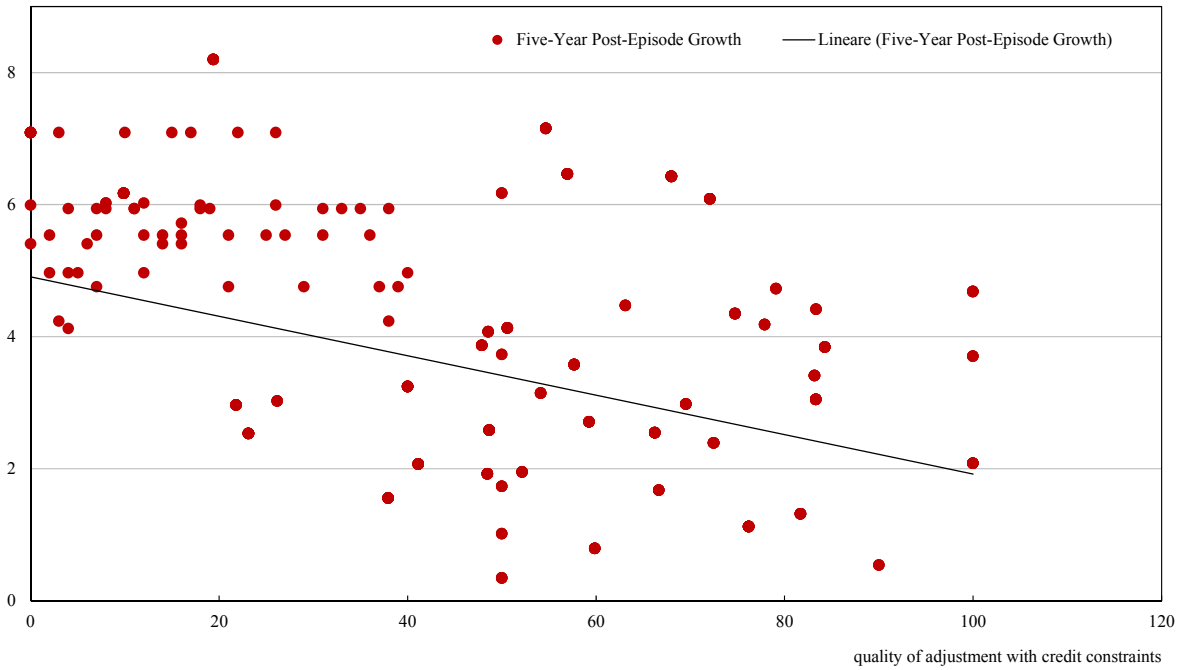
Quality of Adjustment and Average Five-year Post-episode Growth



Source: Authors' own calculations.

Figure 5

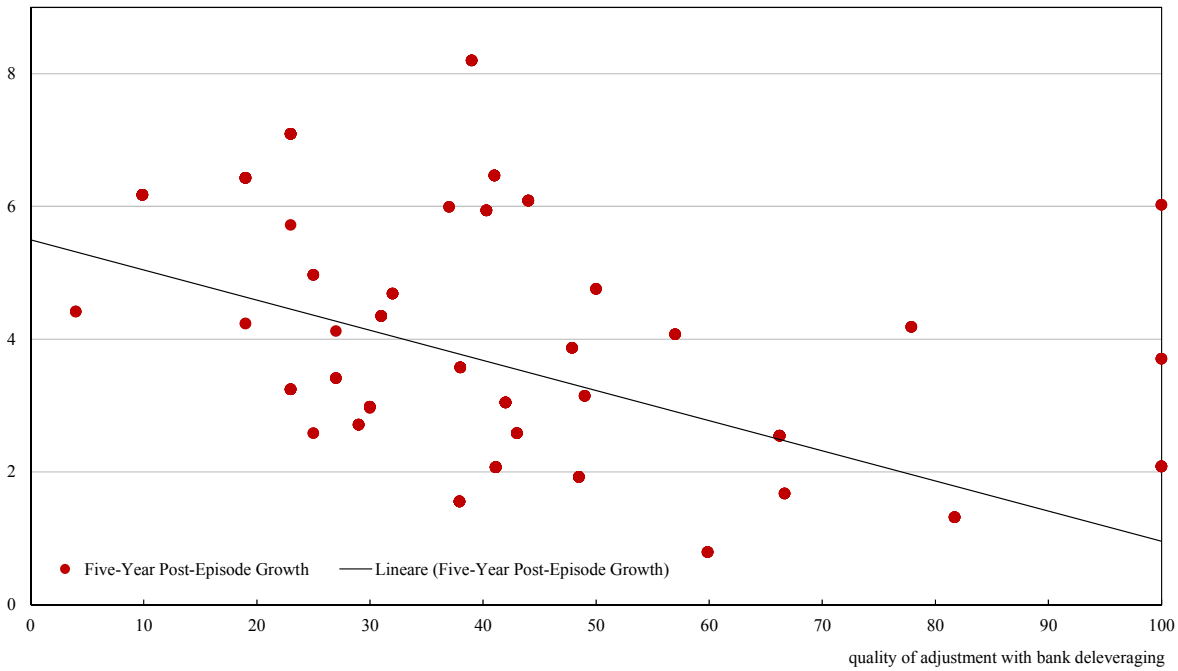
Quality of Adjustment with Credit Constraints and Average Five-Year Post-Episode Growth



Source: Authors' own calculations.

Figure 6

Quality of Adjustment with Bank Deleveraging and Average Five-Year Post-Episode Growth



Source: Authors' own calculations.

of expenditures on goods and services in total public spending; share of transfers in total public spending, and share of public investment in total public spending).

In order to test the interplay between credit constraints and fiscal adjustment strategies, we include a term that takes into account nonlinear effects. To do so, we focus on the fiscal consolidation mix and calculate its interaction with private sector credit and banking sector lending proclivity.[13] We expect that when credit conditions are weak, reflecting a weak financial sector, fiscal adjustments based on spending cuts are less effective than deficit reductions based on a more balanced contribution of revenue measures and expenditure savings.

The budget composition is also expected to have an impact on economic growth: increases in indirect taxes are expected to reduce private consumption potentially harming growth via lower domestic demand. Public investment is expected to have a greater positive growth impact than public spending on wages and goods and services, via increases in domestic demand and productivity.

The model specifications above are estimated in steps, from the basic model (no interaction term and no budget mix variables) to the augmented versions. Coefficients are estimated using a GLS estimator. Robust estimator results are reported in the next section along with a range of other robustness tests.

3.2 Empirical results

3.2.1 General results

In general, the basic results confirm our expectations. Fiscal adjustments relying on focused public expenditure cuts that preserve public investment contribute positively to medium-term output growth.

During debt reduction episodes, gradually paced fiscal adjustments are positive for output expansion, but large deficit cuts have a contractionary effect. A 1-per cent of GDP reduction in the cyclically-adjusted fiscal deficit reduces average medium-term growth by 0.27 percentage points. However, one more year in the length of the debt consolidation episode raises average economic growth by 0.22 percentage points in the subsequent five-year period. Initial public debt is not a significant impediment for future growth.[14] The fiscal adjustment mix can have an impact on growth: a 1-per cent increase in contribution of cuts to fiscal adjustment increases medium-term growth by 0.32 percentage points.

This relationship between the fiscal adjustment mix and growth is however affected by financial conditions. The results show that spending-based adjustments support output growth after the debt consolidation episode, except in cases where there is sustained bank deleveraging and tight private sector credit conditions . In both cases, the coefficients of the interacted variables turn negative and are larger than the quality-of-adjustment coefficient. As a result potential benefits of expenditure cuts on medium-term growth would be offset under difficult financial conditions.

The shrinkage of banks' balance sheet in response to capitalization needs leads to difficulties for private sector's initiative, because the banking sector is less willing to finance new activities. In these cases, revenue-based adjustments can be more effective in stimulating growth than expenditure-based adjustments. Similar results hold when private sector credit supply is scarce.

---

[13] We also tried an alternative approach, by introducing indicators of both revenue and spending discretionary changes in the equation (instead of the quality variable) and interacting them with the credit-constraint variables. Results did not vary substantially.

[14] This is in line with results on the economic growth effects of public debt (IMF, 2012a).

Table 2

Econometric Results: Basic Model
(dependent variable: five-year output growth)

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Initial distance from debt target	0.00730	0.00573	0.00383	0.0142**	0.0113*	0.0177**
	(1.312)	*(0.992)*	*(0.747)*	*(2.082)*	*(1.771)*	*(2.472)*
Duration of debt consolidation	0.228***	0.287***	0.330***	0.175**	0.272***	0.455***
	(3.495)	*(4.274)*	*(5.386)*	*(2.365)*	*(3.841)*	*(6.229)*
Size of deficit cut	–0.276***	–0.267***	–0.278***	–0.282***	–0.300***	–0.310***
	(–5.903)	*(–5.587)*	*(–6.488)*	*(–4.996)*	*(–5.674)*	*(–5.240)*
Contemporaneous growth	0.491***	0.448***	0.516***	0.513***	0.536***	
	(8.188)	*(7.229)*	*(9.370)*	*(7.050)*	*(7.869)*	
Quality of fiscal adjustment	0.0329**	0.344***	0.0295***	0.0298***	0.0384***	0.0428***
	(3.247)	*(3.909)*	*(6.033)*	*(3.758)*	*(6.587)*	*(6.521)*
Quality * Credit constraints			–0.0342***		–0.0249***	–0.0214***
			(–7.834)		*(–5.961)*	*(–4.577)*
Quality * Bank deleveraging				–0.0241***	–0.0193***	–0.0165***
				(–3.146)	*(–2.789)*	*(–4.206)*
Quality * G&S Index[(1)]		–0.384***				
		(–3.903)				
Constant	1.039**	1.134***	0.523	0.347	–0.00887	1.360**
	(2.553)	*(2.627)*	*(1.379)*	*(0.618)*	*(–0.0168)*	*(2.436)*
Number of observations	330	288	330	245	245	249
R^2	0.299	0.334	0.411	0.406	0.484	0.327
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000

*** significant at 1%; ** significant at 5%; * significant at 10%.
[(1)] Goldman & Sachs Index on Financial Conditions. Note that this column is not fully comparable with the other as the sample size is slightly different due to data availability.

Table 3

Econometric Results: Augmented Model
(dependent variable: five-year output growth)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Initial distance from debt target	0.0147**	0.0156**	0.00961	0.0121*	–0.0173*	0.0105
	(2.640)	*(2.706)*	*(1.650)*	*(1.741)*	*(1.810)*	*(1.007)*
Duration of deficit cut	0.286***	0.306***	0.232***	0.266***	0.187**	0.257***
	(4.699)	*(4.747)*	*(4.746)*	*(3.798)*	*(2.892)*	*(3.789)*
Size of consolidation	–0.279***	–0.276***	–0.295***	–0.322***	–0.191***	–0.290***
	(3.525)	*(3.554)*	*(3.537)*	*(3.531)*	*(3.671)*	*(3.605)*
Contemporaneous growth	0.479***	0.496***	0.545***	0.592***	0.532***	0.502***
	(3.696)	*(3.733)*	*(3.687)*	*(3.704)*	*(3.763)*	*(3.823)*
Quality of fiscal adjustment	0.0340***	0.0337***	0.0390***	0.0396***	0.0315***	0.0462***
	(3.603)	*(3.689)*	*(3.592)*	*(3.584)*	*(3.770)*	*(3.848)*
Quality * Credit constraints	–0.0264***	–0.0288***	–0.0295***	–0.0299***	–0.0334***	–0.0307***
	(3.414)	*(3.421)*	*(3.425)*	*(3.416)*	*(3.469)*	*(3.514)*
Quality * Bank deleveraging	–0.0145**	–0.0111***	–0.0147**	–0.0112***	–0.0144**	–0.0182***
	(2.369)	*(3.374)*	*(2.184)*	*(3.376)*	*(2.221)*	*(3.412)*
Change in direct taxes[(1)]	0.0366***					
	(3.122)					
Change in taxes on goods and services[(1)]		–0.0298				
		(0.809)				
Change in goods & services expenditures[(1)]			–0.0383			
			(0.432)			
Change in wage expenditures[(1)]				–0.0756***		
				(3.264)		
Change in transfers expenditures[(1)]					0.104***	
					(3.352)	
Change in public investment expenditures[(1)]						0.0454**
						(2.209)
Constant	–0.385	–0.454	0.0930	–0.264	0.927	0.0652
	(0.534)	*(0.611)*	*(0.535)*	*(0.541)*	*(0.688)*	*(0.549)*
Number of observations	245	245	240	240	190	212
R^2	0.503	0.488	0.485	0.497	0.433	0.508
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000

*** significant at 1%; ** significant at 5%; * significant at 10%.
(1) Percent of total revenues or total expenditures.

However, adequately paced deficit reductions that help lower public debt to sustainable levels are positive for economic growth both in normal times and in periods of financial sector distress.

Results for budget composition variables highlight the importance of the tax and spending mix. An increase in the share of direct taxes in total revenue affects output growth positively, while increasing the share of indirect taxes during the debt consolidation episodes is generally insignificant for output growth thereafter.

The expenditure mix also matters for growth. Higher spending (as a share of total expenditure) on public investment and transfers spurs output growth, while increasing the weight of spending on wages and purchases of goods and services is harmful for output expansion. Protecting public investment during adjustment periods and continuing to provide funds for critical investment in infrastructure is essential for raising productivity and potential output.

3.2.2 Robustness analysis

The results presented in the previous section are significantly different from previous studies on fiscal adjustments and growth (Alesina and Perotti, 1996; Alesina and Ardagna, 2010), mostly because we incorporate in the analysis the effect of credit restrictions on the relationship between fiscal consolidation and economic activity. These results are robust to alternative estimation methods and do not change when the baseline and augmented models are estimated with robust standard errors. Results also hold when potential outliers are dropped and robust regression used. We further estimate the model using random effects and OLS with panel-corrected standard errors and find consistent results; results are aconfirmed when we change the dependent variable to capture average output growth three years after the episode.[15] They also hold when the variable that controls for contemporaneous GDP growth is not included in the baseline model.[16]

Findings are robust to the choice of alternative subsamples.[17] These are built by selecting episodes that have a higher-than-average values of key variables. In general, the main results are confirmed:[18]

- High unemployment (Table 4). In this subsample of countries with higher-than-average unemployment, results hold except for the duration variable. Gradual (longer) debt consolidations are less clearly associated with stronger growth performance: an indication of reform fatigue in countries where social cohesion pressure, as measured by unemployment, is high. Moreover, spending cuts are more harmful for growth in this sample compared to the baseline model, and this negative impact is also valid in the absence of credit constraints.
- High-tax countries (Table 5). Results are confirmed when we perform the analysis on a subsample of high-tax countries, which includes most advanced economies. Interestingly, in this subsample of countries, starting with a high level of public debt is more harmful for post-episode growth than in the baseline model.

---

[15] We do not report these results, as they are similar to those in Tables 2 and 3. They are available from the authors upon request.

[16] We tested the potential collinearity between contemporaneous GDP Growth and the fiscal variables such as size or quality, but results remained unchanged. See Table 2, model 6.

[17] We also interacted the fiscal mix variable with the Goldman and Sachs' Financial Conditions Index, for a reduced sample of countries where data are available. Results in the paper are confirmed using this alternative indicator.

[18] We also assessed the importance of simultaneous financial and corporate/household sector develeraging in the regressions, but results do not change. From Table 4 onwards, the interaction variable "Quality*Bank deleveraging" is dropped, due to a lack of degrees of freedom when running the model in the subsamples. We keep the "Quality*Credit constraints" variable which captures similar information.

Table 4

Econometric Results: Augmented Model
(dependent variable: five-year output growth; sub-sample high initial unemployment episodes)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Initial distance from debt target	0.0170**	0.0193**	0.0120*	0.0106	–0.000274	0.0243**
	(2.484)	*(2.415)*	*(1.744)*	*(1.521)*	*(–0.0285)*	*(2.332)*
Duration of consolidation	0.307*	0.328**	0.307**	0.428*	0.465*	0.418*
	(2.003)	*(2.060)*	*(2.051)*	*(2.005)*	*(1.978)*	*(1.912)*
Size of deficit cut	–0.108*	–0.121**	–0.107*	–0.138**	–0.182**	–0.0764
	(1.894)	*(2.045)*	*(1.843)*	*(2.374)*	*(2.464)*	*(0.840)*
Contemporaneous growth	0.123	0.139	0.225**	0.192**	0.421**	0.0296
	(1.340)	*(1.395)*	*(2.471)*	*(2.102)*	*(2.577)*	*(0.230)*
Quality of fiscal adjustment	–0.0141*	–0.0156*	–0.0254***	–0.0241***	–0.00160	–0.00418
	(1.739)	*(1.681)*	*(3.255)*	*(3.067)*	*(0.120)*	*(0.422)*
Quality * Credit constraints	–0.0610*	–0.0581*	–0.0897*	–0.0870*	–0.0797*	–0.0502*
	(1.704)	*(1.630)*	*(1.759)*	*(1.691)*	*(1.744)*	*(1.805)*
Change in direct taxes(1)	0.0316***					
	(3.376)					
Change in taxes on goods and services(1)		–0.0321				
		(1.614)				
Change in goods and services expenditures(1)			–0.0830***			
			(2.868)			
Change in wage expenditures(1)				–0.0185		
				(0.358)		
Change in transfers expenditures(1)					0.0600**	
					(2.448)	
Change in public investment expenditures(1)						0.0347*
						(1.890)
Constant	3.222***	3.282***	3.409***	4.035***	1.945	3.470***
	(3.664)	*(3.462)*	*(3.849)*	*(4.519)*	*(1.466)*	*(3.492)*
Number of observations	111	111	111	111	79	102
R^2	0.404	0.354	0.387	0.374	0.504	0.313
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000

*** significant at 1%; ** significant at 5%; * significant at 10%.
(1) Percent of total revenues or total expenditures.

Table 5

Econometric Results: Augmented Model
(dependent variable: five-year output growth; sub-sample high-tax countries)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Initial distance from debt target	–0.0119**	–0.0250***	–0.0101**	–0.0104**	–0.0321***	–0.0176***
	(2.374)	*(4.105)*	*(2.043)*	*(2.118)*	*(6.075)*	*(3.026)*
Duration of consolidation	0.135**	0.169**	0.115*	0.141**	0.234***	0.291***
	(2.125)	*(2.574)*	*(1.770)*	*(2.186)*	*(3.905)*	*(3.722)*
Size of deficit cut	0.0276	–0.0283	–0.0178	–0.0244	0.174***	0.105**
	(0.588)	*(–0.581)*	*(–0.426)*	*(–0.586)*	*(3.659)*	*(2.263)*
Contemporaneous growth	0.241***	0.490***	0.235***	0.261***	0.272***	0.231***
	(4.294)	*(6.751)*	*(4.093)*	*(4.673)*	*(4.828)*	*(3.918)*
Quality of fiscal adjustment	0.0319	–0.0708	–0.0728	0.0333	–0.0128**	0.0304***
	(0.568)	*(–1.211)*	*(–1.188)*	*(0.0593)*	*(–2.386)*	*(3.938)*
Quality* Credit constraints	–0.0132***	–0.0150***	–0.00672	–0.0108**	–0.00686	–0.0343***
	(2.614)	*(2.964)*	*(1.255)*	*(2.112)*	*(1.416)*	*(5.067)*
Change in direct taxes[(1)]	0.0345***					
	(4.105)					
Change in taxes on goods and services[(1)]		–0.0354***				
		(4.025)				
Change in goods and services expenditures[(1)]			–0.0805***			
			(2.837)			
Change in wage expenditures[(1)]				0.0638***		
				(3.231)		
Change in transfers expenditures[(1)]					0.203***	
					(6.328)	
Change in public investment expenditures[(1)]						0.00171
						(0.109)
Constant	2.414***	2.920***	2.784***	2.559***	2.903***	2.595***
	(5.650)	*(6.184)*	*(6.298)*	*(5.925)*	*(6.396)*	*(6.135)*
Number of observations	190	188	191	191	157	170
R^2	0.246	0.255	0.209	0.219	0.398	0.258
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000

*** significant at 1%; ** significant at 5%; * significant at 10%.
[(1)] Percent of total revenues or total expenditures.

- Countries that did not reduce debt (Table 6). In countries that implemented a fiscal adjustment but did not manage to achieve a significant debt reduction (or even increased their debt-to-GDP ratio during the period), the negative impact of expenditure-based adjustments on growth in the presence of credit constraints is weaker than in the baseline model, but still statistically significant.
- Post-crisis episodes (Table 7). When focusing on post-crisis debt consolidation episodes, we find stronger results. The negative growth impact of spending cuts in periods of high debt deleveraging and credit crunch is higher than in the baseline model.
- High credit constraints (Table 8). Results are confirmed in the subsample of countries in which credit growth was below the sample average. They show that fiscal adjustments that rely excessively on spending cuts when credit restrictions are significant can harm growth. The coefficients of the key variables are larger in this subsample than in the baseline model.
- Countries that apply structural reforms (Table 9). We used an expanded version of the index of structural reforms based on Lora (2001),[19] and estimating the model for a subsample of countries that implemented structural reforms during the debt consolidation episode. Major results are confirmed. In this case, the composition of fiscal adjustment is less important for post-episode average output growth than in the baseline model, but the growth-enhancing impact of public investment increases (as a share of total spending) is reinforced.
- Larger sample of debt reduction episodes (Table 10). Finally, we estimated the model using the original sample of 160 episodes of debt reduction. This included countries that received debt relief, and does not differentiate between debt reductions driven by fiscal-adjustments and those caused by other factors (e.g., exchange rate appreciation and privatization). Key results largely hold. In this case, countries with high initial debt benefit from lower growth than in the baseline. The positive contribution of spending-based adjustment is weaker.
- Other specific country characteristics. We ran the model on a subsample of advanced economies, and the major difference with respect to the baseline model is that the negative effect of weak credit conditions on medium term growth is higher than before (Table 11). In addition, when we ran the model on a subsample of open economies, the importance of the quality variable and other fiscal variables is reduced, possibly reflecting that medium term growth in these economies is more dependent on external conditions, not directly impacted by domestic fiscal policy (Table 12).

4 Concluding remarks

This paper shows that gradual and adequately balanced fiscal adjustments may be more appropriate to spur medium-term economic growth than deficit reductions driven by spending cuts in a context of financial constraints. If credit is not available to consumers and investors, private demand cannot compensate for cutbacks in public demand and strong fiscal adjustments can have a negative effect on growth. Crowding-in of the private sector when the public sector adjusts is also difficult in the presence of credit constraints.

Post-crisis uncertainty about the financial sector health could affect the degree to which fiscal policy can raise medium-term growth through public debt consolidation. The combination of bank deleveraging and public debt consolidation could change the way economic agents assess the effect of government policies. In particular, the fiscal mix that under normal circumstances would

[19] The Index of Structural Reforms was originally developed for Latin American countries. We have extended it to our sample using the methodology in Lora (2001). The index is an average of four sub-indexes, namely: trade policy reform; financial policy reform; labor market reform, and privatization reform. We excluded a fifth area of reform initially considered by Lora (e.g., tax policy reform) because we control directly for tax changes in our empirical analysis.

Table 6

Econometric Results: Augmented Model

(dependent variable: five-year output growth; sub-sample non-major debt reduction countries)

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Initial distance from debt target	–0.00365	–0.0203***	–0.000636	–0.00334	–0.00417	0.00216
	(0.596)	*(3.152)*	*(0.107)*	*(0.525)*	*(0.528)*	*(0.309)*
Duration of consolidation	0.236***	0.125**	0.258***	0.235***	0.250***	0.229***
	(3.909)	*(2.045)*	*(4.167)*	*(3.805)*	*(3.257)*	*(3.311)*
Size of deficit cut	–0.0427	–0.0869	–0.0956*	–0.102**	–0.0865	–0.0668
	(0.748)	*(1.597)*	*(1.903)*	*(2.019)*	*(1.222)*	*(1.214)*
Contemporaneous growth	0.574***	0.781***	0.602***	0.581***	0.649***	0.557***
	(10.23)	*(13.24)*	*(10.91)*	*(10.44)*	*(9.344)*	*(8.400)*
Quality of fiscal adjustment	0.0259***	0.00922*	0.0238***	0.0227***	0.0274***	0.0235***
	(5.210)	*(1.796)*	*(5.008)*	*(4.654)*	*(4.615)*	*(3.611)*
Quality * Credit constraints	–0.0282***	–0.0180***	–0.0290***	–0.0260***	–0.0295***	–0.0253***
	(5.669)	*(4.618)*	*(5.143)*	*(5.041)*	*(5.802)*	*(4.162)*
Change in direct taxes[(1)]	0.0220**					
	(2.030)					
Change in taxes on goods and services[(1)]		–0.0494***				
		(5.702)				
Change in goods and services expenditures[(1)]			–0.0116			
			(0.503)			
Change in wage expenditures[(1)]				–0.0195		
				(0.708)		
Change in transfers expenditures[(1)]					0.0584	
					(1.653)	
Change in public investment expenditures[(1)]						0.0658*
						(1.819)
Constant	–0.249	0.653	–0.281	0.0756	–1.209**	–0.0656
	(0.630)	*(1.554)*	*(0.684)*	*(0.179)*	*(2.151)*	*(0.142)*
Number of observations	247	244	244	248	191	224
R^2	0.450	0.521	0.451	0.440	0.452	0.414
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000

*** significant at 1%; ** significant at 5%; * significant at 10%.

[(1)] Percent of total revenues or total expenditures.

Table 7

Econometric Results: Augmented Model. Dependent Variable Five-Year Output Growth. Sub-sample Post-Crisis Episodes

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Initial distance from debt target	0.0196***	0.00206	0.0182***	0.0153***	0.0197*	0.00862
	(3.204)	*(0.311)*	*(3.187)*	*(2.609)*	*(1.891)*	*(1.386)*
Duration of consolidation	0.338***	0.164**	0.317***	0.312***	0.334***	0.338***
	(5.083)	*(2.329)*	*(4.829)*	*(4.369)*	*(3.934)*	*(4.420)*
Size of deficit cut	–0.331***	–0.373***	–0.296***	–0.328***	–0.294***	–0.290***
	(6.252)	*(7.508)*	*(6.351)*	*(6.938)*	*(3.775)*	*(5.641)*
Contemporaneous growth	0.468***	0.685***	0.480***	0.489***	0.494***	0.361***
	(7.804)	*(10.69)*	*(8.091)*	*(8.056)*	*(6.388)*	*(4.950)*
Quality of fiscal adjustment	0.0513**	0.0326*	0.0520**	0.0461*	0.0552*	0.0567**
	(2.190)	*(1.941)*	*(2.565)*	*(1.888)*	*(1.717)*	*(2.651)*
Quality* Credit constraints	–0.493***	–0.437***	–0.394***	–0.315***	–0.306***	–0.396***
	(9.521)	*(8.461)*	*(9.199)*	*(8.757)*	*(8.696)*	*(8.425)*
Change in direct taxes[(1)]	0.0234**					
	(2.414)					
Change in taxes on goods and services[(1)]		–0.0484***				
		(5.497)				
Change in goods & services expenditures[(1)]			0.0792***			
			(3.394)			
Change in wage expenditures[(1)]				–0.0130		
				(0.519)		
Change in transfers expenditures[(1)]					0.0592*	
					(1.843)	
Change in public investment expenditures[(1)]						0.0798***
						(4.932)
Constant	–0.307	1.058**	–0.459	0.0966	–0.782	0.434
	(0.701)	*(2.166)*	*(1.012)*	*(0.195)*	*(1.225)*	*(0.936)*
Number of observations	223	221	219	223	158	197
R^2	0.554	0.606	0.573	0.540	0.537	0.560
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000

*** significant at 1%; ** significant at 5%; * significant at 10%.
[(1)] Percent of total revenues or total expenditures.

Table 8

Econometric Results: Augmented Model. Dependent Variable Five-Year Output Growth. Sub-sample High Credit Constraints

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Initial distance from debt target	0.0195***	0.00577	0.0167***	0.0165***	0.0106	0.0208***
	(3.252)	*(0.889)*	*(2.879)*	*(2.867)*	*(1.058)*	*(3.324)*
Duration of consolidation	0.356***	0.242***	0.359***	0.376***	0.325***	0.361***
	(4.850)	*(3.199)*	*(4.772)*	*(5.033)*	*(3.147)*	*(4.563)*
Size of deficit cut	–0.354***	–0.397***	–0.335***	–0.350***	–0.180**	–0.357***
	(6.018)	*(7.185)*	*(6.317)*	*(6.942)*	*(2.116)*	*(6.823)*
Contemporaneous growth	0.590***	0.811***	0.629***	0.622***	0.748***	0.557***
	(9.218)	*(11.51)*	*(9.633)*	*(9.668)*	*(8.808)*	*(7.023)*
Quality of fiscal adjustment	0.0331***	0.0125*	0.0304***	0.0301***	0.0366***	0.0361***
	(5.388)	*(1.845)*	*(4.899)*	*(4.845)*	*(5.030)*	*(4.832)*
Quality * Credit constraints	–0.0357***	–0.0202***	–0.0334***	–0.0340***	–0.0399***	–0.0393***
	(5.668)	*(4.515)*	*(5.076)*	*(5.235)*	*(6.112)*	*(5.529)*
Change in direct taxes[(1)]	0.0310***					
	(2.751)					
Change in taxes on goods and services[(1)]		–0.0483***				
		(4.940)				
Change in goods and services expenditures[(1)]			0.0181			
			(0.829)			
Change in wage expenditures[(1)]				0.0343		
				(1.245)		
Change in transfers expenditures[(1)]					0.201***	
					(4.749)	
Change in public investment expenditures[(1)]						0.0924***
						(3.356)
Constant	–0.462	0.584	–0.497	–0.418	–1.449**	–0.193
	(1.048)	*(1.210)*	*(1.069)*	*(0.867)*	*(2.364)*	*(0.387)*
Number of observations	229	227	226	230	161	217
R^2	0.520	0.561	0.516	0.505	0.560	0.495
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000

*** significant at 1%; ** significant at 5%; * significant at 10%.
[(1)] Percent of total revenues or total expenditures.

Table 9

Econometric Results: Augmented Model. Dependent Variable Five-Year Output Growth. Sub-sample Structural Reform Episodes

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Initial distance from debt target	–0.00714	–0.0127*	–0.00469	–0.00551	–0.0109	–0.000574
	(1.007)	*(1.820)*	*(0.722)*	*(0.860)*	*(1.214)*	*(0.0714)*
Duration of consolidation	0.288***	0.189**	0.271***	0.307***	0.262***	0.358***
	(3.658)	*(2.215)*	*(3.300)*	*(3.996)*	*(3.037)*	*(3.829)*
Size of deficit cut	–0.166**	–0.187**	–0.156**	–0.169***	–0.263***	–0.258***
	(2.033)	*(2.402)*	*(2.572)*	*(2.890)*	*(3.017)*	*(3.920)*
Contemporaneous growth	0.684***	0.737***	0.664***	0.678***	0.690***	0.455***
	(8.661)	*(9.580)*	*(8.791)*	*(8.880)*	*(6.886)*	*(4.227)*
Quality of fiscal adjustment	0.00704	0.00140	0.00902*	0.00992	0.0249*	0.00582
	(0.878)	*(0.170)*	*(1.195)*	*(1.304)*	*(1.924)*	*(1.497)*
Quality * Credit constraints	–0.0151***	–0.00935*	–0.0157***	–0.0166***	–0.00859*	–0.00683*
	(2.651)	*(1.837)*	*(2.922)*	*(3.050)*	*(1.736)*	*(1.856)*
Change in direct taxes[(1)]	0.00725					
	(0.650)					
Change in taxes on goods and services[(1)]		–0.0514***				
		(2.959)				
Change in goods and services expenditures[(1)]			0.0241			
			(0.888)			
Change in wage expenditures[(1)]				–0.0194		
				(0.873)		
Change in transfers expenditures[(1)]					0.0697**	
					(2.049)	
Change in public investment expenditures[(1)]						0.0937***
						(4.639)
Constant	0.147	0.826	0.103	–0.0795	–0.557	1.675**
	(0.254)	*(1.181)*	*(0.187)*	*(0.140)*	*(0.763)*	*(2.269)*
Number of observations	159	157	165	165	120	135
R^2	0.440	0.495	0.445	0.445	0.530	0.478
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000

*** significant at 1%; ** significant at 5%; * significant at 10%.
[(1)] Percent of total revenues or total expenditures.

Table 10

Econometric Results: Augmented Model. Dependent Variable Five-Year Output Growth. Enlarged Sample of 160 episodes

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Initial distance from debt target	–0.00540***	–0.00646***	–0.00316***	–0.00366***	–0.00359***	–0.00454***
	(4.407)	*(5.202)*	*(2.755)*	*(3.904)*	*(3.578)*	*(5.181)*
Duration of consolidation	0.178***	0.149***	0.125***	0.198**	0.064**	0.094***
	(5.913)	*(4.809)*	*(4.281)*	*(2.803)*	*(2.228)*	*(3.148)*
Size of deficit cut	–0.182***	–0.101***	–0.139***	–0.216***	–0.266***	–0.283***
	(7.134)	*(7.662)*	*(7.740)*	*(5.090)*	*(4.193)*	*(6.169)*
Contemporaneous growth	0.398***	0.337***	0.268***	0.182***	0.114***	0.200***
	(8.307)	*(6.855)*	*(5.817)*	*(4.528)*	*(2.708)*	*(5.461)*
Quality of fiscal adjustment	0.0660***	0.0910***	0.0463***	–0.0172	–0.0143	0.0387***
	(3.448)	*(4.629)*	*(2.619)*	*(1.113)*	*(0.845)*	*(2.757)*
Quality * Credit constraints	–0.0217***	–0.0229***	–0.0186***	–0.00667***	–0.0111***	–0.0147***
	(7.712)	*(7.891)*	*(7.062)*	*(3.008)*	*(4.668)*	*(7.163)*
Change in direct taxes[(1)]	0.0146**					0.0279***
	(2.398)					*(8.909)*
Change in taxes on goods and services[(1)]		–0.0143***				
		(3.337)				
Change in goods and services expenditures[(1)]			–0.0207***			
			(6.425)			
Change in wage expenditures[(1)]				–0.0547**		
				(2.201)		
Change in transfers expenditures[(1)]					0.0746*	
					(1.887)	
Change in public investment expenditures[(1)]						0.0279***
						(8.909)
Constant	–0.0778**	–0.0447	–0.00605	0.0980***	0.170***	0.0362
	(2.193)	*(1.233)*	*(0.175)*	*(3.106)*	*(4.955)*	*(1.310)*
Number of observations	480	450	527	469	499	633
R^2	0.413	0.431	0.391	0.382	0.359	0.393
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000

*** significant at 1%; ** significant at 5%; * significant at 10%.
[(1)] Percent of total revenues or total expenditures.

Table 11

Econometric Results: Augmented Model. Dependent Variable Five Year Output Growth. Subsample of Advanced Economies

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Initial distance from debt target	–0.0219	–0.0104	–0.116***	–0.0572**	–0.0219	–0.138***
	(1.282)	*(0.627)*	*(8.959)*	*(2.387)*	*(1.257)*	*(7.285)*
Duration of deficit cut	0.0172	0.0388	0.616***	0.323**	0.112	–0.224***
	(0.169)	*(0.344)*	*(7.667)*	*(2.104)*	*(1.081)*	*(3.160)*
Size of consolidation	–0.0725	0.385***	0.184***	0.127	0.515***	0.606***
	(0.498)	*(4.044)*	*(3.392)*	*(0.932)*	*(5.877)*	*(10.12)*
Contemporaneous growth	0.505***	0.289	0.333***	0.543***	1.471***	0.650***
	(4.202)	*(1.309)*	*(4.573)*	*(3.905)*	*(4.625)*	*(3.205)*
Quality of fiscal adjustment	0.0481*	0.0317	0.110*	0.0755*	0.0204	0.106*
	(1.693)	*(1.458)*	*(1.944)*	*(1.858)*	*(0.838)*	*(1.803)*
Quality * Credit constraints	–0.0340**	–0.0105	–0.0524***	–0.0318**	–0.0178*	0.0398***
	(2.310)	*(1.024)*	*(–7.758)*	*(–2.514)*	*(1.471)*	*(4.361)*
Quality * Bank deleveraging	–0.0358***	–0.0263***	–0.0248***	–0.0347***	–0.0445***	–0.0268***
	(–4.655)	*(–3.022)*	*(–5.317)*	*(–4.170)*	*(–5.081)*	*(–3.087)*
Change in direct taxes[(1)]	0.474***					
	(3.912)					
Change in taxes on goods and services[(1)]		–0.0312				
		(–0.472)				
Change in goods and services expenditures[(1)]			–0.765***			
			(–11.73)			
Change in wage expenditures[(1)]				–0.137**		
				(2.556)		
Change in transfers expenditures[(1)]					0.429***	
					(3.708)	
Change in public investment expenditures[(1)]						0.498***
						(6.254)
Constant	6.604***	–0.0498	–5.351***	–1.733	4.868***	4.862***
	(3.252)	*(–0.0371)*	*(–6.138)*	*(–1.208)*	*(2.791)*	*(5.911)*
Number of observations	94	94	94	94	94	97
R^2	0.498	0.381	0.801	0.436	0.488	0.847
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000

*** significant at 1%; ** significant at 5%; * significant at 10%.
[(1)] Percent of total revenues or total expenditures.

Table 12

Econometric Results: Augmented Model. Dependent Variable Five Year Output Growth. Subsample of Open Economies

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Initial distance from debt target	–0.0133*	–0.0167**	–0.00755	–0.00989	–0.00528	–0.00418
	(1.885)	*(2.187)*	*(0.899)*	*(1.403)*	*(0.346)*	*(0.556)*
Duration of deficit cut	0.283***	0.310***	0.251***	0.219**	0.197	0.125
	(3.178)	*(3.392)*	*(2.684)*	*(2.352)*	*(1.604)*	*(1.134)*
Size of consolidation	–0.475***	–0.453***	–0.450***	–0.488***	–0.376***	–0.426***
	(–7.424)	*(–6.817)*	*(–6.272)*	*(–7.867)*	*(–3.977)*	*(–5.574)*
Contemporaneous growth	0.527***	0.497***	0.530***	0.584***	0.525***	0.581***
	(6.687)	*(6.110)*	*(7.005)*	*(7.742)*	*(5.856)*	*(6.296)*
Quality of fiscal adjustment	0.0449***	0.0487***	0.0433***	0.0463***	0.0378***	0.0579***
	(6.275)	*(6.259)*	*(6.489)*	*(6.938)*	*(3.550)*	*(5.462)*
Quality * Credit constraints	–0.0319***	–0.0324***	–0.0338***	–0.0315***	–0.0326***	–0.0392***
	(–5.930)	*(–6.068)*	*(–5.486)*	*(–5.875)*	*(–5.108)*	*(–6.659)*
Quality * Bank deleveraging	–0.0039***	–0.0044***	–0.0011***	–0.0018***	–0.0088***	–0.0085***
	(–5.072)	*(–5.292)*	*(–4.009)*	*(–4.479)*	*(–3.314)*	*(–4.947)*
Change in direct taxes[(1)]	0.00583*					
	(1.967)					
Change in taxes on goods and services[(1)]		–0.0257				
		(1.221)				
Change in goods and services expenditures[(1)]			–0.0403			
			(1.003)			
Change in wage expenditures[(1)]				–0.0754**		
				(2.251)		
Change in transfers expenditures[(1)]					0.0754	
					(1.487)	
Change in public investment expenditures[(1)]						0.0265*
						(1.958)
Constant	1.060*	0.717	1.314**	1.066**	1.648**	1.165**
	(1.946)	*(1.155)*	*(2.400)*	*(2.018)*	*(2.086)*	*(2.151)*
Number of observations	158	158	153	153	124	138
R^2	0.622	0.626	0.618	0.629	0.553	0.638
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000

*** significant at 1%; ** significant at 5%; * significant at 10%.
[(1)] Percent of total revenues or total expenditures.

have delivered growth-boosting public debt consolidations may not be successful under the new environment.

These findings are consistent with some results in Eggertsson and Krugman (2010) who illustrate the growth consequences of deleveraging when the effectiveness of monetary policy is constrained by a liquidity trap. They are also consistent with the findings in the expansionary fiscal contraction literature (Alesina and Ardagna, 2010) in cases where credit supply to the private sector is not affected by financial sector weaknesses.

Results presented in this paper show that the fiscal adjustment size and its pace are both relevant for medium-term output growth. When private debt remains high and lending to the private sector subdued, the fiscal mix is critical for post-episode output expansion:

- Spending cuts may reduce aggregate demand and exacerbate real debt pressures by causing price deflation, while protecting public investment during deficit-reduction spells can support medium-term output growth.
- Revenue increases may be beneficial for economic growth to the extent that they do not harm consumption in the medium term. Deficit-reduction measures that succeed in raising direct tax revenues by broadening the tax base can be beneficial for medium-term growth.

The policy implications of these results are significant: when bank deleveraging is high and credit is not flowing to the private sector, public debt consolidations should be gradual and based on an appropriate combination of revenue and expenditure measures rather than spending cuts alone (IMF, 2012b). The fiscal policy mix should rely on cutting non-priority spending and protecting pro-growth public investment, especially when there is high structural unemployment. Revenue raising measures should aim at reducing inefficiencies and encouraging labor market participation and consumption. This calls for removing tax exemptions, lowering incentives for tax avoidance and evasion, and shifting tax pressure away from labor to property and low-elasticity consumer goods and services.

Reforms to enhance competitiveness in product and labor markets and strengthen fiscal institutions (Schaechter and others., 2012) can also help support debt consolidation strategies over time sustaining the needed fiscal reforms while limiting the risk of "adjustment fatigue" (IMF, 2012a).

ANNEX 1
A SIMPLE FRAMEWORK

This Annex presents a simplified economic framework that illustrates the interaction between fiscal policy and economic growth in the steady state using comparative statics analysis. The model is meant to be illustrative and does not present a comprehensive derivation of fiscal multipliers. It nevertheless provides an intuitive rationale for the factors at play when fiscal policy effects growth under difficult financial sector conditions.

Let us define output Y as a sum of private consumption C, investment I, government expenditure G, and export minus import $(X–M)$:

$$Y_t = C_t + G_t + I_t + (X_t – M_t)$$

We assume for simplicity that the economy is closed and drop the term $(X–M)$. Our results do not change if we relax this assumption.[20]

The government's budget constraint requires that excess government spending over taxes (T) be financed by borrowing (B). Each year:

$$G_t – T_t = B_t$$

The government budget can also be rewritten as:

$$B_t = (PB_t + rD_{t-1})$$

where r is the effective interest rate on public debt and PB is the primary balance $T–(G–rD)$, where primary spending PG is $(G–rD)$. The intertemporal budget constraint implies that debt can only be sustained if the net present value of the stream of future primary balances is sufficient to cover the (discounted) flow of debt service payments. And public debt D[21] is:

$$D_{t+1} = – PB_t + (1+r)\, D_t$$

When D and B are large, governments will need to intervene with fiscal adjustment by increasing taxes, reducing spending or doing both. YL is labor income and it is assumed to be exogenous. Taxes are proportional to labor income with a tax rate t.

$$T_t = t\, YL_t$$

The behavioral equations of the output components are as follows:

$$C_t = c\,(1–t)YL_t + vA_t$$

$$I_t = (1–c)\,(1–t)\, YL_t$$

In this simple framework, private consumption depends on after-tax income from labor, through the average propensity to consume c and returns on accumulated assets ($v\, A_t$). Investment (assumed to equal to savings supply) is based on the disposable income and propensity to consume, with:

$$A_{t+1} = I_t + rA_t + (1–d)\, A_t – sA_t$$

The asset stock motion equation takes into account new investment, initial capital and capital depreciation d. We also add a term sA that accounts for deleveraging in the banking sector and its effect on capital accumulation and ultimately growth. When a financial crisis erupts assets are worth less, as a result of valuation changes due to higher financial market risks, repricing of assets

---

[20] In this simplified framework we do not model explicitly the supply side. A complete treatment of fiscal multipliers in a dynamic setting can be found in Perotti (1999).

[21] Public debt is assumed to be held abroad for simplicity.

and higher funding costs in the banking industry. Bank deleveraging in response to reduced asset valuation leads to lower private capital. This affects consumption via return on assets if the banking sector is unable to provide sufficient credit to the economy to smoothen consumption because of balance sheet weaknesses.

The authorities can change tax rates and transfers, which would affect consumption and investment, or decide to change government consumption and public investment. However, debt service for the government depends on interest rates r which can be decomposed into $r= i+R$ where i is the policy interest rate that is defined by monetary policy and R is a credit risk spread that depends on market perceptions about fiscal sustainability (Poghosyan, 2012). R is higher than zero only when public debt is higher than a market-perceived risk-less threshold D^* (Panizza, Sturzenegger, and Zettelmeyer, 2009), with e being the long-run elasticity of credit risk premia to the difference between actual debt and the risk-free threshold:[22]

$$R = max[0, e(D - D^*)]$$

The above equations can be used to derive steady state conditions for comparative statics analysis as stated below:[23]

$$(t\ YL - PG\ ) / r = D$$

$$C = c(1-t)\ YL + vA$$

$$I = (1-c)(1-t)\ YL$$

$$A = (1/h)\ (1-c)\ (1-t)\ YL$$

$$Y = c(1-t)\ YL + vA + G + hA$$

And, substituting $YL = (1/t)\ (rD + PG)$ in the output equation:

$$Y = c(1/t)\ rD + c(1/t)\ PG + (v+h)\ A$$

where $h = (s+d-r)$. It shows that fiscal savings are necessary for debt reduction but higher interest rates make adjustment more difficult. Also fiscal consolidation affects growth negatively via a reduction in after-tax income and the direct effect of government consumption on output. We get the following partial derivatives that provide an illustration of the size of fiscal multipliers for taxes and expenditure and the output effects of changes in assets and interest rates in the model

Based on these partial derivatives, fiscal multipliers depend on propensity to consume, the inverse of the tax rate, public debt stock, interest rate (which in turn depends on credit risk premia and debt stock) and primary spending:[24]

$$dY/dPGc/t > 0$$

$$dY/dt = -\ c(rD+PG)^{-2}) < 0$$

The output impact of a change in the asset stock depends on the develeraging rate, capital depreciation, return on assets and interest rates.

$$dY/dA = v+h > 0 \qquad if \quad s+d+v > r$$

The impact of a change in interest rates on output is negative and depends on the propensity to consume, the inverse of the tax rate, the stock of public debt and the asset stock.

---

[22] In Poghosyan (2012) this elasticity takes a value of 0.02 in advanced economies.

[23] With $I=(s+d-r)\ A$.

[24] The size of multipliers has been found to be cycle-dependent in several recent empirical studies (for example, Auerbach and Gorodnichenko, 2012; Corsetti, Meier and Muller, 2012).

$$dY/dr = (1/t)\, cD - A < 0$$

Finally, a change in bank deleveraging affects output negatively, in proportion to the stock of assets.

$$dY/ds = -A < 0$$

Since asset stock depends on the saving rate, which in turn is affected by the economy's tax rate, fiscal policy has an impact on asset accumulation. The asset stock derivative with respect to the tax rate can be expressed as:

$$dA/dt = -(1/h)(1-c)YL < 0$$

which implies that higher taxes reduce the stock of capital, in particular when propensity to save and credit risk premia are high. Since $dA/ds = -A$, this result leads to the conclusion that a change in taxes can increase the negative impact of bank deleveraging on output.

REFERENCES

Abbas, A.S., B. Akitoby, J. Andritzky, H. Berger, T. Komatsuzaki and J. Tyson (2013), "Dealing with High Debt in an Era of Low Growth", IMF, Staff Discussion Note, SDN/12/07, Washington (D.C.).

Afonso, A., H.P. Grüner and C. Kolerus (2009), "Fiscal Policy and Growth, Do Financial Crises Make a Difference?", ECB, Working Paper, No. 1217.

Alesina, A.F. and S. Ardagna (2010), "Large Changes in Fiscal Policy: Taxes Versus Spending", *Tax Policy and the Economy*, Vol. 24.

Alesina, A.F. and R. Perotti (1996), "Fiscal Consolidation in Europe: Composition Matters", *American Economic Review*, Vol. 86, No. 2, pp. 105-10.

Ardagna, S. (2004), "Financial Markets Behavior Around Episodes of Large Changes in the Fiscal Stance", ECB, Working Paper, No. 390.

Auerbach, A.J. and Y. Gorodnichenko (2012) "Measuring the Output Responses to Fiscal Policy", *American Economic Journal: Economic Policy*, Vol. 4, No. 2, pp. 1-27.

Baldacci, E., S. Gupta and C. Mulas-Granados (2009), "How Effective is Fiscal Policy Response in Systemic Banking Crises?", IMF, Working Paper, No. 09/160, Washington (D.C.).

——————(2012), "Reassessing the Fiscal Mix for Successful Debt Reduction", *Economic Policy*, Vol. 27, No. 71, pp. 36-406.

Barrios, S., S. Langedijk and L. Pench (2010), "EU Fiscal Consolidation After Financial Crisis: Lessons from Past Experiences", European Commission, *Economic Papers*, No. 418.

Baum, A., M. Poplaski-Ribeiro and A. Weber (2012), "Fiscal Multipliers and the State of the Economy", IMF, Working Paper, No. 12/286, Washington (D.C.).

Bayoumi, T. (2000), "The Morning After: Explaining the Slowdown in Japanese Growth", in T. Bayoumi and C. Collyns (eds.), *Post Bubble Blues. How Japan Responded to Asset Price Collapse*, pp. 10-44, IMF, Washington (D.C.).

Corsetti, G., A. Meier and G. Muller (2012), "What Determines Government Spending Multipliers?", IMF, WP/12/150, Washington (D.C.).

Cottarelli, C. and L. Jaramillo (2012), "Walking Hand in Hand: Fiscal Policy and Growth in Advanced Economies", IMF, Working Paper, No. 12/137, Washington (D.C.).

Eggertsson, G.B. and P. Krugman (2010), "Debt, Deleveraging and the Liquidity Trap: A Fisher-Minsky-Koo Approach", mimeo.

Escolano, J. (2010), "A Practical Guide to Public Debt Dynamics, Fiscal Adjustment and Cyclical Adjustment of Budgetary Aggregates", IMF, Technical Notes and Manuals, No. 10/02, Washington (D.C.).

Eyraud, L. and A. Weber (2013), "The Challenge of Debt Reduction During Fiscal Consolidation", IMF, Working Paper, No. 13/167, Washington (D.C.).

Guajardo, J., D. Leigh and A. Pescatori (2011), "Expansionary Austerity: International Evidence", IMF, WP/11/158, Washington (D.C.).

Herndon, T., M. Ash and R. Pollin (2013), "Does High Public Debt Consistently Stiffle Economic Growth? A Critique of Rogoff and Reinhart", University of Massachusetts Amherst, PERI Working Paper, No. 332.

Kumar, M.S. and J. Woo (2010), "Public Debt and Growth", IMF, Working Paper, No. 10/174, Washington (D.C.).

Laeven, L. and F. Valencia (2008), "Systemic Banking Crises: A New Database", IMF, Working Paper, No. 08/224, Washington (D.C.).

——————(2012), "Systemic Banking Crises Database: An Update", IMF, Working Paper, No. 12/163, Washington (D.C.).

Laubach, T. (2009), "New Evidence on the Interest Rate Effects of Budget Deficits and Debt", *Journal of the European Economic Association*, Vol. 7, pp. 858-85.

International Monetary Fund (2010), "Will It Hurt? Macroeconomic Effects of Fiscal Consolidation", Chapter 3 in *World Economic Outlook, October 2010: Recovery, Risk, and Rebalancing*, World Economic and Financial Surveys, pp. 93-124, Washington (D.C.).

——————(2012), *Fiscal Monitor* "Balancing Fiscal Policy Risk", Washington (D.C.).

——————(2012a), *World Economic Outlook* "Coping with High Debt and Sluggish Growth", World Economic and Financial Survey, Washington (D.C.).

——————(2012b), *Fiscal Monitor* "Taking Stock: A Progress Report on Fiscal Adjustment", World Economic and Financial Survey, Washington (D.C.).

——————(2013), "Reassessing the Role and Modalities of Fiscal Policy in Advanced Economies", IMF, Policy Paper, Washington (D.C.).

Panizza, U., F. Sturzenegger and J. Zettelmeyer (2009), "The Economics and Law of Sovereign Debt and Default", *Journal of Economic Literature*, Vol. 47, No. 3, pp. 651-98.

Perotti, R. (1999), "Fiscal Policy in Good Times and Bad", *Quarterly Journal of Economics*, Vol. 114, No. 4, pp. 1399-436, November.

Poghosyan, T. (20129, "Long-run and Short-run Determinants of Government Bond Yields in Advanced Economies", IMF, Washington (D.C.).

Reinhart, C.M. and K.S. Rogoff (2009), "This Time Is Different: Eight Centuries of Financial Folly", Princeton University Press.

——————(2010), "Growth in Time of Debt", NBER, Working Paper, No. 15639.

Schaechter, A., T. Kinda, N. Budina and A. Weber (2012), "Fiscal Rules in Response to the Crisis – Toward the 'Next-Generation' Rules: A New Dataset", IMF, Working Paper, No. 12/187, Washington (D.C.).

Tagkalakis, A. (2008), "The Effects of Fiscal Policy on Consumption in Recessions and Expansions", *Journal of Public Economics*, Vol. 92, No. 5-6, pp. 1486-508.

Von Hagen, J., A. Hughes Hallett and Rolf Strauch (2001), "Budgetary Consolidation in EMU", European Economy, *Economics Papers*, p. 148, Brussels, European Commission.

IMPLICATIONS FOR FISCAL POLICY OF SUSTAINING A LARGE BANKING SECTOR

Fabio Balboni[*] *and Mirko Licchetta*[**]

"The sheer size of an object, institution or animal determined their structure[...] as their size rose, their structure needed to strengthen more than proportionately if they were to remain robust and resilient"

Andrew G. Haldane, Executive Director, Financial Stability, Bank of England

This paper investigates common determinants of fiscal crises using a standard Early Warning System (EWS) approach, with a particular focus on the role of the financial sector. We find that the probability of a fiscal crisis decreases with the level of domestic credit (as a share of GDP), but that at very high levels of credit it starts to increase. The critical threshold above which an increase in the level of credit signals an increase in the likelihood of a fiscal crisis, appears to be country (or group) specific, rather than an absolute level valid across all countries as previous research on this issue seemed to suggest. The paper also presents some preliminary results suggesting that, to determine a country's vulnerability to fiscal crises, it might play a role whether the credit is provided to the real economy (e.g., households, non-financial corporations) as opposed to the financial sector. In fact, after controlling for the stage of financial development of a country, the likelihood of a fiscal crisis decreases with the ratio of credit to the real economy (as a share of GDP) and increases with the ratio of credit to the financial sector (as a share of GDP). Consistent with previous findings in this literature, we find that higher levels of gross government debt, larger budget deficits, lower GDP growth and a loss of competitiveness (at least for more advanced economies) increase the likelihood of a fiscal crisis. We also find that countries with larger negative Net International Investment Positions (NIIPs) are more vulnerable to fiscal crises, especially if the level of debt liabilities (as opposed to FDIs) is large. This paper does not, however, account for other important factors that are likely to have an impact on a country's vulnerability to a fiscal crisis. These include the strength and credibility of domestic institutions, the potentially stabilising role of an independent monetary policy, progress made on structural reforms; and other political economy factors. These limitations inevitably call for some care in assessing the key policy implications of this paper.

1 Introduction

The recent financial crisis has shown the limits of traditional debt sustainability analysis (DSA). First, focusing on a central case scenario and with a limited range of sensitivity tests that can be applied to the key variables, it cannot capture the impact of relatively unlikely, but large,

---

[*] HM Treasury. E-mail: fabio.balboni@hmtreasury.gsi.gov.uk

[**] HM Treasury. E-mail: mirko.licchetta@hmtreasury.gsi.gov.uk

Disclaimer: The views expressed in this article are those of the authors and do not necessarily represent the views of, and should not be attributed to, HM Treasury or UK Government.

We would like to thank Emanuele Baldacci,, James Richardson, Charles Roxburgh Richard Salt, Alex Skinner, Alex Tuckett and Alex Pienkowski for helpful comments. We are grateful to Jan Grabowiecki and Susan Lund from McKinsey Global Institute (MGI) for providing some of the data used in the paper . All remaining errors and omissions are of course entirely our own.

tail-risk events, such as bank recapitalisations or other large stock-flow adjustments.[1] Second, its focus of analysis (the debt-to-GDP ratio) is too narrow to assess the risk that countries might not be able to rollover their existing debt, which is a key source of vulnerability. There have been several attempts to overcome these limitations. For example, Early Warning Systems (EWS) for fiscal crises complement the evaluation of debt ratios with other macro-economic variables. Other research has focussed on the implications for fiscal policy of large contingent liabilities, in particular from the financial sector.

The purpose of this paper is twofold. First, it provides a review of the existing literature on contingent liabilities from the financial sector and their impact on the sustainability of public finances, including key stylised facts characterising the relationship between banking and fiscal crises. Second, it aims to contribute to the literature on early-warning indicators, assessing common determinants of fiscal crises, focusing in particular on the relationship between financial depth and fiscal crises. Importantly, this paper does not attempt to estimate the exact likelihood that a fiscal crisis will occur given a set of macroeconomic and financial variables, this would require controlling for other factors including the political economy factors, the strength and credibility of domestic institutions, the potentially stabilising role of an independent monetary policy and progress made on planned structural reforms; rather, its main objective is to explore what economic and financial variables are associated with fiscal crises and might be seen as a warning signal for possible future crises. Furthermore, this paper does not reach any definite conclusion on the direction of causality between the likelihood of a crises and the set of key variables investigated.

The main findings of this paper are as follows. First, the likelihood of a fiscal crisis declines with the level of domestic credit (as a share of GDP), a measure of financial depth. However, there is evidence of non-linear effects in the relationship between domestic credit and the occurrence of fiscal crises: at very high levels of credit, the probability that a crisis will occur starts to increase. The critical threshold of credit, above which it starts to signal an increase in the likelihood of a crisis, appears to be country (or group) specific, rather than an absolute level valid for all countries. We also find some preliminary evidence that the likelihood of a fiscal crisis increases with the level of credit to the financial sector and decreases with the level of credit to the real economy. Consistent with previous findings from the Early Warning Systems (EWS) literature, we find that higher levels of gross government debt, larger budget deficits, lower GDP growth and a loss of competitiveness (at least for more advanced economies) all increase the likelihood of fiscal crises. Finally, we find that large negative Net International Investment Positions (NIIPs) increase the likelihood of a crisis; and the composition of the external balance sheet is also important.

This paper does not, however, account for other important factors that are likely to have an impact on a country's vulnerability to a fiscal crisis. These include the strength and credibility of domestic institutions, the potentially stabilising role of an independent monetary policy, progress made on structural reforms; and other political economy factors. These limitations inevitably call for some care in assessing the key policy implications of this paper.

The paper is structured as follows. The second part presents the literature review. The third looks at some stylised facts regarding possible links between banking and fiscal crises. The fourth section investigates common determinants of fiscal crises using a probabilistic approach in a subset of advanced and emerging market economies. Finally, the last section draws together the key conclusions and policy implications of the paper, and suggests avenues for further work.

---

[1] The Irish sovereign debt crisis is an example of how a large banking sector can put at risk the sustainability of the public finances: Ireland's public debt ballooned from 25 per cent of GDP in 2007 to over 100 per cent in 2011, which caused the country to lose access to the markets and having to resort to an international package of financial assistance. Around thirty percentage points of this increase was due to more than €60 billion banking support measures provided by the government.

2 Literature review

There are two main strands in the literature on the fiscal implications of banking crises: a number of papers have investigated the transmission channels between banking and fiscal crises while more recent work has focused on the size of the financial sector and its role in the build-up of fiscal crises. This work considers how the *ex ante* fiscal policy can reduce the impact of contingent liabilities from the financial sector and the likelihood that these might lead to a fiscal crisis. The following sections give an overview of the main findings from both strands.

2.1 From banking to sovereign crises

The literature on the relationship between the state and the banking system dates back at least to the time of the Italian banking houses in the 13th century when banks were financiers of the sovereign. As shown by Alessandri and Haldane (2009), this relationship has evolved over time, with "the Great Depression marking a regime-shift in state support to the banking system". Before it was the banks supporting the state, after it has become common for the state to act as a lender of last resort for the banks. If large, systemically important financial institutions face the risk of bankruptcy, governments have little option other than to provide the required financial support if they want to preserve the stability of the financial system. But there are other channels through which weaknesses in the banking sector can be transmitted to the sovereign: for example, a deterioration of bank balance sheets could constrain their ability to lend to the real the economy or reduce the investor base for government bonds. Furthermore, a rapid expansion of the financial sector could boost government revenues over and above normal cyclical fluctuations, with the apparent strength of public finances allowing governments to justify permanent increases in spending, which may lead to unsustainable fiscal positions once such revenues suddenly disappear.

In several cases, the economic effects of banking crises have been so large as to lead to state default.[2] De Paoli *et al.* (2009) found a strong correlation between banking and sovereign crises, finding that two thirds of sovereign defaults in their sample overlap with banking crises, and almost half of these episodes overlap with both banking and currency crises.[3] Reinhart and Rogoff (2009) found that government debt grew on average by 86 per cent in the major post-World War II banking crisis episodes. Such increases are, however, only partly justified by the direct costs of "bailing-out" the banks, the main cause being indirect costs such as a sharp decline in tax revenues and/or increase in government spending.[4] Bénassy-Quéré and Roussellet (2012) have estimated the gross fiscal costs of a set of 60 systemic banking crises involving 51 different countries from 1977 to 2007, finding an average cost of 14.3 per cent of GDP. Laeven and Valencia (2012) find that, of the banking crises included in their sample, 5 per cent are followed by a sovereign debt crisis within three years, whereas only 1 per cent are preceded by a sovereign debt crisis in the previous three years.

Recent experience has also emphasised that there are important feedback loops between the sovereign and the banking sector. There are several channels through which the sovereign and the

---

2 As noted by Reinhart (2009), "Sharp economic downturns follow banking crises; with government revenues dragged down, fiscal deficits worsen; deficits lead to debt; as debt piles up rating downgrades follow. For the most fortunate, the crisis does not lead to the deadliest D: default, but for many it has".

3 The probability of a banking crisis occurring in the same year or after a default is 0.46 in their sample of crises. Output losses after a default last about 10 years, and are larger in the event of a triple crisis.

4 Indeed, they note that "the main cause of debt explosions is not the widely cited costs of bailing-out and recapitalising the banking system, [but] the inevitable collapse in tax revenues that governments suffer in the wake of deep and prolonged output contractions, as well as often ambitious countercyclical fiscal policies aimed at mitigating the downturn".

banking sector could influence each other.[5] For example, an increase in sovereign risk could push up bank funding costs because of a deterioration of the perceived ability (or willingness) of the sovereign to support the banks, or because banks are forced to record a loss in the domestic and foreign sovereign portfolio. Studying a sample of 534 unsecured fixed-rate senior banks bonds from 116 banks in 14 advanced countries in 2010, BIS (2011) concluded that about 30 per cent of the spread at the launch of the bonds depended on the conditions of the sovereign, reaching 50 per cent for countries under severe fiscal strain. In more "normal" times, they find that bank-specific factors have a more prominent role in determining bank funding costs.

2.2 Fiscal risks from a large financial sector

Systemic banking crises have been frequent around the world, carrying fiscal costs which ultimately lead to large increases in public debt.[6] According to recent research by Laeven and Valencia (2012) on over 147 banking crisis episodes globally, the median increase in public debt associated with banking crisis episodes – which reflects both direct (e.g., recapitalization, liquidity) and indirect *(i.e.*, subsequent falls in GDP and government revenues) costs – is close to 20 per cent of GDP, although there is a large variation across countries. Further evidence (Tagkalakis, 2012) suggests that the increase in public debt tends to be related to the size of the financial sectors: countries with large financial sectors saw their debt increase on average between 4.2 and 5.3 per cent of GDP, compared to between 1.4 and 1.7 per cent for those with smaller financial sectors.[7]

The financial sector has recently become more important in determining the markets' perception of a country's vulnerability to fiscal crises. Mody (2009) showed that US intervention in support of Bear Stearns in 2008 strengthened the link between financial sector variables and sovereign spreads. Gerlash *et al.* (2010) found that the size and structure of the banking system are important determinants of sovereign risk premia during periods of financial crisis; and that countries with large banking systems, especially those with low equity ratios, tend to experience higher yield spreads when aggregate risk increases. Mody and Sandri (2011) found that the vulnerability of domestic banks is an important driver of sovereign spreads and that this relationship tends to be stronger for countries with high debt-to-GDP ratios.

The traditional literature on financial deepening suggests that more credit in the economy should lead to better economic performance. For example, in a cross-country study, Beck and Levine (2004) found that financial deepening has a positive effect on medium-term growth. However, this conventional wisdom has recently been called into question. Recent IMF research (Arcand, Berkes and Panizza, 2012) suggests that, whilst financial deepening is positive for growth, at high levels of private credit-to-GDP, it could start to have a negative impact. The threshold appears to be at levels of private credit of 80-100 per cent of GDP. This finding is consistent with earlier cross-country studies (Easterly, Islam and Stiglitz, 2000) which suggested that output volatility tends to increase at credit-to-GDP ratios above unity. Since this threshold is well below the levels of financial depth in most advanced economies, this finding would suggest that the banking sector could be acting as a drag on medium-term growth in these countries.

Finally, Taylor and Schularick (2012) found that financial crises, recessions and recoveries are more painful than normal recessions and that there is a close correlation between the build up of credit in the expansion and the severity of the subsequent recession: the more excess-credit in the

---

5 For an in-depth discussion of these channels, see BIS (2011).

6 On the costs of banking crises see also OECD (2009) and the Independent Banking Commission (2011).

7 Large is defined as private sector domestic credit relative to GDP above 120 per cent (small is below 120 per cent).

expansion, the worse the recession and subsequent recovery seems to be. This result is robust to the inclusion of several macro control variables such as current account and real investment per capita.

Recent research has also focussed on the role of fiscal buffers in mitigating the fiscal consequences of bankruptcies and banking sector crises. In a review of the experience of five economies with large financial sectors relative to GDP during the recent financial crises (Hong Kong SAR, Iceland, Ireland, Singapore and Switzerland), the IMF (2010) concluded that one of the reasons why Hong Kong SAR and Singapore managed to escape from the crisis relatively unaffected was that they had developed prudent fiscal buffers. By contrast, bubble-related revenues in Iceland and Ireland in the pre-crisis period obscured weaknesses in the underlying fiscal position. Switzerland, which was running a significant structural budget surplus, also experienced limited negative consequences from the crisis. In their analysis of tax gaps, Bénassy-Quéré and Roussellet (2012) also found that these increase with the level of contingent liabilities, suggesting that more prudent fiscal policy could reduce the likelihood of debt becoming unsustainable following a banking crisis. Without diminishing the role of fiscal buffers in mitigating these countries' vulnerability to the financial crisis, the IMF (2010) also recognises that there were several other important factors that might have contributed to insulating Asian economies from the risk of a fiscal crisis, including a large positive net international investment position, a large stock of international reserves (as a share of GDP), a banking sector with a relatively well diversified funding structure and more effective financial market regulation and supervision.[8]

3 From banking to fiscal crises: stylised facts

This section provides some stylised facts about the relationship between banking and fiscal crises. The aim is twofold. First, to identify how often a banking crisis is associated with a fiscal crisis and whether fiscal crises tend to occur before, at the same time, or after the banking crises. Second, to provide a preliminary assessment of whether key macroeconomic and financial variables behave differently in cases where a banking crisis eventually leads to a fiscal crisis compared to when it does not. In fact, as it will become evident later on in the paper, traditionally in the Early Warning System (EWS) literature the whole duration is used between in the estimation phase, to increase the sample size. This makes it very difficult to determine whether the fiscal crisis had started before, in the same year, or after the banking crisis occurred. On the contrary, in the descriptive analysis presented, each crisis episode counts as one data point, which allows us to shed some light on the direction of causality between banking and fiscal crises.

3.1 Defining banking and fiscal crisis

There are several approaches used to identify banking crisis episodes. We follow the approach used by Laeven and Valencia (2012), which identifies a systemic banking crisis when the following two conditions occur simultaneously: (i) significant signs of financial stress in the banking system (e.g., bank runs, liquidations, etc.); and (ii) significant policy intervention in response to losses in the banking system (*i.e.*, when there have been at least three out of six possible interventions identified by the authors, which include restructuring of banks, injections of

[8] Other factors that could make an economy (especially with a large banking sector) particularly vulnerable to episodes of crises are large cross-border banking systems, issuing a (non-reserve) currency or adopting a reserve currency as its legal tender.

liquidity). With this definition, the authors found 147 banking sector crises in over 100 countries over the period 1970-2011.[9]

For these countries, we constructed a binary indicator of fiscal crises following the definition by Baldacci *et al.* (2011) and European Commission (2012). We identify a fiscal crisis when at least one of the following conditions is satisfied: (i) IMF programme (not precautionary) of more than 100 per cent of quota; (ii) public debt default is reported based on Standard & Poor's definition, or a restructuring/rescheduling is reported; (iii) sovereign spreads relative to US comparable bonds more than two standard deviations above long-term average, highlighting significant market financing pressure; and (iv) inflation above 35 per cent for advanced economies (AE) and 500 per cent for emerging markets (EME), capturing an implicit default event. Our indicator covers a larger number of countries than Baldacci (2011) or European Commission (2012). However, for available countries, we obtain results in line with previous estimates (full list of fiscal crises in Annex 2).

We found that, of the 147 episodes of banking crises, 79 were associated to the occurrence of a fiscal crisis.[10] In 28 cases the fiscal crisis preceded the banking crisis; in 20 they started in the same year. Using data from Laeven and Valencia (2012) and IMF WEO (2012), we then assessed the performance of a number of key macro variables across the different banking crisis episodes, investigating whether their behaviour changes when these are also associated with a fiscal crisis.[11] As is evident from Figure 1a, output loss, direct fiscal costs (e.g., to recapitalise the banks), liquidity support, Non-performing Loans (NPLs) and Increase in public debt, were all higher when there is a banking and a fiscal crisis. To account for the risk of endogeneity (*i.e.*, that the fiscal crisis preceded the banking one), we also ran the analysis excluding the cases in which there was already a fiscal crisis in place, and in fact found that in this case (Figure 1b) the differences in the other macroeconomic variables are even more accentuated.[12]

We then considered a different sets of macroeconomic and financial variables, from the IMF World Economic Outlook (WEO) and found that (see Figures 2a and 2b) countries that experienced a fiscal crisis following a banking crisis had a more negative Net Investment International Position (NIIP) than those that did not, and higher level of public debt (even if the difference is less evident than in the case of the NIIP).[13] Finally, we found that, among the countries that experienced a banking crisis, those that also experienced a fiscal crisis tended to have lower levels of domestic credit (as a share of GDP), particularly in these countries where the fiscal crisis preceded the banking one (see Figure 2b on the right). This seems to confirm some of the early findings in the literature on the stabilising role of greater financial deepening.

However, we also found that higher levels of domestic credit also tend to be associated with higher direct fiscal costs of a banking crisis (Figure 3a, left), which in turn lead to larger contractions in output (Figure 3b, right). This relationship seems to be even more evident when the banking crisis is associated with a fiscal one (dotted line). This suggests that the relationship

---

[9] Another possible definition is the one by Reinhart and Rogoff (2011), who mark a banking crises as two types of events: (i) bank runs that lead to the closure, merging or takeover by the public sector of one or more financial institutions; or (ii) closure, merging, takeover, or large-scale government assistance of an important financial institution that marks the start of a string of similar outcomes for others. With these criteria, they identify 66 cases between 1945 and 2007.

[10] Our definition of fiscal crises is different than the one used by Laeven and Valencia (2012), which is one reason why their conditional probability of fiscal crises given a banking crisis is lower.

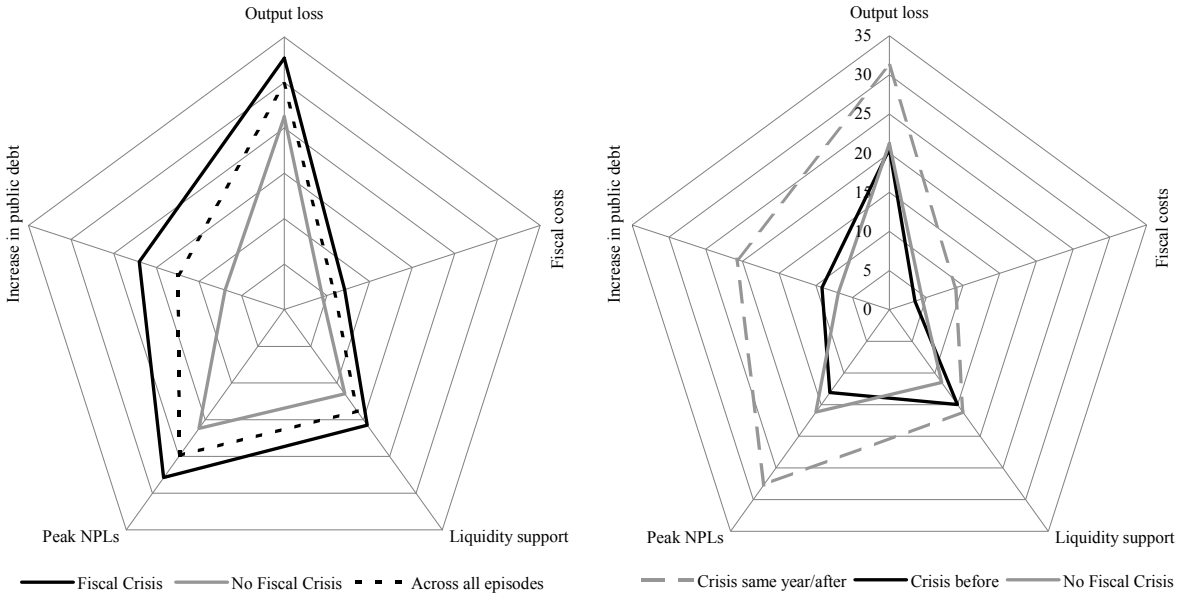
[11] To eliminate the impact of possible outliers, for each of the regressors we have excluded observations higher or smaller than the average by three standard deviations.

[12] One caveat in our analysis is related to the use of annual data. This allows us to control for whether the crises took place in the same or in different years, but within the same year we are not able to do so. Therefore, among the "same year" category, it is still possible that the fiscal crisis would have preceded the fiscal one. But with annual data this is a difficult limit to overcome.

[13] While we do not show this in the figure for scale reasons, also the current account balances tend to me more negative when a banking crisis is accompanied by a fiscal crisis (–5 per cent of GDP) than when it is not (–2 per cent of GDP).

Figure 1

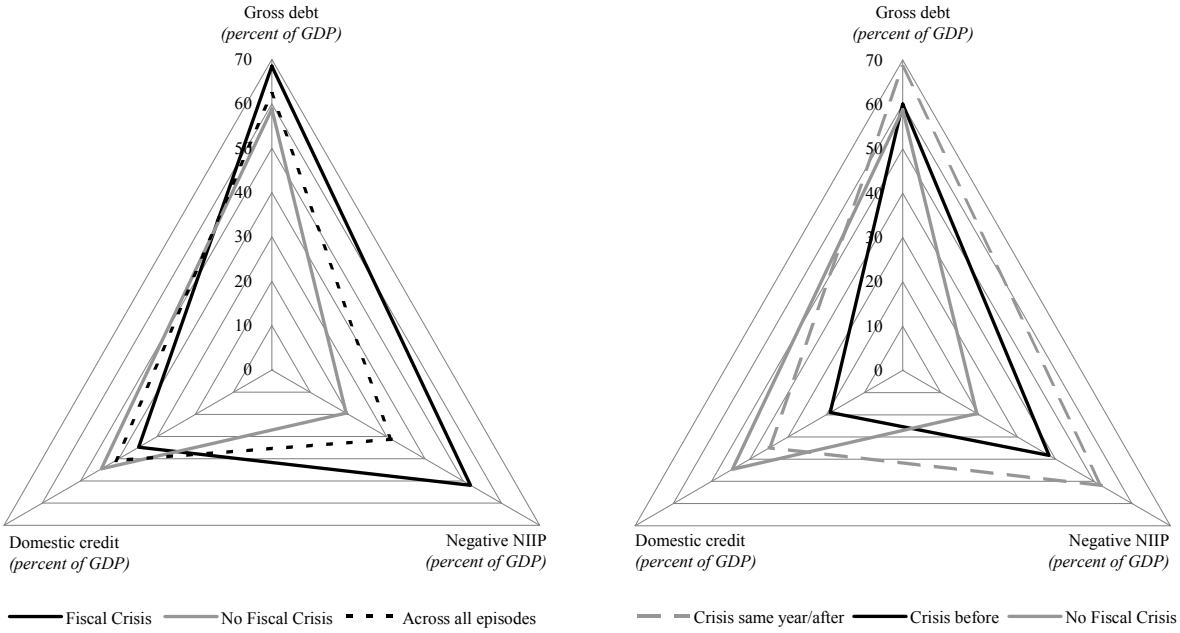
Key Macroeconomic Indicators During Banking Crisis Episodes
a) With Fiscal Crisis **b) Without Fiscal Crisis**



Source: Authors' calculations from Laeven and Valencia (2012).

Figure 2

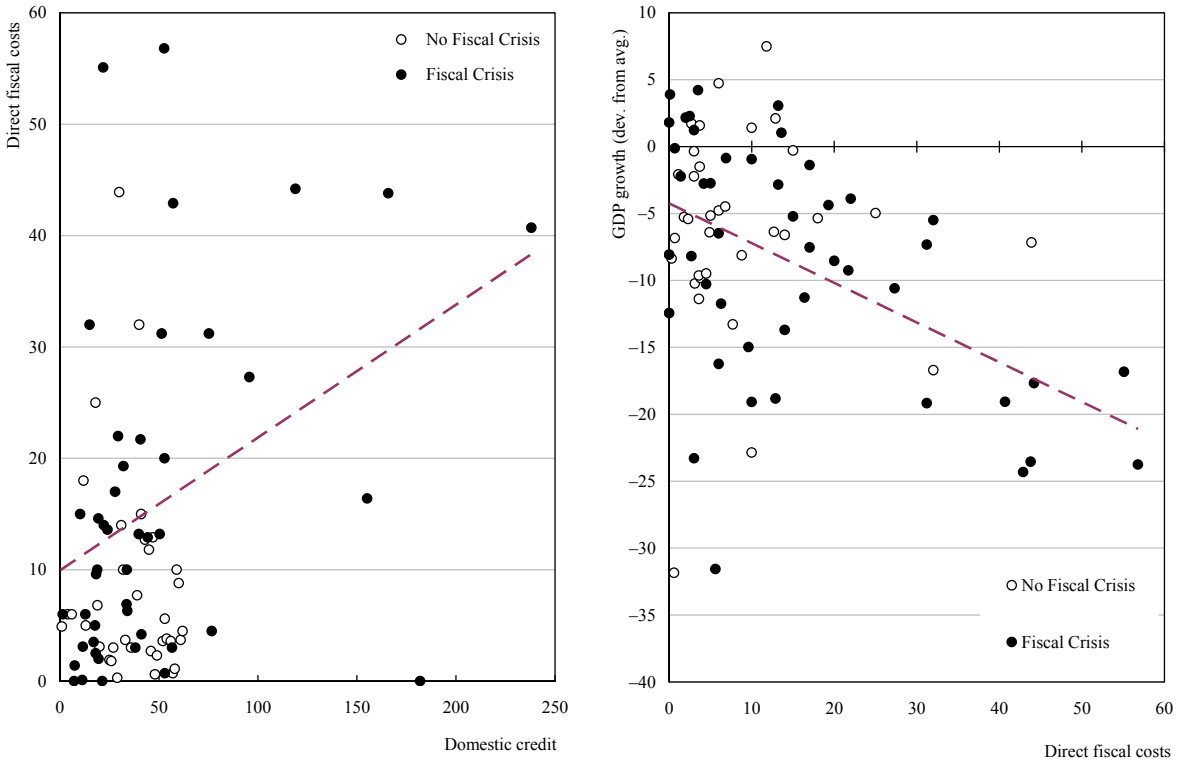
Other Macroeconomic Indicators During Banking Crisis Episodes
a) With Fiscal Crisis **b) Without Fiscal Crisis**



Source: Authors' calculation from IFS (Datastream) and WEO.

Figure 3a/3b

Domestic Credit, Direct Fiscal Costs and GDP During Banking Crises
(percent of GDP)



Source: Authors' calculations from Laeven and Valencia (2012), IFS (Datastream) and WEO.

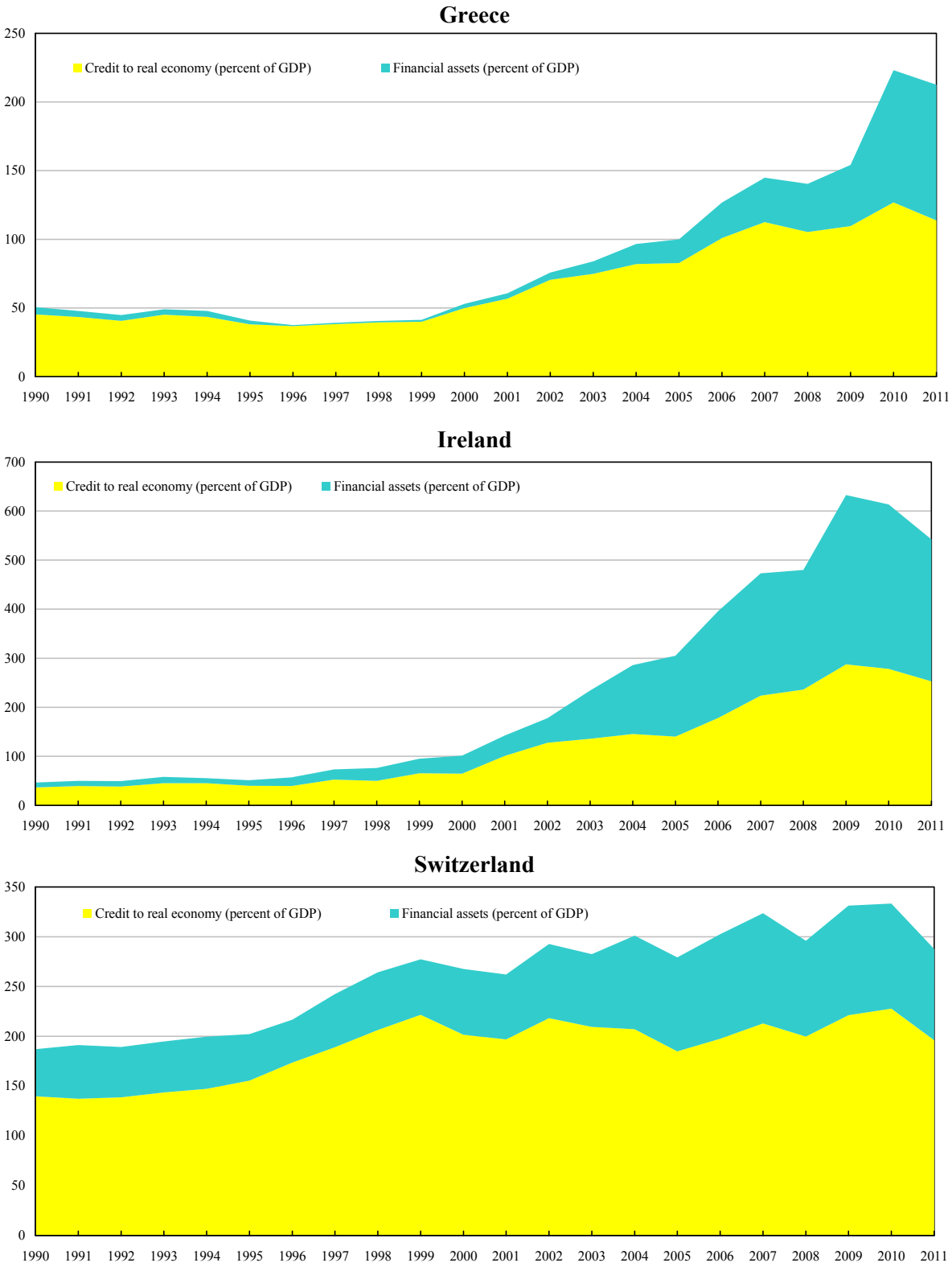
between the level of domestic credit and the likelihood being affected by a fiscal crisis might be more complex, which will be explored later on.

Finally, we investigated whether the likelihood of a fiscal crisis is influenced by whether credit is provided to the real or financial sector of the economy. Theory predicts that credit should be a stabilising influence if it is provided to the productive sectors of the economy, but that when it is provided to the financial sector it could become destabilising. Using data from the McKinsey Global Institute (MGI), we distinguish between credit provided to the "real" economy and to financial institutions.[14] As shown in the Figure 4, countries that have experienced banking and fiscal crises (Ireland and Greece) had previously experienced an impressive growth in financial assets. Conversely, a country such as Switzerland, which also has a very high level of overall credit but experienced much less significant growth in the exposure of financial institutions to financial sector bonds, managed to escape the worst consequences of the crisis.

[14] According to definition provided by MGI, credit to households and non-financial companies, intermediated through banks and capital markets, include: for households, mortgages and other loans from banks and other financial institutions (auto loans, student loans, credit card debt and home equity lines of credit); for non-financial corporations, loans from banks and non-bank financial institutions (lines of credit, commercial paper, and all corporate bonds). Equity market capitalisation of listed non-financial corporations is also included. Credit to financial institutions includes tradable securities issued by banks and other financial institutions to fund their own operations (commercial paper, bonds and asset-backed securities issued by financial institutions). Stock-market capitalization of financial institutions listed on stock exchanges is also included whereas interbank loans are excluded.

Figure 4

Bank Assets Split into Credit to the Real Economy and Financial Assets: Selected Countries



Source: authors' reelaboration from McKinsley Global Institute (MGI).

4 Econometric analysis

In this section, in line with traditional EWS literature, we assess the common determinants of fiscal crises conditional on a set of macroeconomic and financial variables. Our dataset comprises annual data for a sample of 60 emerging and advanced economies over the period 1980-2012 (due to data constraints, we have considered a subset of the countries in the previous section).[15] The majority of the data are taken from the IMF's *World Economic Outlook* (WEO) and the IMF's *International Financial Statistics* (IFS).[16]

The estimation technique used is a standard probabilistic framework, following Verbeek (2004). We used a pooled logit model to estimate the probability of a fiscal crisis conditional on a set of explanatory variables (full details of the estimation technique are presented in Annex 1). The endogenous variable (Y) is a binary variable that takes the value of 1 in periods when a fiscal crisis occurs and 0 otherwise. Consistent with the earlier EWS literature (and differently than what we did previously when assessing some of the stylised facts) the fiscal crisis dummy equals 1 for the whole duration of the crisis. The vector of explanatory variables consists of quantitative (e.g., macroeconomic and financial) as well as qualitative (e.g., a dummy variable for emerging vs. advanced economies) indicators. Overall, we identified 84 episodes of fiscal crisis in the 60 countries, of different duration (full list of fiscal crisis presented in Annex 2).

This probabilistic approach allows us to fully exploit the cross-sectional and time-series information contained in the panel data set, to test the statistical significance of individual variables and also take into account the correlation between variables, which would not be possible if each control was introduced separately as is the case with the so-called "signalling" approach to fiscal crisis.[17] Binary choice models do, however, also present drawbacks, which will be discussed later in the paper.[18]

4.1 Results

The estimation procedure consists of two steps. First, we assess the ability of each variable individually to explain fiscal crises. Table 1 presents the full list of variables, reporting expected and actual signs. The expected signs are based on previous findings from the EWS literature on fiscal crises, as well as the stylised facts presented above. As shown in the table, the results are in line with the *a priori*.

---

[15] Our sample includes 60 countries, 32 advanced economies in the OECD (Australia, Austria, Belgium, Bulgaria, Canada, Switzerland, Czech Republic, Germany, Denmark, Spain, Estonia, Finland, France, Great Britain, Greece, Hungary, Ireland, Iceland, Italy, Japan, Latvia, Lithuania, Netherland, Norway, New Zealand, Poland, Portugal, Romania, Slovenia, Slovak Republic, Sweden, USA) and 28 Emerging Economies from the JP Morgan *EMbig* Index (Argentina, Brazil, Chile, China, Colombia, Ecuador, Egypt, Hong Kong, Indonesia, India, Israel, Korea, Morocco, Malaysia, Mexico, Nigeria, Pakistan, Panama, Peru, Philippines, Russia, Singapore, El Salvador, South Africa, Thailand, Turkey, Uruguay and Venezuela). To eliminate the impact of possible outliers, for each of the regressors we have excluded observations higher or smaller than the average by three standard deviations.

[16] Data for the external balance sheet variables are from Lane and Milesi-Ferretti (2010) while data on domestic credit are from the financial structure database developed by Beck *et al*. (2012) and from the World Development Indicators (WDI) of the World Bank. Finally, the split of banks' assets between credit to the real economy and financial assets is courtesy of MGI.

[17] This non-parametric approach is followed, among others, by the European Commission (2012).

[18] One drawback worth mentioning here is the incidental parameter, which arises in every fixed-effects model. This type of model accounts for heterogeneity $(\varepsilon \neq 0)$ treating the constant heterogeneous term ε as a fixed unknown parameter, by including N dummy variables in the model. However, the process of estimation of β and ε provide consistent results only under the assumption that the number of periods T goes to infinity. Therefore, the incidental parameter problem arises because for fixed T, the number of parameters grows with the sample size N. This problem is extensively discussed in Greene (2002).

Table 1

Single Variables Regressions

Indicator	Expected Sign	Actual Sign
International reserves *(percent of GDP)*	–	– (***)
REER annual change	+	– (*) + for AEs only (***)
REER two year change	+	– () + for AE only (***)
Real GDP annual change	–	– (***)
Real GDP two year average (before crisis)	–	– (***)
Real GDP Dev. from trend (after crisis)	–	– (**)
Change in revenue *(percent of GDP)* (*t*+1, *t*–1)	+	+() Significant at 15%
Gross Debt *(percent of GDP)*	+	+ (***)
Budget Balance *(percent of GDP)*	–	–(***)
Current account *(percent of GDP)*	–	– (***)
Avg. 2 year change CA before event	–	– ()
Net International Investment Position *(percent of GDP)*	–	– (***)
Bank deposit *(percent of GDP)*	–	– (***)
Domestic Credit *(percent of GDP)*[19]	–	– (***)
Change in Domestic Credit *(percent of GDP)*	–	– (***)
Financial liberalisation (A+L, *percent of GDP*)	–	– (**) >150% + (***)
FDI *(percent of total liabilities)*	–	– (***)
Debt liabilities *(percent of total liabilities)*	+	+ (***)

We then estimated the likelihood of a fiscal crisis conditional on a set of explanatory variables. We started from a wide selection of possible variables, deleting stepwise the ones that were not statistically and economically significant until we reached a satisfactory model specification. Table 2 below reports the most parsimonious model specifications (the actual STATA output with the value of the parameters is reported in Annex 3).

The most notable results are as follows. First, in all model specifications (1-6), domestic credit (as a share of GDP) is highly significant and reduces the likelihood of a fiscal crisis. This provides support for the idea, presented in the literature review, that a high degree of financial depth has a stabilising effect. However, our results also show that at very high levels of domestic credit, the probability of a fiscal crisis increases. This is shown by the highly positive and statistically significant quadratic term (specifications 3-6). We also found that the deviation from the country-specific average is positive and significant. This suggests that the critical level of

[19] Refers to financial resources provided to the private sector (e.g., loans, purchases of non equity securities, and trade credits and other accounts receivable), that establish a claim for repayment. For some countries includes credit to public enterprises.

Table 2

Summary of Econometric Results for Different Model Specifications (1-6)

Y = Probability of Fiscal Crisis	1	2	3	4	5	6
GDP Growth	– ***	– **	– *	– *	–	– *
Net International Investment Position *(percent of GDP)*	– ***	– ***	– ***	– ***	– **	–
Domestic Credit *(percent of GDP)*	– ***	– ***	– ***	– ***	– ***	– ***
Gross Government Debt *(percent of GDP)*	+ **					
Debt liabilities *(percent of total external liabilities)*		+ ***	+ ***	+ ***	+ ***	+ ***
Domestic Credit *(percent of GDP)*, squared			+ ***	+ ***	+ **	+ **
DC deviation from country-specific average				+ ***	+ **	+
Banking crisis (LV) dummy					+ ***	+ ***
EME dummy						+ ***
Pseudo R^2 [20]	0.16	0.19	0.20	0.21	0.25	0.28
Observations	1017	1435	1435	1428	1428	1435

domestic credit, above which the likelihood of a fiscal crisis starts to increase, may be specific to each country, as suggested in some of the earlier literature.

Second, there is evidence that the probability of a fiscal crisis increases as a country's NIIP (as a share of GDP) becomes more negative. This confirms one of the stylised facts identified in the previous sections, and suggests that external imbalances are a very important source of fiscal vulnerability. We also find that (specifications 2-6) the probability of fiscal crisis increases with the share of debt in total external liabilities and decreases with the share of Foreign Direct Investments (FDIs) in Total External Liabilities. A possible reason could be that FDI provides a more stable source of financing for a country's external liabilities. Third, the probability of a fiscal crisis increases with the level of government gross debt (as a share of GDP), suggesting that fiscal variables matter for a country's vulnerability to fiscal crisis. Unfortunately, we could not include this variable in all model specifications because it reduces the sample size significantly. Real economy variables also play a key role: high real GDP growth reduces the probability that a country will be affected by a fiscal crisis. Fourth, the banking crisis dummy is positive and significant (specification 5). However, as previously mentioned, in this approach it is not possible to identify the direction of causality. The emerging economies dummy is also positive and significant (specification 6), suggesting that these economies are, in general, more vulnerable to fiscal crises.

[20] The joint hypothesis that all the coefficients are zero is examined using a chi-squared test. In order to approximate the explanatory power of the model, the value of the likelihood function for the full model as well as for the model with the constant only are considered and pseudo *R*-squared is computed.

Table 3

Regression Results with the Inclusion of Credit to the Real Economy vs. Financial Sector

***Y* = Probability of a Fiscal Crises**	**Coefficient**[21]	***Z*-test**
Net International Investment Position *(percent of GDP)*	–0.22	–5.11 (***)
GDP growth	–0.13	–3.93 (***)
Credit to the "real" economy *(percent of GDP)*	–0.32	–6.34 (***)
Financial sector bonds *(percent of GDP)*	0.23	3.83 (***)
Share of financial sector bonds over total assets	–4.39	–3.65 (***)
	Pseudo R^2	0.21

Finally, using the dataset provided by MGI, we also tested whether the split between credit to the real economy and the financial sector plays a role in determining the likelihood of a fiscal crisis. As we only have data from 1990 to 2011, adding this variable to the previous model specification reduces the sample size significantly. We have therefore run this regression separately, looking for the most parsimonious model specification; and not included it in the set of model specification presented in Table 3.

Similarly to the previous model specifications, large negative NIIPs increase the likelihood of a fiscal crisis, as does GDP growth. The level of credit to the "real" economy reduces the likelihood of a fiscal crisis. However, the level of credit to the financial sector (as a share of GDP) increases the likelihood of a crisis, while the share of credit to the financial sector over total credit reduces the likelihood. Interpreting these results is not straightforward. One plausible interpretation is that, after controlling for the "stage" of financial development of each country (for which the share of credit to the financial sector over total credit seems to be a good proxy) higher levels of credit to the financial sector increase the likelihood of a fiscal crisis. Controlling for the stage of financial development seems justified, since we have observed previously that emerging economies, that tend to have much lower ratios of credit to the financial sector, also exhibit a higher unconditional probability of a fiscal crisis to occur. Whilst still preliminary, these results appear to be very interesting and merit further work.

4.2 Robustness results and limits

We have undertaken a number of robustness tests and our results are robust to all the tests performed. First, we re-estimated the most parsimonious pooled logit model with a pooled probit; and with/without Huber-White robust standard errors to account for possible heteroskedasticity in the estimated residual. Second, the most parsimonious model was also re-estimated using a random

[21] The estimated coefficients in a binary regression are related to the effect of the independent variables on the estimated probability but they cannot be directly interpreted as changes in the dependent variable as a result of a change in the explanatory variable. The marginal impact of a change in one explanatory variable depends on the values of other variables as well as the value of this variable. To study the magnitude of the impact of a marginal change in an independent variable, marginal impacts can be derived at different levels of the explanatory variables (e.g., mean, median and given percentile, etc).

effect probit estimator to fully exploit the cross-sectional and time-series information contained in the panel data set. This approach is also free from the incidental parameters problem and provides unbiased estimates in the presence of heterogeneity of the country-specific term.[22] In particular, it specifies this term as randomly distributed across cross-sectional units. However, it relies on the very strong assumption that the country-specific term (εi) is uncorrelated with the regressors (X).

Third, we estimated the most parsimonious model in the advanced economies and emerging market sub-sample, using an alternative fiscal crises index obtained using a different definition of fiscal crises including Baldacci *et al.* (2011a); and using a different definition of domestic credit as a share of GDP.

However, of course some weaknesses remain. First, our approach does not account for other important dimensions that could reduce a country's vulnerability to a fiscal crisis. These include political economy factors, the strength and credibility of domestic institutions, the potentially stabilising role of an independent monetary policy and progress made on planned structural reforms.

Furthermore (and as mentioned previously this is a limit of all traditional EWS literature), our results have been obtained assuming that the fiscal crisis dummy maintains a value of 1 for the whole duration of the crisis. However, this leads to some problems. One, identified by Ciarlone and Trebeschi (2006), is the so-called "post-crisis bias." This is the risk of confusing the behaviour of explanatory (macroeconomic and financial) variables which are meant to predict a fiscal crisis, with the behaviour associated with the adjustment process after the crisis.[23] Another is the possible exacerbation of the endogeneity problem. In the years following the start of a crisis, the explanatory variables (Xs) are likely to be correlated with the Ys (fiscal crises). In order to mitigate these problems, we ran regressions where the dependent variable Y was set equal to 1, rather than in the years of the crisis itself, in the year before the crisis, in the two years before the crisis and in the three years before the crisis; and the results remained broadly unchanged.[24]

It is also worth referring back to the evidence from the stylised facts presented earlier in the paper, where, using one single data point for each crisis episodes, we could distinguish whether a fiscal crisis started before, in the same year or after the banking crisis. The findings on the behaviour of key macroeconomic and financial variables were broadly consistent with the results of the econometric analysis in the last section, which provides some reassurance on the robustness of these results to the endogeneity problem.

5 Conclusions, main policy implications and next steps

This paper investigates common determinants of fiscal crises using a standard Early Warning System approach; and especially the role of the financial sector. The main finding of the paper is that a high level of domestic credit (as a share of GDP) is associated with a lower likelihood of a

---

[22] The incidental parameter arises in every fixed-effects model. This type of model accounts for heterogeneity ($\varepsilon \neq 0$) treating the constant heterogeneous term ε as a fixed unknown parameter, by including N dummy variables in the model. However, the process of estimation of β and ε provide consistent results only under the assumption that the number of periods T goes to infinity. Therefore, the incidental parameter problem arises because for fixed T, the number of parameters grows with the sample size N. This problem is extensively discussed in Greene (2002).

[23] The logit approach to the EWS literature cannot distinguish between the behaviour of the regressors in the run up to a crisis and during the post-crisis adjustment period. An alternative approach is the one followed by the Commission (2012), *i.e.*, to use a non-parametric approach based on the so called "signalling" approach, taking each single regressor individually. But this has other drawbacks, such as for example not being able to take into account the interaction between different regressors.

[24] This is *de facto* equivalent to using lagged regressors as instruments for the regressors. Another possible way to account for the "post-crisis bias" is the approach followed by Ciarlone and Trebeschi (2006) who used a multinomial approach to distinguish between periods building up to a fiscal crisis, and periods of adjustment after the crisis hit.

fiscal crisis. However, there is preliminary evidence of non-linear effects in the relationship between domestic credit and fiscal crises. At very high levels of credit, the probability of a fiscal crisis starts to increase. The critical threshold of credit, above which it starts to signal an increase in the likelihood of a crisis, appears to be country (or group) specific, rather than an absolute level valid for all countries as some of the previous evidence from the literature seemed to suggest.

We also found some preliminary evidence that whether the credit is provided to the real economy (e.g., households, non-financial corporations) as opposed to the financial sector might play a role in determining a country's vulnerability to fiscal crises: after controlling for the stage of financial development of a country (measured by the share of financial sector bonds over total assets), a higher level of credit to the real economy is associated with a lower likelihood of a fiscal crisis. By contrast, the likelihood of a fiscal crisis increases with the ratio of credit to the financial sector.

Furthermore, we found that large negative Net International Investment Positions increase the likelihood of a fiscal crisis and that the composition of the external balance sheet is important: financing large external liabilities through debt leaves a country more vulnerable than FDIs. Finally, consistent with previous findings from the Early Warning Systems (EWS) literature, we also found that higher levels of gross government debt, larger budget deficits, lower GDP growth and a loss of competitiveness (at least for more advanced economies) increase the likelihood of fiscal crises.

This paper does not, however, account for other important factors that are likely to have an impact on a country's vulnerability to a fiscal crisis. These include the strength and credibility of domestic institutions, the potentially stabilising role of an independent monetary policy, progress made on structural reforms; and other political economy factors. These limitations inevitably call for some care in assessing the key policy implications of this paper.

From a policy point of view – notwithstanding the caveats mentioned above – our results support previous findings from the literature on fiscal crisis, that large fiscal buffers are important in reducing the risk of a fiscal crisis. However, they are not sufficient. The occurrence of a large banking sector crisis might put at risk the sustainability of public finances, regardless of the initial position. Therefore, the findings of this paper emphasise the importance of macro-prudential policy in reducing the likelihood of banking crises and the risk they pose to the sovereign by breaking possible feedback loops. Governments should also be realistic in assessing the impact of financial sector cycles on the economy (and on the Government's revenues); and consider policies to avoid the build up of excessive external imbalances.

There are several directions for future work. First, we could further investigate the relationship between financial depth and the likelihood of a crisis, especially focusing on the role played by the funding strategy (e.g., wholesale vs. deposits). Second, one focus of the literature on contingent liabilities from the financial sector to date (Bénassy and Roussellet, 2012) has been to investigate the relationship between the size of these liabilities and the fiscal surpluses that a country should run to create the adequate fiscal buffer. While these are certainly useful steps forward in assessing the sustainability of current fiscal policies, one of the limits of this approach is that it disregards likely non-linearities in the transmission mechanism between the materialisation of the contingent liabilities from the financial sector and the occurrence of a fiscal crisis. One interesting development of this literature would be to integrate this analysis with the one on the fiscal space literature (IMF, 2011a), for example using a probabilistic approach to analyse the likelihood that, if these liabilities materialise, a country might hit their debt ceiling.

ANNEX 1
PROBABILISTIC APPROACH

For the general case of an unbalanced panel with N countries that are observed over T periods, a general binary dependent variable model can be formulated in terms of an underlying latent variable (Y^*it) defined as follows:[25]

$$Y^*it = \beta\, Xit + \varepsilon i + \mu it \quad i = 1....N\ ;\ t = 1...T \tag{1}$$

where Xit is the vector of explanatory variables, β is a vector of corresponding parameters estimated for m explanatory variables, εi is the unobserved individual country-specific heterogeneity, which explains the specific features of the group (e.g., country) that are constant over time and, finally, μit is the disturbance term.

The latent (Y^*it) and observed binary variable (Yit) are related through the following measurement equation:

$$Yit = 1 \text{ if } Y^*it > 0 \text{ and } = 0 \text{ otherwise} \tag{2}$$

Then, $Yit = 1$ when Y^*it is above a certain threshold (assumed equal to 0 for simplicity). It follows that:

$$P(Yit = 1 \mid Xit) = P(Y^* > 0 \mid Xit) = P(\beta Xit + \varepsilon it + \mu it > 0 \mid Xit) = P(\varepsilon i \leq \beta Xit + \mu it \mid Xit) \tag{3}$$

which represents the cumulative distribution function of the error distribution evaluated at $(\beta Xit + \mu it)$. The latter can also be written as follows:

$$P(Y=1 \mid Xit) = \Phi\,(\beta\, Xit) \tag{4}$$

where Φ is the logistic cumulative distribution.

Equation (4) summarises the relationship between the crisis probability and the explanatory variables.

[25] See, for instance, Verbeek (2004).

ANNEX 2
BANKING AND FISCAL CRISES

Table 4

Fiscal Crises Events Identified in the Period 1980-2012

Country	Fiscal Crisis Events	Baldacci *et al.* (2011)
Albania	1993-96; 1998-2001	1991-96; 1998
Algeria	1995-98	1991-97
Angola	1993-96; 2009-12	N/A
Antigua and Barbuda	2010-12	N/A
Argentina	1983-86; 1989-90; 1992-19; 1998-06	1982-93; 1998; 2000-05
Armenia	1993-1994; 1996-99; 2009-10	1993-94; 1996; 2000-03; 2009-10
Australia	1986-87; 1989	1986-87; 1989; 2008-10
Azerbaijan	1993-94	N/A
Bangladesh	1980-82; 1990-93;	N/A
Barbados	1982-84	N/A
Belarus	1993-95; 2009-10	N/A
Belize	2006-07; 2012	N/A
Benin	1993-96; 2010-12	N/A
Bolivia	1980-81; 1984-85; 1988-91	N/A
Bosnia and Herzegovina	2009-12	1992-97; 2009
Botswana		N/A
Brazil	1983-86; 1988-90; 1992-94; 1998-2001	1983-1994; 1998; 2001-02
Bulgaria	1980; 1994-95; 1997-2001	1990-95; 1997-98; 2009
Burkina Faso	1993-96	N/A
Burundi	1991-94	N/A
Cambodia	1994-97	N/A
Cameroon	1997-2000	N/A
Canada	1990	N/A
Central African Republic	1998-2001; 2006-10	
Chad	1995-99	
Chile	1983-89	1972; 1974-75; 1983-90
Colombia	1999-2002	1999; 2003; 2009
Comoros	2009-12	
Dem. Rep. of the Congo	1981-85; 1992-96; 2000; 2002-06	
Republic of Congo	1996-99	
Costa Rica	1980-85; 2009	1980-90; 2009
Côte d'Ivoire	1981-84; 1994-2004; 2009-12	
Croatia	1993; 1997-2000	1992-97
Cyprus	2012	N/A
Czech Republic	1991-1992	1991
Denmark	1982	1982
Djibouti	1999-2003	N/A
Dominica	1981-84	N/A
Dominican Republic	1983-85; 2003-07; 2009-12	1980-94; 2003; 2005; 2009
Ecuador	1983-84; 1999-2000; 2008-09	1982-1995; 1999-2000; 2005
Egypt	1980-81	N/A
El Salvador	2009	1981-96; 2009-10
Equatorial Guinea	1980	N/A

Country	Fiscal Crisis Events	Baldacci *et al.* (2011)
Ethiopia	1981-82; 2009-10	N/A
Fiji	2009	N/A
Finland	1990; 1992	1990; 1992
Gabon	1980-82; 1986-88; 1995-99	N/A
The Gambia	1982-83; 1988-91	N/A
Georgia	1996-99; 2008-10; 2012	1996; 2008
Ghana	1983-84; 1987-1991; 2009-12	N/A
Greece	1993; 2010-12	1993; 2008-12
Grenada	1983-84; 2004-09; 2012	N/A
Guatemala	1983-84; 1989;	1983; 1986; 1989. 2009
Guinea	1991-96; 2012	N/A
Guinea-Bissau	1995-98; 2000-01	N/A
Guyana	1980-82; 1990-93	N/A
Haiti	1980-85; 1996-99; 2006-10	N/A
Honduras	1980-83; 1996; 1999-2002	N/A
Hungary	1982-84; 1991-93; 2008-10	1982; 1991; 2008-10
Iceland	2008-11	2008-11
India	1981-84;	1981; 1989-90
Indonesia	1997-2003	1997-2000; 2002
Iraq	2010-12	
Ireland	2010-12	2008-12
Israel		1982-86
Italy		2008-10
Jamaica	1980-1984; 2010-12	1981-97; 2010
Japan		2009-10
Jordan	1994-99	1989-94; 1996
Kazakhstan	1993-94; 1996-1999	1993-94; 1996
Kenya	1980-84; 1989-1992	1980; 1982-83; 1988-89; 1994-98; 2000
Korea	1980-85; 1997-2000	1983-1984; 1997-2000
Kosovo	2010-12	N/A
Kyrgyz Republic	1993-2001; 2011-12	N/A
Latvia	2008-11	2008-10
Lesotho	1991-94; 2010-12	N/A
Liberia	1980-84; 2008-12	N/A
Libya	1984	N/A
Lithuania	1994-97; 2009	1994; 2009
FYR Macedonia	1997-2000	1992-97
Madagascar	1980-83; 1988-92; 1996-99	N/A
Malawi	1980-86; 1988-99	N/A
Malaysia	1998	1998; 2009-10
Maldives	2009-12	N/A
Mali	1983-85; 1992-95	N/A
Mauritania	1980-82; 1989-92; 2010-12	N/A
Mauritius	1980-81; 1983-84	N/A
Mexico	1980-93; 1995-97; 1999-2000	1982-90; 1995-97; 1999; 2009-10
Moldova	1993; 1996-2000; 2002; 2010-12	N/A
Mongolia	1993-96; 2009-10	N/A
Morocco	1980-85	1980-83; 1986-90
Mozambique	1990-95; 2009-10	N/A

Country	Fiscal Crisis Events	Baldacci *et al.* (2011)
New Zealand	1985-87	1985-87; 2008
Nicaragua	1985-90; 1994-02	N/A
Niger	1988-91; 1996-99	N/A
Nigeria	1986-88; 1992; 2002	1982-92; 2001; 2004-05
Norway	1986-88	1986-88
Pakistan	1980-83; 1999; 2001-04; 2008-11	1980-81; 1988; 1994; 1997-99; 2001; 2008-10
Panama	1980; 1982-83; 1987-94	1980; 1983-96
Paraguay	2003-04	
Peru	1980; 1982-84; 1988-90; 1993-96	1980; 1982-97
Philippines	1980-81; 1983-86; 1989-91; 1994-2001	1980; 1983-92; 1998
Poland	1990-93; 2001	1981-94; 2001; 2009-10
Portugal	1983-85; 2011-12	1983-85; 2008; 2010
Qatar		
Romania	1981-84; 2009-12	1981-83; 1986; 2008-10
Russia	1993; 1995-2000	1991-99; 2009
Rwanda	1998-2002	N/A
Senegal	1980-84; 1988-98	N/A
Serbia	2002-06	1983-2004
Seychelles	2008-12	N/A
Sierra Leone	1981-82; 1994-98; 2001-05	N/A
Slovenia	1992	N/A
Solomon Islands	2010-11	N/A
South Africa		1985-87; 1989; 1993
Spain		2010
Sri Lanka	1980-81; 1991-95; 2009-12	1991; 1993; 2003; 2009
St. Kitts and Nevis	2011-12	N/A
Sudan	1981-84	N/A
Sweden	1990	1990
Switzerland		2008
Tajikistan	1993; 1995; 1998-2001	N/A
Tanzania	1980-82; 1991-94; 1996-2000; 2009-10	N/A
Thailand	1981-83; 1985-87; 1997-2000	1981-82; 1985; 1997-98
Dem. Rep. Timor-Leste		N/A
Togo	1981-83; 1989-98; 2008-11	N/A
Tonga		N/A
Trinidad and Tobago	1992	N/A
Tunisia	1988-92	1988
Turkey	1980-83; 1999-08	1980; 1982; 1999; 2002; 2005
Uganda	1981-83; 1989-94	
Ukraine	1993-96; 1998-2002; 2008-12	1992-95; 1998-2000; 2008; 2010
Uruguay	1993-94;	1983-85; 1987; 1990-91; 2002-03; 2005
Venezuela	1989-94; 2005	1983-2005; 2008; 2010
Vietnam	1994-97	1985-1998
Yemen	1997-2000; 2010-12	N/A
Zambia	1980-84; 1995-98	N/A
Zimbabwe	1980; 1983-84; 1991-95	N/A

Table 5

Banking Crisis (Valencia-Laeven, 2012) and Fiscal Crisis Events

Country	Group	Banking Crisis		Fiscal Crisis	
		Start	End	Start	Relative to Banking Crisis
Albania	Developing	1994	1994	Already	Before
Algeria	Developing	1990	1994	1996	After
Argentina	EMBig	1995	1995	Already	Before
Argentina	EMBig	1980	1982	1984	After
Argentina	EMBig	1989	1991	1993	After
Argentina	EMBig	2001	2003	2002	After
Armenia	Developing	1994	1994	Already	Before
Austria	Advanced	2008	2012		After
Azerbaijan	Developing	1995	1995		After
Bangladesh	Developing	1987	1987		After
Belarus	Developing	1995	1995	Already	Before
Belgium	Advanced	2008	2012		After
Benin	Developing	1988	1992	1994	After
Bolivia	Developing	1986	1986		After
Bolivia	Developing	1994	1994		After
Bosnia and Herzegovina	EMBig	1992	1996		After
Brazil	EMBig	1990	1994	Already	Before
Brazil	EMBig	1994	1998	Already	Before
Bulgaria	Advanced	1996	1997	1998	After
Burkina Faso	Developing	1990	1994	1994	After
Burundi	Fragile	1994	1998	Already	Before
Cameroon	Developing	1987	1991		After
Cameroon	Developing	1995	1997	1998	After
Cape Verde	Developing	1993	1993		After
Central African Rep.	Fragile	1976	1976	N/A	N/A
Central African Rep.	Fragile	1995	1996		After
Chad	Fragile	1983	1983		After
Chad	Fragile	1992	1996	1996	After
Chile	EMBig	1976	1976	N/A	N/A
Chile	EMBig	1981	1985	1984	After
China	EMBig	1998	1998		After
Colombia	EMBig	1982	1982		After
Colombia	EMBig	1998	2000	2000	After

Country	Group	Banking Crisis		Fiscal Crisis	
		Start	End	Start	Relative to Banking Crisis
Congo, Democratic Rep.	Fragile	1983	1983		After
Congo, Democratic Rep.	Fragile	1991	1994		After
Congo, Democratic Rep.	Fragile	1994	1998	1997	After
Congo, Republic	Fragile	1992	1994	Already	Before
Costa Rica	EMBig	1994	1995		After
Costa Rica	EMBig	1987	1991		After
Cote d'Ivoire	Fragile	1988	1992		After
Croatia	EMBig	1998	1999	Already	Before
Czech Republic	Advanced	1996	2000		After
Denmark	Advanced	2008	2012		After
Djibouti	Fragile	1991	1995		After
Dominican Republic	Developing	2003	2004	2004	After
Ecuador	EMBig	1982	1986	1984	After
Ecuador	EMBig	1998	2002	2000	After
Egypt	EMBig	1980	1980	Already	Before
El Salvador	EMBig	1989	1990		After
Equatorial Guinea	Fragile	1983	1983		After
Eritrea	Fragile	1993	1993		After
Estonia	Advanced	1992	1994		After
Germany	Advanced	2008	2012		After
Ghana	Developing	1982	1983	1984	After
Greece	Advanced	2008	2012	2011	After
Guinea	Fragile	1985	1985		After
Guinea	Fragile	1993	1993	Already	Before
Guinea-Bissau	Fragile	1995	1998	1996	After
Guyana	Developing	1993	1993	Already	Before
Haiti	Fragile	1994	1998	1997	After
Hungary	Advanced	1991	1995	1992	After
Hungary	Advanced	2008	2012	2009	After
Iceland	Advanced	2008	2012		After
India	EMBig	1993	1993		After
Indonesia	EMBig	1997	2001	1998	After
Ireland	Advanced	2008	2012	2011	After
Israel	Developing	1977	1977	N/A	N/A
Italy	Advanced	2008	2012		After
Jamaica	Developing	1996	1998		After
Japan	Advanced	1997	2001		After

Country	Group	Banking Crisis		Fiscal Crisis	
		Start	End	Start	Relative to Banking Crisis
Jordan	Developing	1989	1991		After
Kazakhstan	Developing	2008	2012		After
Kenya	Fragile	1985	1985		After
Kenya	Fragile	1992	1994	Already	Before
Korea	EMBig	1997	1998	1998	After
Kuwait	Developing	1982	1985		After
Kyrgyz Republic	Developing	1995	1999	Already	Before
Latvia	EMBig	1995	1996		After
Latvia	Advanced	2008	2012	2009	After
Lebanon	Developing	1990	1993		After
Liberia	Fragile	1991	1995		After
Lithuania	Advanced	1995	1996	Already	Before
Luxembourg	Advanced	2008	2012		After
Macedonia, FYR	Developing	1993	1995		After
Madagascar	Developing	1988	1988	1990	After
Malaysia	EMBig	1997	1999	1999	After
Mali	Developing	1987	1991	1993	After
Mauritania	Developing	1984	1984		After
Mexico	EMBig	1981	1985	Already	Before
Mexico	EMBig	1994	1996		After
Mongolia	Developing	2008	2012	2010	After
Morocco	EMBig	1980	1984	1981	After
Mozambique	Developing	1987	1991	1991	After
Nepal	Fragile	1988	1988		After
Netherlands	Advanced	2008	2012		After
Nicaragua	Developing	1990	1993	Already	Before
Nicaragua	Developing	2000	2001	Already	Before
Niger	Fragile	1983	1985		After
Nigeria	Fragile	1991	1995	1993	After
Nigeria	EMBig	2009	2012		After
Norway	Advanced	1991	1993		After
Panama	EMBig	1988	1989	Already	Before
Paraguay	Developing	1995	1995		After
Peru	EMBig	1983	1983	Already	Before
Philippines	EMBig	1983	1986	1984	After
Philippines	EMBig	1997	2001	Already	Before
Poland	Advanced	1992	1994	Already	Before

Country	Group	Banking Crisis		Fiscal Crisis	
		Start	End	Start	Relative to Banking Crisis
Portugal	Advanced	2008	2012	2012	After
Romania	Advanced	1990	1992		After
Russia	EMBig	1998	1998	1999	After
Russia	EMBig	2008	2012		After
São Tomé & Príncipe	Fragile	1992	1992		After
Senegal	Fragile	1988	1991	1989	After
Sierra Leone	Fragile	1990	1994	1995	After
Slovak Republic	Advanced	1998	2002		After
Slovenia	Advanced	2008	2012		After
Slovenia	Advanced	1992	1992	1993	After
Spain	Advanced	1977	1981	N/A	N/A
Spain	Advanced	2008	2012		After
Sri Lanka	Developing	1989	1991	1992	After
Swaziland	Developing	1995	1999		After
Sweden	Advanced	1991	1995		After
Sweden	Advanced	2008	2012		After
Switzerland	Advanced	2008	2012		After
Tanzania	Developing	1987	1988		After
Thailand	EMBig	1983	1983	Already	Before
Thailand	EMBig	1997	2000	1998	After
Togo	Fragile	1993	1994	Already	Before
Tunisia	Developing	1991	1991	Already	Before
Turkey	EMBig	1982	1984	Already	Before
Turkey	EMBig	2000	2001	Already	Before
Uganda	Fragile	1994	1994	Already	Before
Ukraine	Developing	1998	1999		After
Ukraine	Developing	2008	2012	2009	After
United Kingdom	Advanced	2007	2012		After
United States	Advanced	1988	1988		After
United States	Advanced	2007	2012		After
Uruguay	EMBig	1981	1985		After
Uruguay	EMBig	2002	2005	2004	After
Venezuela	EMBig	1994	1998	1995	After
Vietnam	Developing	1997	1997	Already	Before
Yemen	Fragile	1996	1996	1998	After
Zambia	Developing	1995	1998	1996	After
Zimbabwe	Fragile	1995	1999	Already	Before

ANNEX 3
STATA RESULTS FOR THE MODEL SPECIFICATIONS PRESENTED IN THE PAPER

Model specification 1

Logistic regression — Number of obs = 1017; LR chi2(4) = 95.83; Prob > chi2 = 0.0000; Log likelihood = -253.87284; Pseudo R2 = 0.1588

blcrisis	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
gdp	-.0945637	.0352253	-2.68	0.007	-.1636041	-.0255233
niip	-.0213836	.0048136	-4.44	0.000	-.0308181	-.0119491
dc	-.0314568	.0046814	-6.72	0.000	-.0406323	-.0222814
debt	.0099532	.0041536	2.40	0.017	.0018122	.0180941
_cons	-1.440152	.3707475	-3.88	0.000	-2.166804	-.7135002

Model specification 2

Logistic regression — Number of obs = 1435; LR chi2(4) = 240.32; Prob > chi2 = 0.0000; Log likelihood = -511.42874; Pseudo R2 = 0.1903

blcrisis	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
gdp	-.0420841	.0216538	-1.94	0.052	-.0845247	.0003565
niip	-.0098775	.003156	-3.13	0.002	-.0160632	-.0036918
dc	-.0293038	.0035453	-8.27	0.000	-.0362525	-.0223551
extdebttot	.0378912	.0057914	6.54	0.000	.0265403	.0492422
_cons	-3.389307	.5185996	-6.54	0.000	-4.405744	-2.37287

Model specification 3

Logistic regression — Number of obs = 1435; LR chi2(5) = 247.97; Prob > chi2 = 0.0000; Log likelihood = -507.60647; Pseudo R2 = 0.1963

blcrisis	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
gdp	-.0412019	.0218509	-1.89	0.059	-.0840289	.0016251
niip	-.0104888	.0031586	-3.32	0.001	-.0166797	-.004298
dc	-.0507628	.0080806	-6.28	0.000	-.0666005	-.0349251
dcsq	.0001906	.000059	3.23	0.001	.0000749	.0003062
extdebttot	.0391665	.005882	6.66	0.000	.0276379	.050695
_cons	-3.104005	.5313483	-5.84	0.000	-4.145428	-2.062581

Model specification 4

Logistic regression — Number of obs = 1428; LR chi2(6) = 259.67; Prob > chi2 = 0.0000; Log likelihood = -500.52853; Pseudo R2 = 0.2060

blcrisis	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
gdp	-.0396745	.0217619	-1.82	0.068	-.082327	.002978
niip	-.0080543	.0032407	-2.49	0.013	-.014406	-.0017026
dc	-.052943	.0084471	-6.27	0.000	-.069499	-.036387
dcsq	.0001583	.0000636	2.49	0.013	.0000336	.0002829
dcdevavg	.0214535	.0059871	3.58	0.000	.009719	.033188
extdebttot	.0424802	.0060164	7.06	0.000	.0306881	.0542722
_cons	-3.073883	.5390812	-5.70	0.000	-4.130463	-2.017303

Model specification 5

Logistic regression — Number of obs = 1428; LR chi2(7) = 314.46; Prob > chi2 = 0.0000; Log likelihood = -473.13519; Pseudo R2 = 0.2494

blcrisis	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
gdp	-.002544	.0230821	-0.11	0.912	-.0477841	.042696
niip	-.0071722	.0033793	-2.12	0.034	-.0137955	-.000549
dc	-.049663	.0086051	-5.77	0.000	-.0665287	-.0327972
dcsq	.0001541	.0000641	2.40	0.016	.0000285	.0002797
dcdevavg	.0154696	.0061531	2.51	0.012	.0034097	.0275296
extdebttot	.0446208	.0064037	6.97	0.000	.0320699	.0571717
lvcrisis	1.704728	.2312137	7.37	0.000	1.251557	2.157898
_cons	-3.729005	.5795971	-6.43	0.000	-4.864994	-2.593015

Model specification 6

Logistic regression — Number of obs = 1428; LR chi2(8) = 353.43; Prob > chi2 = 0.0000; Log likelihood = -453.64826; Pseudo R2 = 0.2803

blcrisis	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
gdp	-.0387213	.0235798	-1.64	0.101	-.0849369	.0074944
niip	-.0034561	.0034606	-1.00	0.318	-.0102388	.0033267
dc	-.0366528	.0087816	-4.17	0.000	-.0538645	-.0194411
dcsq	.0001579	.0000626	2.52	0.012	.0000351	.0002807
dcdevavg	-.0037785	.0069623	-0.54	0.587	-.0174244	.0098674
extdebttot	.0421779	.0065515	6.44	0.000	.0293372	.0550186
lvcrisis	1.641243	.237875	6.90	0.000	1.175017	2.10747
eme	1.462656	.2467938	5.93	0.000	.9789494	1.946363
_cons	-4.857611	.6332043	-7.67	0.000	-6.098668	-3.616553

REFERENCES

Abiad, A. (2003), "Early-warning Systems: A Survey and a Regime-switching Approach", IMF, Working Paper, No. 03/32.

Alessandri, P. and A.G. Haldane (2009), "Banking on the State", Bank of England Speech, No. 409.

Arcand, J.L., E. Berkes and U. Panizza (2012), "Too Much Finance?", IMF, Working Paper, No. 12/161.

Baldacci, E., J. McHugh and I. Petrova (2011a), "Measuring Fiscal Vulnerability and Fiscal Stress: A Proposed Set of Indicators", IMF, Working Paper, No. 11/94.

Baldacci, E., I. Petrova, N. Belhocine, G. Dobrescu and S. Mazraani (2011b), "Assessing Fiscal Stress", IMF, Working Paper, No. 11/100.

Beck, T. and R. Levine (2004), "Stock Markets, Banks and Growth: Panel Evidence", NBER, Working Paper, No. 9082.

Bénassy-Quéré, A. and G. Roussellet (2012), "Fiscal Sustainability in the Presence of Systemic Banks", CEPII, Working Paper, No. 5, March.

Berg, A. and C. Pattillo (1999), "Predicting Currency Crises: The Indicators Approach and an Alternative", *Journal of International Money and Finance*, Vol. 18, pp. 561-86, August.

Berg, A., E. Borensztein and C. Pattillo (2004), "Assessing Early Warning Systems: How Have They Worked in Practice?", IMF, Working Paper, No. 04/52.

BIS (2011), "The Impact of Sovereign Credit Risk on Bank Funding Conditions", CGFS, Paper, No. 43, July.

Blanchard, O.J. (1990), "Suggestions for a New Set of Fiscal Indicators", OECD, Economics Department, Working Paper, No. 79.

Ciarlone, A. and G. Trebeschi (2006), "A Multinomial Approach to Early Warning System for Debt Crises", Banca d'Italia, Tema di Discussione, No. 588, May.

De Paoli, B., G. Hoggarth and V. Saporta (2009), "Output Costs of Sovereign Crises: Some Empirical Estimates", Bank of England, Working Paper, No. 362.

Easterly, W., R. Islam and J.E. Stiglitz (2000), *Explaining Growth Volatility*, World Bank.

European Central Bank (2012), "Analysing Government Debt Sustainability in the Euro Area", *ECB Monthly Bulletin*, April.

European Commission (2009), *Sustainability Report. Technical Report*.

——————(2011), "Public Finances in EMU 2011", *European Economy*, No. 3.

——————(2012), "Fiscal Sustainability Report 2012", *European Economy*.

Gerlach, S., A. Schulz and G. Wolff (2010), "Banking and Sovereign Risk in the Euro Area", CEPR, Discussion Paper, No. 7833.

Ghosh, A.R., J.D. Ostry and N. Tamirisa (2009), "Anticipating the Next Crisis. What Can Early Warning Systems Be Expected to Deliver?", *Finance & Development*, Vol. 46, Issue 3, pp. 35-37.

Ghosh, S. and A. Ghosh (2002), "Structural Vulnerabilities and Currency Crises", IMF, Working Paper, No. 02/9.

Hemming, R., M. Kell and A. Schimmelpfennig (2003), "Fiscal Vulnerability and Financial Crises in Emerging Market Economies", IMF, Occasional Paper, No. 218.

IMF (2010), "Cross-cutting Themes in Economies with Large Banking Systems", prepared by Strategy, Policy, and Review and Monetary and Capital Markets Departments.

——————(2011a), *Modernizing the Framework for Fiscal Policy and Public Debt Sustainability Analysis*.

——————(2011b), "Measuring Fiscal Vulnerability and Fiscal Stress: A Proposed Set of Indicators", IMF, Working Papers, No. 1194.

——————(2012), "IMF-FSB Early Warning Exercise", IMF, Factsheet, September.

Kaminsky, G.L. (1998), "Currency and Banking Crises: The Early Warnings of Distress".

Kaminsky, G.L. and C.M. Reinhart (1999), "The Twin Crises: The Causes of Banking and Balance-of-payments Problems", *American Economic Review*, Vol. 89, No. 3, pp. 473-500.

Kaminsky, G.L., S. Lizondo and C.M. Reinhart (1998), "Leading Indicators of Currency Crises", IMF, Staff Paper, Vol. 45, No. 1.

Kumar, M., U. Moorthy and W. Perraudin (2002), "Predicting Emerging Market Currency Crashes", IMF, Working Paper, No. 02/7.

Laeven, L. and F. Valencia (2012), "Systemic Banking Crises Database: An Update", IMF, Working Paper, No. WP/12/163, June.

Manasse, P. and N. Roubini (2009), "Rules of Thumb for Sovereign Debt Crises", *Journal of International Economics*, No. 78, pp. 192-205.

Manasse, P., N. Roubini and A. Schimmelpfennig (2003), "Predicting Sovereign Debt Crises", IMF, Working Paper, No. 03/221.

Mody, A. and D. Sandri (2011), "The Eurozone Crisis: How Banks and Sovereigns Came to Be Joined at the Hip", IMF, Working Paper, No. 11/269.

Mulder, C., R. Perrelli and M. Rocha (2002), "The Role of Corporate, Legal and Macroeconomic Balance Sheet Indicators in Crisis Detection and Prevention", IMF, Working Paper, No. 02/59.

Reinhart, C.M. (2002) "Default, Currency Crises and Sovereign Credit Ratings", NBER, Working Paper, No. 8738.

——————(2009), "This Time Is Different: Eight Centuries of Financial Folly", Princeton Books.

——————(2011), "From Financial Crash to Debt Crisis", *American Economic Review*, No. 101, pp. 1676-706, August.

Reinhart, C.M., M. Goldstein and G.L. Kaminsky (2000), "Assessing Financial Vulnerability, an Early Warning System for Emerging Markets: Introduction", Institute for International Economics, Washington (D.C.).

Schularick, M. and A.M. Taylor (2012), "Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870-2008", *American Economic Review*, Vol. 102, No. 2, pp. 1029-61.

Sturzenegger, F. and J. Zettelmeyer (2006), *Debt Defaults and Lessons form a Decade of Crises*, MIT Press, Cambridge (MA).

Tagkalakis, A. (2012), "The Effects of Financial Crisis on Fiscal Positions", Bank of Greece, Working Paper.

Taylor, A. and M. Schularick (2012), "Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870-2008", *American Economic Review*, Vol. 102, No. 2, April.

Verbeek, M. (2004), *A Guide to Modern Econometrics*, John Wiley & Sons, Inc.

GROWTH FOLLOWING INVESTMENT AND CONSUMPTION-DRIVEN CURRENT ACCOUNT CRISES

Alexander Klemm[*]

Current account deficits imply increasing liabilities to the rest of the world. External sustainability then depends on whether these can be met in the future without defaulting, i.e.*, normally through trade account surpluses. To run such surpluses without a fall in consumption, capital inflows should be used to increase future output. This paper tentatively finds that current account deficits reversals that follow investment booms are marked by better growth performance than those following consumption booms. It also shows that many recent large current account deficits have been predominantly the result of consumption or non-productive investment booms.*

1 Introduction

The current sovereign debt crisis in Europe has brought not only budgetary discipline back to the fore, but more generally economic imbalances. Indeed, looking at euro area fiscal and current account deficits prior to the crisis (Table 1), it appears that measures of external balances have been better at identifying countries that would run into difficulties.

By definition the current account balance is equal to the difference between savings and investment. However, a given savings shortfall can be the result of very different absolute amounts of savings and investment. While this is obvious, this paper argues that this may merit more attention than it has been given in the past, and that it may be relevant for the assessment of external sustainability.[1]

Running a current account deficit implies that liabilities to the rest of the world are increasing. To assess external sustainability, it is therefore necessary to ascertain whether these liabilities can be met in the future without defaulting, *i.e.*, normally through running future trade account surpluses. To run future trade account surpluses without a fall in consumption, the economy will have to use the capital inflow that occurs to increase future output. This can be achieved for example by increasing the rate of investment in assets that produce future returns, which can be used to pay off the creditors. In other words, the economy's capacity for producing tradable goods and services needs to increase.

One exception to this mechanism is the possibility that liabilities can be reduced through valuation effects.[2] E.g., a devaluation or depreciation will increase the value of foreign assets relative to liabilities as long as liabilities are denominated in domestic currency. It is also possible that rates of return on foreign assets exceed those of domestic assets held by foreigners, which would reduce the value of net liabilities. Some commentators have argued that this was the case in the USA (e.g., Kitchen (2007)), although it remains controversial, as the data are incomplete (Gros, 2006). The scope for valuation effects clearly depends on the structure of assets and liabilities, e.g., foreign-currency denominated debt is unlikely to be reduced significantly through valuation effects,

---

[*] European Central Bank.

[1] Higgins and Klitgaard (2011) is one of a few papers that mention this idea.

[2] And, as argued in Nickell (2006), these effects could be huge in some countries, such as the UK, where the current account deficit is small compared to the stock of international assets and liabilities.

Table 1

Euro Area Countries' Pre-crisis Balances, 2007
(percent of GDP)

Fiscal Balance	
Greece	–6.5
Portugal	–3.1
France	–2.7
Malta	–2.3
Slovakia	–1.8
Italy	–1.6
Austria	–0.9
Belgium	–0.1
Slovenia	0.0
Ireland	0.1
Germany (until 1990 former territory of the FRG)	0.2
Netherlands	0.2
Spain	1.9
Cyprus	3.5
Luxembourg	3.7
Finland	5.3

Current Account Balance	
Greece	–14.6
Cyprus	–11.7
Portugal	–10.1
Spain	–10.0
Malta	–6.2
Ireland	–5.3
Slovakia	–5.3
Slovenia	–4.8
Italy	–1.3
France	–1.0
Belgium	1.9
Austria	3.5
Finland	4.3
Netherlands	6.7
Germany (until 1990 former territory of the FRG)	7.4
Luxembourg	10.1

Source: Eurostat.
Countries that required a support program printed against grey background.

while the liabilities connected to non-debt creating FDI could be reduced to nil if the investment turns out unsuccessful.

Theoretically, the starting point for a study of balance of payments pressure would be the net international investment position, which should be the result of past current account balances and valuation effects. A negative position would indicate the need for adjustment through future current account surpluses and/or devaluation. However, the quality of data on the international investment position is very questionable, as valuation effects are difficult to estimate. Gros (2006), for example, shows that for the US the discrepancy between cumulated current account deficits over 1985-2005 and the change in net international investment decisions amounted to an impressive $2.6 trillion, which he argues cannot be explained even when taking valuation effects into account. We therefore look at cumulative current account deficits instead, but will need to remember that liabilities to the rest of the world need not be completely fulfilled through future current account surpluses.

While a current account deficit necessarily implies capital imports, it does not necessarily increase domestic investment.[3] Instead, the local savings rate could decrease, so that consumption would rise with investment staying flat. More precisely, when a country runs a current account deficit, this could have the following consequences (or combinations thereof):

1) Additional capital is imported so that the economy's capital stock increases.
2) Capital owned by residents is sold to non-residents, with no change in the stock of capital located in the economy.
   a) Residents reduce their net holdings of productive capital (possibly to below zero by issuing debt) and consume the proceeds.
   b) Residents sell capital to foreigners and the foreign demand bids up prices. Residents therefore maintain their financial capital, but own a smaller share of real capital.

The implication on liabilities is different, each time. Under 1, there is a foreign liability, but also a domestic asset producing returns. Theoretically, this would also include certain investment in human capital such as the financing of scholarships abroad, provided students return and use their skills for tradable production. A future reversal in the current account could then in principle occur without any crisis, simply as a result of the investment facilitating the production of tradables. A particularly obvious case is the investment in mining equipment, which may then lead to current account surpluses as soon as natural resources are mined and exported.

Under 2a there is the same foreign liability, but no domestic asset, hence future consumption must be reduced to service the liability. Under 2b domestic investors own less of the economy's real capital, but they may not notice it, because of the value of financial capital may be the same as before. If the asset price bubble bursts, resident investors will notice it and reduce their consumption. However, not as much as under 2a, as the value of domestic assets held by foreigners declines also.

There are countless other possibilities and combinations thereof. But these illustrations certainly show that domestic investment may not increase as a result of capital imports, not even when the value of domestic assets increases. The role of the real domestic capital stock may therefore be important and will be examined more closely in the empirical part.

Many different, but equivalent, processes may take place behind these possibilities. The first possibility, for example, could be directly the result of foreign investors buying foreign investment goods and bringing them into a country. Equivalently, it could also be the result of domestic producers switching production from consumption goods to domestically-sold investment goods, while total consumption is maintained through imported consumption goods financed by loans from foreign banks. In both cases, productive capacity is enhanced and as long as the investment turns out successful, it will allow closing the current account deficit in the future without a drop in consumption. It is therefore not relevant whether imports are in consumption or investment goods, nor whether the rest of the world acquires domestic debt or physical assets (at least for this purpose), but whether the capital stock increases compared to the case in which the current account were balanced.

The different investment levels behind current account deficits are likely to have important implications for sustainability. In the first case, the future trade account surpluses that are required can be supplied by the additional capital, and domestic consumption does not need to be reduced. In the second case, domestic consumption is higher now, but will be permanently lower than it

---

[3] Some confusion may arise from the different meanings of the term capital. Capital, in the sense of foreign funds is typically imported to finance a current account deficit. But that does not mean that capital, in the sense of a physical or human capital stock is build up.

would have been without the initial current account deficit. In case 2b this may be less obvious to residents than in case 2a, as they will initially not notice a decrease in their wealth.

An impact of investment on the current account would have implications for public policy. Apart from the well-known channel of the public sector deficit affecting the current account, there could be another channel through public investment, so that for a given public sector deficit, current account outcomes may be more or less sustainable, depending on public investment relative to consumption expenditure, and the quality of the public investment. Moreover, the impact hinges on whether public and private investments are substitutes or complements.

There is a related, but different literature looking more directly at the link between the fiscal and current account deficits. Funke and Nickel (2006) point out that the empirical literature has tended to find ambiguous results on this link. Their own analysis is also ambiguous, which they explain by the counter-acting effects of public spending on aggregate demand and crowding out of private spending. IMF (2011), however, argues that fiscal policy does have a strong impact on current account deficits. They base this finding on results from an action-based fiscal variable data set, which they argue is reliably exogenous. In any case, none of these studies distinguish between public consumption and investment.

Another related literature has looked at the sustainability of current account balances. One theory was that current account deficits were necessarily sustainable if the result of private-sector behavior ("Lawson doctrine"), but this does not stand up to empirical evidence as shown by Reisen (1998). There are also various studies of particular countries, especially the US, where views on the sustainability of the current account deficit and the process and implications of its reduction differ widely.[4]

One further possible approach to this question is the intertemporal view of the current account (surveyed by Obstfeld and Rogoff, 1995). Under this view, the sustainability of the current account depends on future developments of incomes and expectations thereof. A current account deficit could, for example, be the result of an expected future income boom. Such a deficit would then not imply an unsustainable consumption path, even if it is the result of an increase in consumption rather than investment. In most cases, however, an intertemporal interpretation of the current account would not come to different conclusions than the illustration above. Except in the case of a natural resource find, which would immediately make a country richer, it is likely that any future increase in income is related to an increase in the domestic capital stock, although other factors, such as demographic developments and structural reforms (which in turn may also boost investment) will also play a role. Hence a sustainable deficit is likely to be accompanied by high real investment rates. And if a country believes that it will get rich without more capital (e.g., simply by joining the EU), then it is quite likely to be proved wrong at a later point, and the current account deficit will have been unsustainable, even though it appeared sustainable based on wrong expectations. Moreover, as argued in Reisen (1998), it is hard to establish any clear benchmarks for excessive current account deficits using the intertemporal approach.

The paper most closely related to this one is Milesi-Ferretti and Razin (1998) which looks empirically at the consequences of current account reversals. While that paper does not cast this as a question of consumption versus investment-related current account deficits, it adds the investment share of GDP as an explanatory variable and finds that a high share leads to higher post-reversal growth. A less directly related paper is Milesi-Ferretti and Razin (2000) which, among other things, looks at determinants of current account reversals and finds that high

---

[4] E.g., Papers arguing in favor of sustainability include Hausman and Sturzenegger (2006) who note the relatively strong position of net liabilities. Papers arguing against include Edwards (2005) and Gros (2006) who questions the quality of data on liabilities. Some papers are undecided and note that it depends on assumptions about future developments of variables, particularly US relative to world income, e.g., Engel and Rogers (2006).

Table 2

Descriptive Statistics

Variable	Unit	Obs.	Mean	Min.	Lower Quartile	Median	Upper Quartile	Max.
Current account	% of GDP	5,217	–3.6	–240.5	–7.5	–3.1	0.7	56.7
Investment	% of GDP	7,494	23.2	–17.4	18.3	22.4	26.9	113.6
Fixed inv.	% of GDP	7,209	22.2	1.9	17.8	21.5	25.4	113.6
Gov. fixed inv.	% of GDP	3,604	7.4	–3.4	4.0	6.4	9.3	43.0
Private fixed inv.	% of GDP	3,608	14.3	–2.6	9.7	13.8	17.9	112.4
Real growth	% change	8,247	3.7	–51.0	1.5	3.8	6.1	106.3
Real effective exchange rate	% change	2,593	0.7	–100.0	–7.4	0.0	6.4	1,415.6
Terms of trade	% change	4,057	2.1	–80.9	–5.8	0.0	6.4	1,213.3
Openness (exports+imports)	% of GDP	7,726	77.4	0.3	44.9	66.3	100.1	460.5
GNI per capita	US$	7,790	6,620	60	550	1,830	6,550	185,730

Source: Author's calculations based on World Development Indicators, except terms of trade: World Economic Outlook.

investment share increases the likelihood of a reversal. This reversal could occur through two rather different channels, either with the investment leading to increased production of tradable goods or with imbalances making countries vulnerable to sudden stops.

To sum up the introductory thoughts – while it is obvious that current account deficits can be due to savings shortfalls as well as consumption booms – so far little attention has been paid to the relationship between external deficits and real domestic investment or, in stock terms, external liabilities and the real domestic capital stock and their implications for current account reversals. Still, the likelihood of a reversal and its implications for domestic savings may strongly depend on how foreign capital imports are used. This paper attempts to fill this gap looking empirically into these issues and drawing from the various related literatures.

The rest of this paper is structured as follows: Section 2 provides a descriptive analysis using table and charts that show the underlying developments behind recent current account imbalances. Section 3 provides an econometric analysis of the impact of investment on economic conditions following a current account reversal. Section 4 concludes.

2 Descriptive analysis

2.1 Data

The data are from the World Bank's World Development Indicators (December 2012 update) except data on the terms of trade which are from the IMF's World Economic Outlook (October 2012). From these data we keep only observations from 1970 to 2011. Disregarding observations where basic variables such as GDP are missing the sample covers 204 economies. Some descriptive statistics are provided in Table 2.

2.2 Methodology and findings

Many existing descriptive analyses depict current account deficits, savings and investment over time. A recent example is Higgins and Klitgaard (2011) who use such charts to show that in European periphery countries, current account deficits were mainly the result of low savings rates in Greece and Portugal, while financing a housing boom in Spain and Ireland. Instead of following this approach, this paper will look at country-specific episodes of current account imbalances and the cumulative savings and investments related to them.

We start with very basic macroeconomic accounting, with GDP as the sum of consumption (C), investment (I) and net exports (X). Instead of adding a term for government spending, we split consumption and investment separately into private (I^P, C^P) and public (I^G, C^G), but only when needed.

$$Y = C + I + X (= C^P + I^P + C^G + I^G + X) \tag{1}$$

Gross National Income (GNI) consists of GDP and net income from abroad (Y^F). It can be consumed or saved (S).

$$Y + Y^F = C + S \tag{2}$$

Putting this together yields the usual result that the current account (CA) is equal to savings less investment.[5]

$$S - I = X + Y^F = CA \tag{3}$$

When looking at the government sector, some confusion can arise because of inconsistent terminologies. Sometimes the budget balance is called "public saving", but here we will use this term only for the budget balance net of investment spending, which is more in line with the definition of private savings.

To study current account imbalances, the analysis starts in times of balanced current accounts, which we define as years in which current account surpluses or deficits remain below 1 per cent of GDP. When a current account imbalance starts evolving we will look at the cumulative implications. For ease of exposition let us rewrite the current account formula from above:

$$CA = S - I = Y + Y^F - C - I \tag{4}$$

Then we consider the change in the current account to GDP ratio compared to the last year without a current account imbalance, which is approximately equal to the change in the ratios of consumption and investment to GDP:

$$\Delta \frac{CA}{Y} = \Delta \frac{Y^F}{Y} - \Delta \frac{C}{Y} - \Delta \frac{I}{Y} \approx - \Delta \frac{C}{Y} - \Delta \frac{I}{Y} \tag{5}$$

To reduce the problem of double-counting of current account episodes, we define current account events. These are years in which the current account deficit peaks over a 10-year horizon,[6] provided it reaches at least 5 per cent of GDP. There are 252 such events in our dataset, and 129 out of the 204 countries have at least one. A complete list of all such events is given in Table 8 in

---

[5] Note that some textbooks do not distinguish carefully between GNI and GDP and hence between the current account deficit and net exports.

[6] To avoid artificial deficit peaks at the beginning and end of sample, we exclude the first and last three years per country as candidates for peaks. A peak is therefore defined as an observation where the current account deficit exceeds the one of the preceding 3 years and the following 6 years, or the preceding 4 year and following 5 years, or preceding 5 years and the following 4 years, or preceding 6 years and the following 3 years.

Table 3

Increases of Consumption and Investment Shares in Current Account Deficit Peaks
(percent of GDP)

	Consumption			Investment			
	Total	**Private**	**Public**	**Total**	**Fixed**	**Private Fixed**	**Public Fixed**
Obs.	233	230	228	233	226	116	116
Mean	4.8	3.5	1.2	4.1	3.9	4.6	0.8
Median	3.5	2.3	0.7	3.7	3.5	3.7	0.4

Source: Author's calculation based on World Development Indicators.

the Appendix. For most of these events we have also data on consumption and investment; and in some cases also a breakdown of private and public fixed investment.

As shown in Table 3, on average, more than half of the increase in current account deficits was associated with more consumption (or reduced saving), which rose 4.8 percentage points of GDP compared to 4.1 percentage point increase in investment. This already confirms that in practice, current account deficits are to an important extent associated with an increase in consumption rather than saving. Moreover, on average these developments were dominated by private sector flows, which were responsible for most of the increase in consumption and virtually all of the increase in investment.

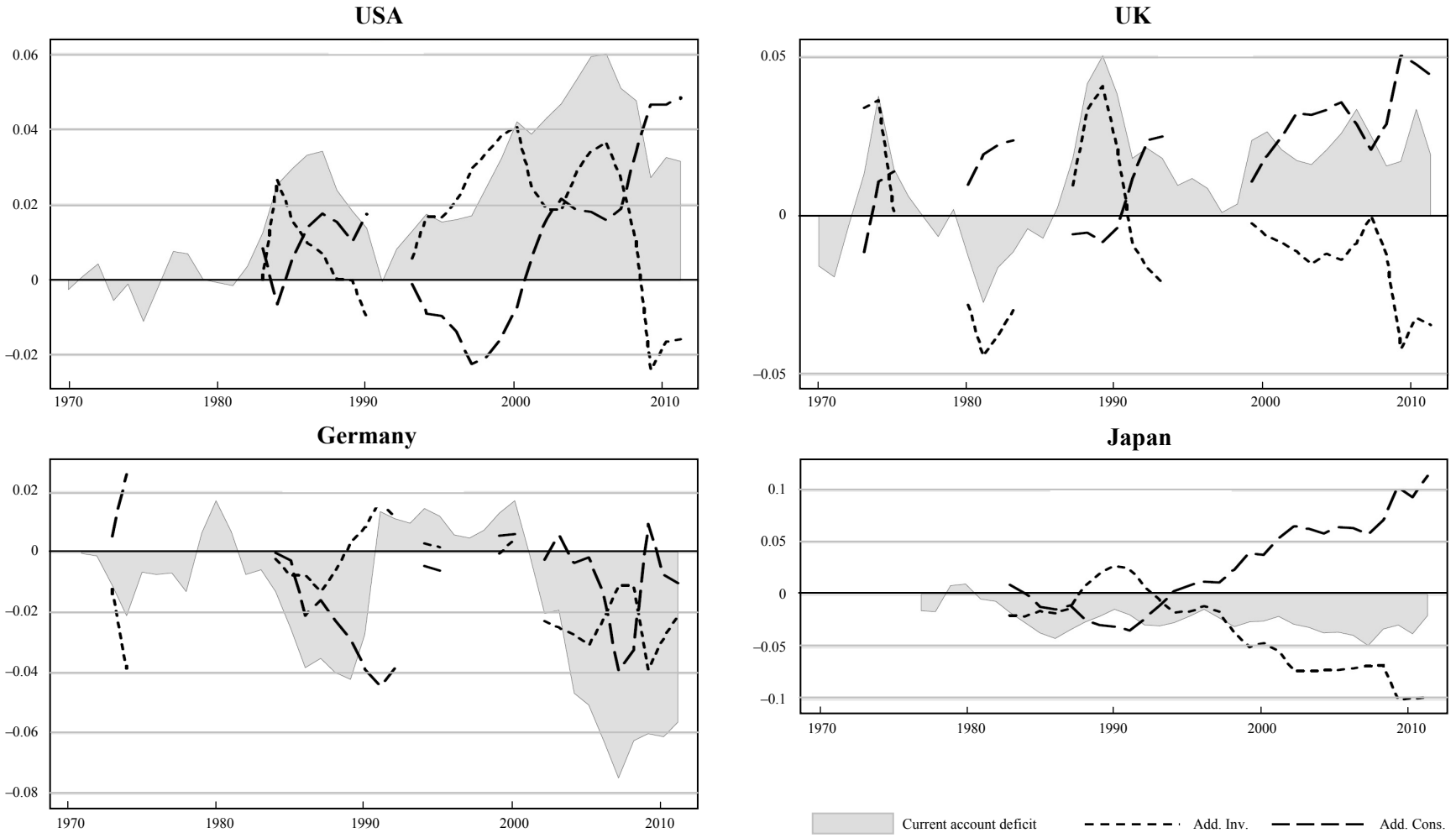
As these averages hide differences in country-specific developments, the next step is to look at developments in individual countries. This is done with the help of charts, which show the current account deficit and the cumulative increase in investment and consumption shares in GDP since the start of the current account imbalance.

Figure 1 presents developments in large economies, showing the USA and the UK as examples for countries with large current account deficits, and Germany and Japan as examples of large surpluses.

- For the US, the chart shows that current account deficits of the 1980s started with increases in investment, followed by a disappearance of the deficit and less investment. The current account deficit, which began appearing in the early 1990s, was also initially marked by an increase in investment. Since the early 2000s, however, consumption has also grown heavily, and in the late 2000s the investment share actually fell below the level seen before the start of the deficit.
- In the UK, the deficit in the 1980s was similarly marked by an increase and subsequent fall in investment, although a smaller deficit in the early 1990s was marked by consumption growth. The latest deficit episode, however, which started in 1999, has been marked since the beginning by a rising share in consumption; recently this has turned so strong that a current account deficit remained despite a fall in the investment share.
- In Germany, large surpluses in the 1980s were marked by high saving, while the investment share remained relatively constant. The even larger surpluses of the 2000s, however, were marked by both savings and reductions in investment.
- In Japan, the situation is different in that the current account surplus has been the most stable feature of the economy, while the role of savings and investment changed over time. Most remarkably, the consumption share of GDP grew much more than in the US and the UK, but a simultaneous reduction in domestic investment meant that the current account surplus was maintained.

Figure 1

Current Account Developments in Selected Large Economies



Source: Author's calculation based on WDI data.

Figure 2 shows developments in euro area crisis and vulnerable countries.

- In Greece, the current account deficit episode was originally marked by rising investment shares, but since the mid-2000s investment started falling.
- In Portugal, a similar pattern applies, with deficits being first associated with high investment and then consumption.
- In Ireland past current account deficits were associated with rising investment shares. The most recent deficit also started with rising investment shares, but then investment fell strongly while consumption rose. By 2010, investment has fallen so much as to eliminate the deficit.
- In Spain, investment is strongly aligned with current account deficits, while consumption remains relatively stable.

Figure 3 provides a further breakdown of Spanish investment, as Spain is a well-known case of a housing investment boom, and as it is one of the few countries for which a more detailed investment breakdown can be obtained from WEO, at least for the most recent years. The figure confirms that most of the continued increase in investment was due to rising investment in residential structures, while investment in plant and machinery only rose in the beginning and then stayed flat until the onset of the crisis, when it collapsed. A small share of the investment in the housing stock may still contribute to future export earnings, as some houses were bought by foreigners who will keep spending on services when they visit as tourists or pensioners.

Figure 4 shows, for comparison, developments in selected previous crisis countries. These also show greater divergence, from consumption-related current account deficits in Argentina (1980s) and Brazil, to investment-related ones in Argentina (1990s), Thailand and Latvia.

To sum up this section we can note that in practice, current account deficits have often been associated with increased consumption (reduced saving) rather than increased investment. Worryingly, the large current account deficits in some advanced economies have recently been marked more by reduced savings than additional investment. This means that if they are reduced in the future, this will require a fall in the consumption share and not simply a reduction in investment from exceptionally high levels.

Even if current accounts are marked by increased investment, economies can end up in crisis, and indeed many historic crises were preceded by investment booms. There are many ways in which investment may not guarantee future current account surpluses, including cases where investment takes place in the non-tradable sector or where it is simply inefficient. But while an increase in investment may not guarantee a soft landing for large current account deficits, it is even harder to see such a solution for a deficit related to consumption booms – unless the present consumption boom is related to a foreseen (and actually occurring) future increase in incomes.

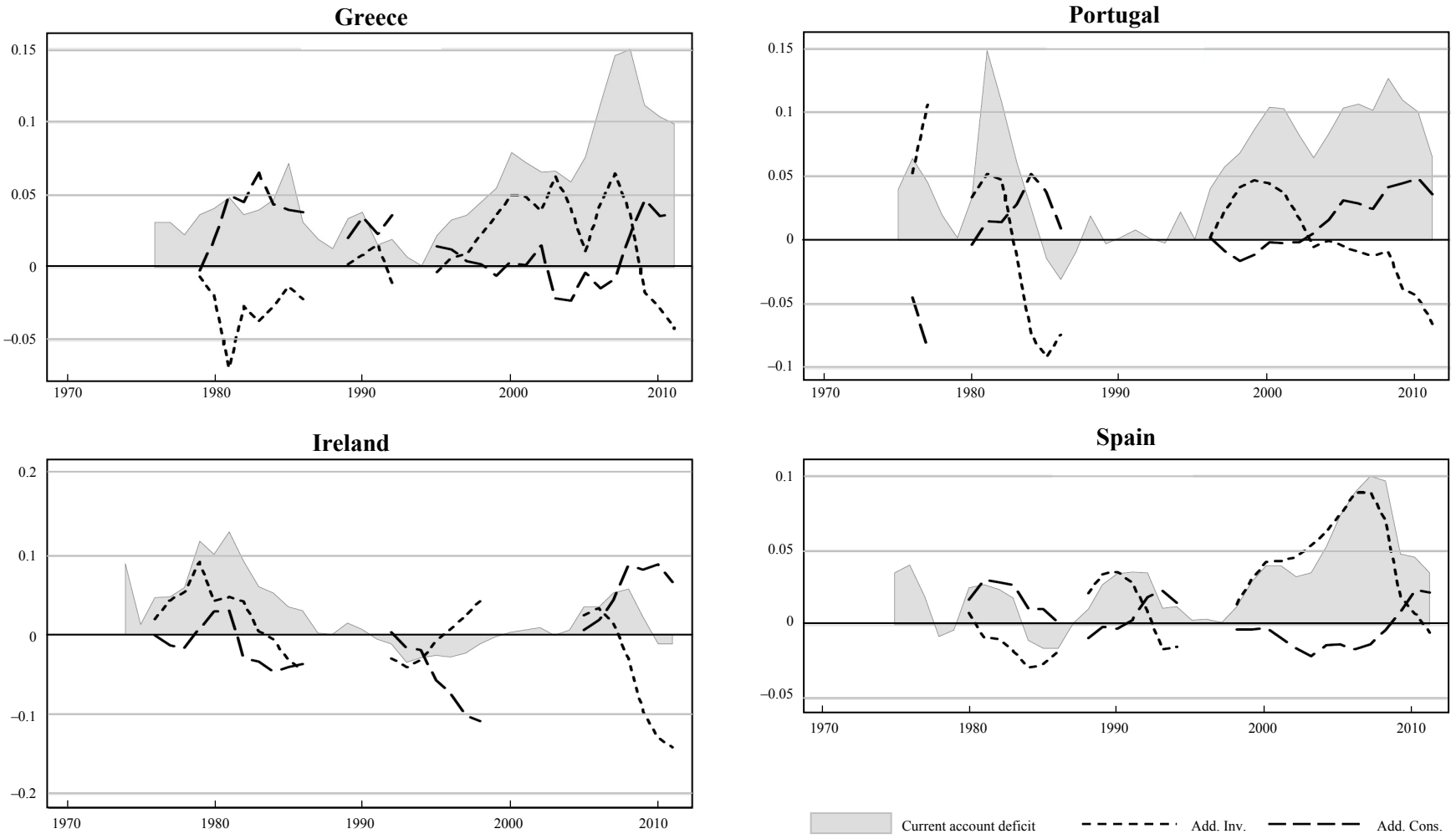
3 Econometric analysis

Having established that current account deficits are in practice both the result of consumption and investment booms, this section looks at the empirical implications for growth.

Obtaining robust empirical findings is quite challenging, given that current accounts and other imbalances can persist for a long time before adjustment takes place. A standard regression involving yearly data would be dominated by the many years in which imbalances are built up rather than when adjustment suddenly takes place. In order to focus on times following a current account adjustment, we look at developments around these periods. We use both the definition of a current account event (deficit peak) as described above, and one based on current account reversals proposed by Milesi-Ferretti and Razin (1998). Restricting the sample to these special cases of

Figure 2

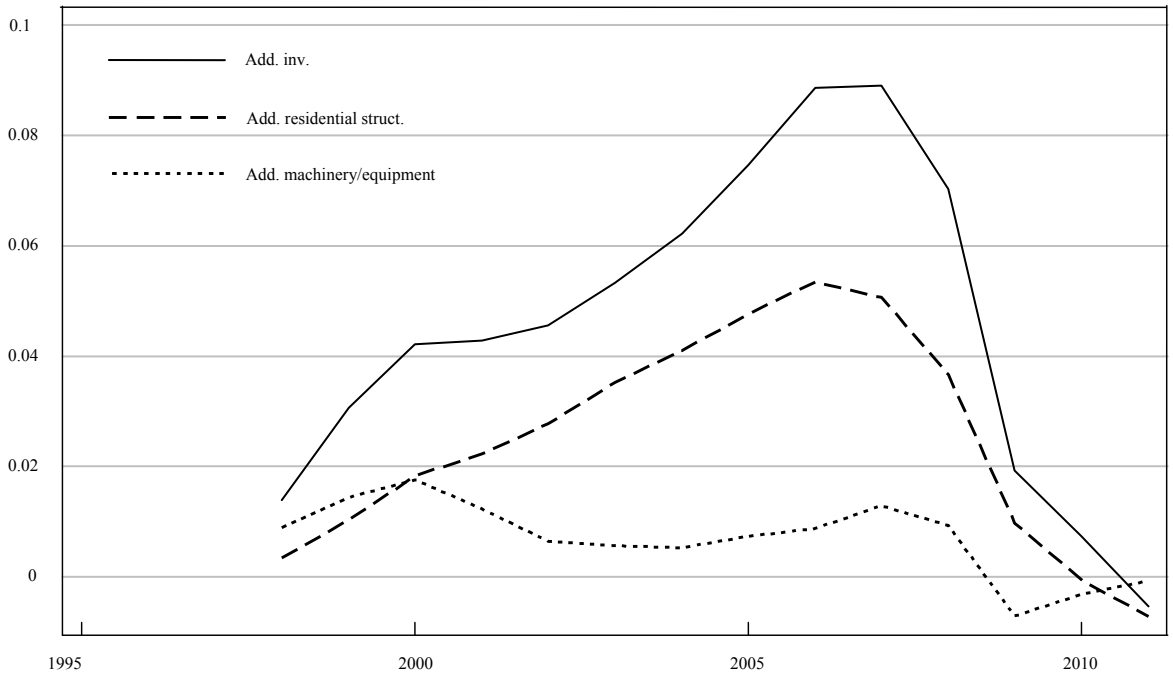
Current Account Developments in Euro Area Crisis and Vulnerable Countries



Source: Author's calculation based on WDI data.

Figure 3

The Composition of Additional Investment in Spain



Source: Author's calculation based on WEO data.

current account deficit peaks/reversals helps us in identifying the impact of investment shares in current accounts. Still, the more general result from the growth literature that investment is typically growth enhancing will also affects these results and cannot be separated econometrically. For a policy maker, the more relevant finding will be the impact of investment on post-current account reversal growth, irrespective of the precise channel through which it operates.

3.1 Results based on the contribution of investment to current account deficit peaks

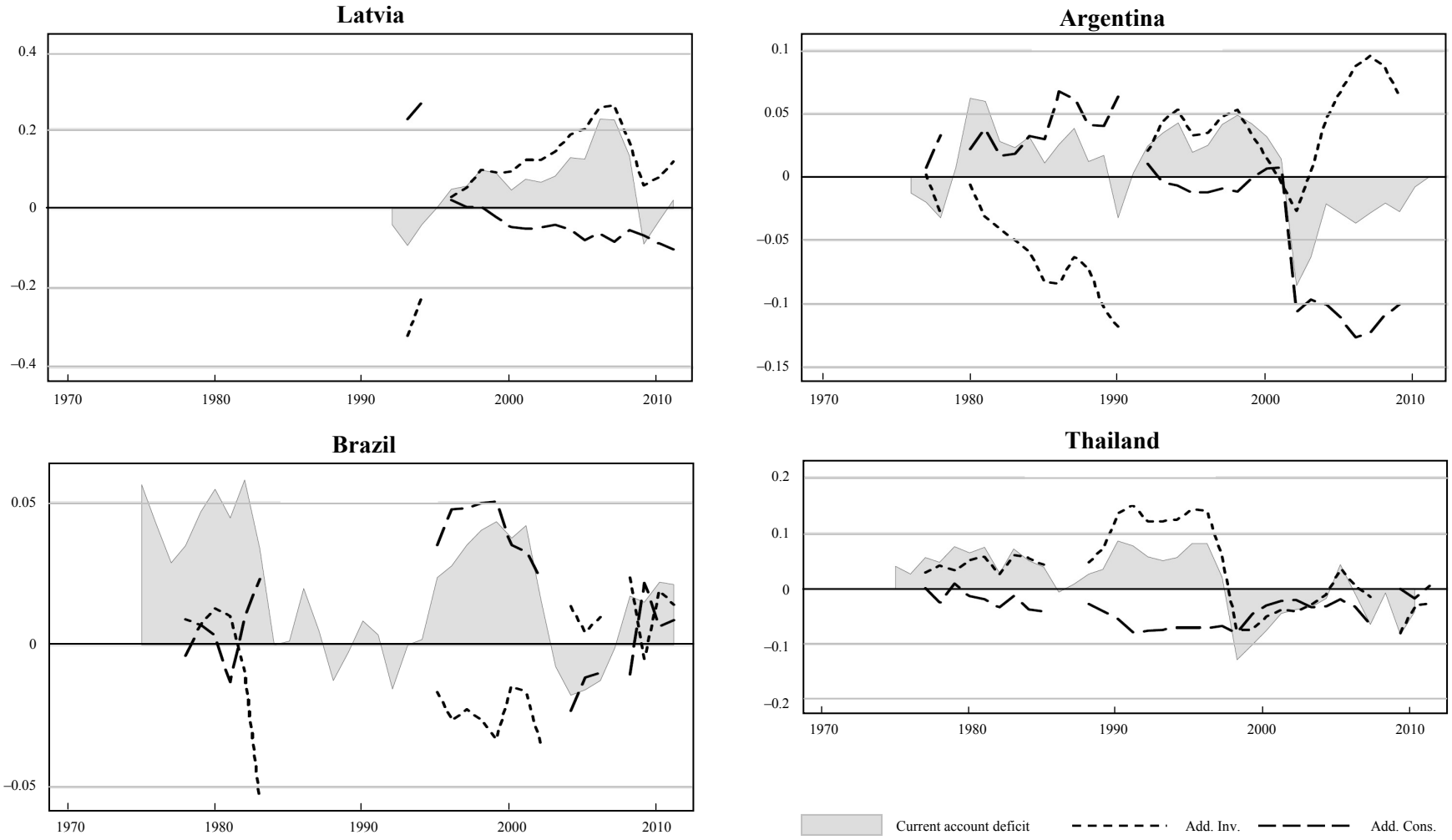
Our first approach is closely linked to the graphical analysis above and relates growth performance following a current account adjustment to the level of the current account and the contribution of investment to that level:

$$\overline{g} = \beta_0 \overline{g}_{t-1} + \beta_1 \Delta \frac{CA}{Y} + \beta_2 \Delta \frac{I}{Y} + y_t + \varepsilon \tag{6}$$

where g is the growth rate – either of consumption or real GDP –, y captures time effects and ε is the error term and the other variables are changes in ratios since the beginning of an imbalance as defined above. The bar indicates that the growth rate is calculated over three-years: the three years following a current account deficit peak for the explained variable, and the three years preceding a peak in case of the explanatory variable. As the regression is estimated only for current account events (as defined above) we usually have only one or two observations per country and country fixed effects are not included.

Figure 4

Current Account Developments in Selected Previous Crisis Countries



Source: Author's calculation based on WDI data.

Table 4

Real Consumption Growth Following a Current Account Deficit Peak

	(1)	(2)	(3)	(4)	(5)
Lagged real cons. growth	0.109	0.097	0.097	0.165	0.022
	(0.124)	*(0.124)*	*(0.121)*	*(0.140)*	*(0.185)*
Δ Current account	0.084	0.055	0.096	0.073	0.031
	(0.063)	*(0.066)*	*(0.064)*	*(0.083)*	*(0.116)*
Δ Investment	0.148**	0.105*			
	(0.073)	*(0.054)*			
Δ Fixed Investment			0.171**		
			(0.067)		
Δ government fixed investment				0.063	0.054
				(0.168)	*(0.148)*
Δ private fixed investment				0.257**	0.097
				(0.104)	*(0.092)*
Year effects		yes	yes		yes
Observations	149	149	145	74	74
R^2	0.0691	0.354	0.383	0.179	0.649
Adj. R^2	0.0499	0.169	0.199	0.132	0.390

Dependent variable: Real consumption growth in the 3 years following an event. Explanatory variables: Lagged real cons. growth: calculated over the 3 years preceeding an event; Δ Current account, Δ Investment (total, fixed, government, private): change in GDP share from beginning of a current account episode. Robust standard errors in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Before turning to overall growth, we consider the impact of the current account and its components on consumption growth. As argued above, we expect consumption growth following a current account deficit peak to be stronger if the current account was associated with strong investment rather than low savings.

Results are shown in Table 4. The first two regressions consider the impact of total investment. They confirm that following a current account deficit peak, consumption growth is higher the greater the increase in the investment share prior to the peak. This is robust to the inclusion of year effects, which control for worldwide economic conditions. The coefficient of the change in the current account deficit has the expected sign, as a stronger current account is followed by higher growth, but is not statistically significant in this and most other specification. Regression (3) replaces total by fixed investment, which yields an even stronger positive impact on post-peak real consumption growth. Regressions (4) and (5) split fixed investment into a government and a private share. The result is that only private investment has a significant impact on real consumption growth, which could indicate that public investment is more likely to be

Table 5

Real Growth Following a Current Account Deficit Peak

Dep. Variable Estimation	3-year Real Growth Least Squares with Robust S.E.			Dummy: 3-year Real Growth < 2.5% Probit			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lagged real growth	0.229**	0.252**	0.231**				
	(0.101)	*(0.109)*	*(0.108)*				
Δ current account	0.010	0.005	0.008	0.061	0.244	–0.064	0.174
	(0.009)	*(0.010)*	*(0.010)*	*(0.631)*	*(0.789)*	*(0.616)*	*(0.745)*
Δ Investment	0.048	0.029		–1.675*	–2.440*		
	(0.045)	*(0.032)*		*(0.992)*	*(1.328)*		
Δ Fixed Investment			0.059			–1.894*	–2.432*
			(0.036)			*(1.071)*	*(1.402)*
Year effects		yes	yes		yes		yes
Observations	149	149	145	229	221	222	212
R^2	0.0691	0.354	0.383				
Adj. R^2	0.0499	0.169	0.199				

Explanatory variables: Lagged real cons. growth: calculated over the 3 years preceeding an event; Δ Current account, Δ Investment (total, fixed, government, private): change in GDP share from beginning of a current account episode. Standard errors in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

wasted or otherwise not contributing to enhancing the productive capacity. The result, however, does not survive the inclusion of year effects, which may be partly due to the reduced sample size.

Next we consider total economic growth. There a positive impact of investment may still be expected, but it could be less strong, because a collapse of investment may also have a negative impact in the short term, unless all investment goods were imported or the economy is very flexible. Results are shown in Table 5.

The first three regressions mirror the ones on consumption growth. However, now the lagged dependent variable turns significant, while the investment variables are not significant anymore – although for fixed investment (regression (3)) the *p*-value at 10.4 is close to standard thresholds for significance. Regressions (4)-(7) look at the probability of growth being low (*i.e.*, below 2.5 per cent over three years, which is just below the median) for total and fixed investment with and without year effects. For these less demanding specifications, there is evidence that the risk of very low growth is reduced when current accounts are associated with investment booms.

3.2 Results based on the current account reversals as developed by Milesi-Ferretti and Razin (1998)

In addition to specifications closely related to the descriptive part, we also employ an approach developed by Milesi-Ferretti and Razin (1998). They look at three year averages before

and after current account reversals. Closely following their approach, a reversal is then defined as a reduction in the average current account deficit to GDP ratio over 3 years by at least 3 percentage points over the preceding years. Additionally the deficit must be reduced by at least a third and the highest post-reversal deficit must be below the lowest pre-reversal deficit. On the dataset made up by reversals only, the following regression is run:

$$\bar{g} = \beta_0 \bar{g}_{t-1} + \beta_1 \frac{\overline{CA}}{Y}_{t-1} + \beta_2 \frac{\bar{I}}{Y}_{t-1} + x_{t-1}'\beta + y_t + \varepsilon \quad (7)$$

where x is a vector of control variables and all other variables are defined as before. The bar over CA and I indicates that the three-year pre-reversal average is taken. One minor difference compared to Milesi-Ferretti and Razin (1998) is that we use a year dummy instead of calculation deviations from world averages.

On control variables we also closely follow Milesi-Ferretti and Razin (1998), although we skip the interest rates (which were hardly ever significant in their paper). Our precise definitions are:

- Real effective exchange rate (REER) appreciation: this is appreciation over the three years before the reversal and is a measure of the change in competitiveness of the economy.
- Change in terms of trade: this is change in the terms of comparing the three years before and after the event. This is to control for the effect of changes in world prices (e.g., commodity prices) on the current account.
- Openness: this is the pre-reversal share of exports and imports in GDP, which may affect the likelihood of a current account reversal, as well as its size and impact.
- GNI per capita: this is a measure of the pre-reversal income of the economy, to control for convergence, *i.e.*, higher growth rates in poorer economies.

Results are shown in Table 6. Regression (1) is the simplest implementation with no controls. It is therefore directly comparable to the previous regression, just that the data set is larger because of the different definition of a current account event, and that we use three year averages of explanatory variables instead of the previous cumulative change in ratio since the beginning of a current account episode. Also in this specification, there is a positive and significant impact of investment on growth, controlling for its impact on the current account. Regression (2) adds the control variables and the results now show an even stronger impact of investment. Moreover, they are similar to those reported in Milesi-Ferretti and Razin (1998), except that in their results the lagged real growth rate is not significant, while the openness indicator is. Most of the control variables are widely available, but the REER reduces the sample size a lot. Removing this variable increases the sample size, but does not affect the coefficient on investment much. Replacing total investment by fixed investment in Regression (4) leads to even stronger results (also in specifications without controls or with the REER, which are not shown). Regression (5) considers public and private fixed investment separately and finds similar coefficients on both, although only the one on private investment is statistically significant.

3.3 Robustness checks

Given that the interest of this paper has been to study current account imbalances, most of the observations used in regressions relate to the most extreme outcomes occurring in the sample. Removing outliers therefore has different implications in such an exercise as in a normal one. Hence, when dropping only the top and bottom five percentiles of the distribution of the current account and investment ratios as well real growth, the sample of current account deficit peaks (or reversals) is reduced significantly. Still, while the results generally got weaker, they held up,

Table 6

Real Growth Following a Current Account Reversal

	(1)	(2)	(3)	(4)	(5)
Lagged real growth	0.219*	0.232***	0.173	0.175	0.124
	(0.115)	*(0.079)*	*(0.137)*	*(0.136)*	*(0.162)*
Current account/GDP	0.027	0.070**	0.032	0.035	0.049
	(0.026)	*(0.034)*	*(0.029)*	*(0.028)*	*(0.041)*
Investment/GDP	0.054*	0.078*	0.092**		
	(0.032)	*(0.040)*	*(0.043)*		
Fixed investment/GDP				0.098**	
				(0.043)	
Public investment/GDP					0.105
					(0.064)
Private investment/GDP					0.107*
					(0.059)
REER		–0.077*			
		(0.040)			
Δ terms of trade		0.011	0.036***	0.037***	0.053***
		(0.013)	*(0.012)*	*(0.012)*	*(0.015)*
Open		0.002	0.001	0.001	–0.007
		(0.004)	*(0.004)*	*(0.004)*	*(0.007)*
GNI per capita		–0.000***	–0.000**	–0.000**	–0.000*
		(0.000)	*(0.000)*	*(0.000)*	*(0.000)*
Year effects	yes	yes	yes	yes	yes
Observations	395	189	331	329	203
R^2	0.240	0.387	0.319	0.321	0.409
Adj. R^2	0.159	0.262	0.246	0.248	0.294

Dependent variable: 3-year average real growth following reversal. Explanatory variables: Growth rate, (public/private) Investment/GDP: 3-year average rate before reversal; REER: averag appreciation over three years before reversal; open, GNI per capita: level before reversal; Δ terms of trade: per cent change of 3-year average post over pre reversal. Robust standard errors in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 7

Regressions on a Sample Without Outliers

Dep. Variable	**Real Cons. Growth**	**Real Growth**	**Low Growth Dummy**	**Real Growth**	**Real Growth**
Estimation Method	**OLS with Robust S.E.**		**Probit**	**OLS with Robust S.E.**	
	(1)	(2)	(3)	(4)	(5)
Lagged dep. variable	0.040	0.208*		0.367***	0.311***
	(0.200)	*(0.116)*		*(0.081)*	*(0.079)*
Current account/GDP	0.259**	0.047	–4.777	–0.020	0.025
	(0.122)	*(0.065)*	*(3.802)*	*(0.031)*	*(0.032)*
Fixed Investment/GDP	0.171*	0.091**	–5.139**	0.073*	0.089**
	(0.098)	*(0.039)*	*(2.261)*	*(0.038)*	*(0.042)*
Δ terms of trade				0.037***	0.024**
				(0.012)	*(0.010)*
Open				0.001	–0.001
				(0.004)	*(0.004)*
GNI per capita				–0.000**	–0.000
				(0.000)	*(0.000)*
Year effects	yes	yes	yes	yes	yes
Observations	107	155	138	288	251
R^2	0.260	0.295	.	0.286	0.316
Adj. R^2	–0.0452	0.102	.	0.190	0.223

Notes: Regression (1) as in Table 4, Regressions (2) and (3) as in Table 5, and Regressions (4) and (5) as in Table 6. Robust (except (3)) standard errors in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

especially for fixed investment, as shown in Table 7. This suggests that the findings are not only valid for the most extreme current account imbalances. Of course, even the remaining sample is still made up of unusual situations compared to most years.

4 Conclusions

This paper has argued that the impact of huge current account imbalances and their corrections could differ depending on whether they were driven by savings shortfalls (excess consumption) or strong investment. In particular, current account deficits that are driven by investment booms that increase the production capacity for tradable goods should have a more benign growth impact following a reversal than consumption-driven deficits.

Empirical evidence presented in this paper, both based on a new specification and one suggested by Milesi-Ferretti and Razin (1998), supports this view and finds that following current account peaks (or reversals) growth is higher in cases where investment contributed strongly to the deficit. The paper also shows that in practice many of the recent large current account deficits were indeed associated with low savings rather than high investment.

Moreover, there is also tentative evidence that private investment is particularly important, while public investment does not have a similar beneficial effect, although this finding is less robust. There are various possible explanations, including that public investment may not benefit the production of tradables or that public investment is partially wasted and therefore not a good proxy for the asset value created.[7]

Some tentative policy implications of these results would be that governments should be particularly concerned about current account deficits that are marked by consumption booms and take remedial action more rapidly. Public investment, especially if debt financed, should be implemented with minimal waste and with a view to expanding the economy's productive capacity. This certainly does not imply that investment-driven current account deficits are necessarily safe, especially if they are large and accompanied by debt creation in foreign currency.

Further research in this area would be warranted. In particular, the investment variables used here may be poor proxies for the creation of export capacity. First, it would be better to exclude investment in residential housing, which has contributed to higher investment rates in some countries, but which is not reported widely and for long enough time periods. And even investment in more directly production-linked assets may not necessarily boost export capacity if the fixed assets are specific to the nontradable sector, if local asset prices are distorted or if part of the investment effort is simply wasted.

---

[7] We reran our regressions using data from Gupta *et al.* (2011) who calculate efficiency-adjusted measures of the public capital stock for a sample of developing countries. This measure deducts a share of investment considered wasted. Even using these data (either by looking at capital stocks or by backing out investment) we did not obtain significant positive results for public investment, possibly because of the significant further reduction in the sample size.

APPENDIX

Table 8

List of Current Account Events and Reversals

	Number of Current Account Events	Average Length of Deficit Episode	Average Current Account at Event		Number of Current Account Reversals	Average Current Account at Reversal
Angola	2	6.0	–109.3		2	10.2
Argentina					3	1.3
Armenia	1	5.0	–22.1		5	–9.5
Antigua and Barbuda	1	12.0	–29.8		6	–5.7
Austria	1	3.0	–5.5		2	1.8
Azerbaijan	2	3.0	–30.3		5	6.0
Benin	1	9.0	–9.3		3	–4.5
Bulgaria	1	9.0	–27.2		3	–3.1
Bahrain	1	7.0	–17.4		4	3.7
Bahamas, The	4	10.0	–13.0		3	–5.2
Bosnia and Herzegovina	1	3.0	–19.5		1	–8.0
Belize	2	9.0	–15.2		4	–8.3
Bolivia	4	10.0	–9.1		6	2.3
Brazil	1	5.0	–5.8		5	–0.5
Barbados	1	10.0	–15.5		4	–2.0
Botswana	1	5.0	–28.3		4	2.8
Canada					1	0.6
Switzerland					3	12.6
Chile	1	5.0	–14.5		4	–0.6
China					4	5.3
Côte d'Ivoire	2	3.0	–15.0		7	–3.7
Cameroon	2	5.5	–6.6		1	1.1
Congo, Republic of	1	5.0	–44.8		3	–4.1
Colombia	1	8.0	–5.4		4	–0.1
Comoros	1	3.0	–30.4		1	–3.1
Cape Verde	1	7.0	–12.7		2	–2.0
Costa Rica	3	10.7	–10.0		3	–6.9
Cyprus	4	11.8	–9.9		5	–5.3
Czech Republic	2	6.5	–6.2		1	–0.9
Germany					3	3.9
Djibouti					1	2.7
Dominica	3	14.7	–26.1		2	–8.2
Denmark	1	11.0	–5.2		3	–0.4
Dominican Republic	4	5.8	–8.3		4	–0.7

Table 8 (continued)

List of Current Account Events and Reversals

	Number of Current Account Events	Average Length of Deficit Episode	Average Current Account at Event		Number of Current Account Reversals	Average Current Account at Reversal
Algeria					1	0.6
Ecuador					4	0.2
Egypt					6	3.2
Spain	1	10.0	–10.0		2	–1.9
Estonia	1	12.0	–15.9		3	–3.6
Finland	1	5.0	–5.4		6	2.3
Fiji	2	4.0	–13.9		3	0.2
Gabon	2	4.0	–22.2		4	4.0
Georgia	1	8.0	–22.1		2	–8.2
Ghana	3	16.0	–11.2		1	–1.7
Guinea	2	6.5	–8.2		1	–1.7
Gambia, The					5	1.7
Guinea-Bissau					4	–24.4
Equatorial Guinea					1	–6.9
Greece	2	10.5	–11.1		2	–7.2
Grenada	3	18.3	–26.5		2	–10.4
Guatemala	3	8.3	–6.7		2	–2.1
Guyana	1	5.0	–13.1		2	–13.2
Hong Kong SAR	0				2	8.8
Honduras	3	8.3	–11.7		2	–4.6
Croatia	1	8.0	–8.7		1	–4.9
Hungary	1	12.0	–8.6		3	–2.1
Indonesia	0				1	4.3
Ireland	2	5.0	–9.4		8	–3.6
Iceland	3	7.0	–14.9		3	–5.1
Israel	2	4.0	–12.0		4	2.3
Italy	0				3	1.0
Jamaica	4	9.0	–13.1		2	0.1
Jordan	1	6.0	–15.7		5	–4.5
Kenya	2	7.5	–12.9		5	–2.1
Kyrgyz Republic	2	5.0	–18.5		2	–3.4
St. Kitts and Nevis	3	16.0	–27.4		3	–14.5
Korea	1	3.0	–7.9		5	2.3
Kuwait	1	4.0	–240.5		4	23.7
Lao P.D.R.	2	3.0	–13.6		5	–1.4
Lebanon					1	–12.6

Table 8 (continued)

List of Current Account Events and Reversals

	Number of Current Account Events	Average Length of Deficit Episode	Average Current Account at Event		Number of Current Account Reversals	Average Current Account at Reversal
Libya					4	21.7
St. Lucia	3	12.3	–22.3		5	–11.7
Sri Lanka	4	8.0	–9.7		3	–3.9
Lesotho	1	9.0	–39.7		5	–4.8
Lithuania	2	9.5	–13.0		2	–0.6
Latvia	2	7.0	–16.2		1	8.8
Morocco	1	7.0	–12.1		2	1.5
Moldova	2	5.0	–18.2		2	–7.0
Madagascar	2	10.0	–11.5		2	–7.8
Maldives	3	14.0	–23.7		4	–3.4
Mexico	1	9.0	–7.0		3	0.0
Mali	3	16.7	–13.1		2	–6.0
Mongolia	2	5.0	–7.1		7	–8.0
Mozambique	3	9.7	–20.9		3	–11.0
Mauritania	2	5.0	–25.4		4	–1.0
Mauritius	1	5.0	–12.8		2	1.1
Malawi	2	5.0	–17.1		2	–10.6
Malaysia	2	5.0	–11.4		7	5.7
Niger	3	7.3	–10.5		2	–5.5
Nigeria	2	8.0	–13.9		4	10.1
Nicaragua	3	17.0	–30.0		3	–15.2
Netherlands					4	4.8
Norway	1	4.0	–5.9		6	2.3
Nepal	2	11.0	–8.3		2	1.1
New Zealand	2	17.5	–9.9		6	–4.1
Oman	2	10.5	–16.0		2	15.2
Pakistan	2	8.5	–8.3		4	–0.4
Panama	2	4.5	–11.3		4	2.1
Peru	2	6.5	–11.7		4	–1.0
Philippines	3	7.3	–6.7		6	–0.1
Papua New Guinea	3	6.0	–12.6		5	–0.7
Poland	3	7.3	–6.7		2	–1.3
Portugal	2	9.0	–11.5		3	–1.0
Paraguay	2	7.0	–10.2		3	0.8
Romania	2	8.0	–11.1		1	–4.3
Russia	0				1	12.6

Table 8 (continued)

List of Current Account Events and Reversals

	Number of Current Account Events	Average Length of Deficit Episode	Average Current Account at Event		Number of Current Account Reversals	Average Current Account at Reversal
Rwanda	3	5.0	–6.9		2	3.9
Saudi Arabia	2	9.5	–18.2		8	4.8
Sudan	3	9.3	–9.9		5	–2.3
Singapore	1	3.0	–13.2		10	2.8
Solomon Islands	3	7.7	–15.7		1	0.3
Sierra Leone	2	6.0	–16.8		2	–4.8
El Salvador	1	10.0	–7.1		2	1.2
Somalia					1	–11.7
São Tomé and Príncipe	1	8.0	–51.0		1	–40.1
Suriname	4	16.8	–22.0		5	0.3
Slovak Republic					1	–3.6
Slovenia	1	5.0	–6.1		1	–0.7
Sweden	0				2	1.1
Swaziland	0				5	1.3
Seychelles	2	5.5	–26.1		4	–1.4
Syria	1	7.0	–5.8		4	3.5
Chad					2	1.9
Togo	3	11.0	–10.7		1	–8.4
Thailand	3	4.7	–8.1		3	3.8
Trinidad and Tobago	2	5.0	–11.4		6	10.3
Tunisia	2	5.0	–9.2		3	–3.8
Tanzania	1	5.0	–21.0		5	–7.3
Uganda	2	10.5	–6.0		2	–2.6
Ukraine	0				2	6.4
Uruguay	0				2	0.1
St. Vincent and the Grenadines	2	19.0	–31.0		1	–6.0
Venezuela	2	11.0	–8.2		3	7.9
Vietnam	0				1	4.1
Vanuatu	2	6.5	–17.4		2	–2.7
West Bank/Gaza					1	–26.3
Samoa	1	8.0	–44.5		3	6.7
Yemen	0				2	6.6
South Africa	2	5.0	–6.5		4	0.6
Zambia	1	7.0	–20.6		3	–7.4
Zimbabwe	1	5.0	–7.4		2	–0.2

Source: Author's calculation based on WDI data.

REFERENCES

Edwards, S. (2005), "Is the US Current Account Deficit Sustainable? If Not, How Costly Is Adjustment Likely to Be?", *Brookings Papers on Economic Activity*, Vol. 2005, No. 1, pp. 211-88.

Engel, C. and J. Rogers (2006), "The US Current Account Deficit and the Expected Share of World Output", NBER, Working Paper, No. 11921.

Funke, K. and C. Nickel (2006), "Does Fiscal Policy Matter for the Trade Account? – A Panel Cointegration Study", ECB, Working Paper, No. 620.

Gros, D. (2006), "Why the US Current Account Deficit is Not Sustainable", *International Finance*, Vol. 9, No. 2, pp. 241-60.

Gupta, S., A. Kangur, C. Papageorgiou and A. Wane (2011), "Efficiency-adjusted Public Capital and Growth", IMF, Working Paper, No. 11/217.

Hausman, R. and F. Sturzenegger (2006), "Why the US Current Account Deficit is Sustainable", *International Finance*, Vol. 9, No. 2, pp. 223-40.

Higgins, M. and T. Klitgaard (2011), "Saving Imbalances and the Euro Area Sovereign Debt Crisis", *Current Issues in Economics and Finance*, Vol. 17, No. 5, Federal Reserve Bank of New York.

International Monetary Fund (2011), "Separated at Birth? The Twin Budget and Trade Balances", in *World Economic Outlook*, September, pp. 135-60.

Kitchen, J. (2007), "Sharecroppers or Shrewd Capitalists? Projections of the US Current Account, International Income Flows, and Net International Debt", *Review of International Economics*, Vol. 15, No. 5, pp. 1036-61.

Milesi-Ferretti, G.M. and A. Razin (1998), "Sharp Reductions in Current Account Deficits – An Empirical Analysis", *European Economic Review*, Vol. 42, pp. 897-908.

——————(2000), "Current Account Reversals and Currency Crises – Empirical Regularities", in P. Krugman (ed.), *Currency Crises*, University of Chicago Press, pp. 285-325.

Nickell, S. (2006), "The UK Current Account Deficit and All That", *Bank of England Quarterly Bulletin*, pp. 231-39, Summer.

Obstfeld, M. and K. Rogoff (1995), "The Intertemporal Approach to the Current Account", in G. Grossman and K. Rogoff (eds.), *Handbook of International Economics*, *Vol. 3*, Elsevier Science, pp. 1731-99.

Reisen, H. (1998), "Sustainable and Excessive Current Account Deficits", *Empirica*, Vol. 25, pp. 111-31.

FISCAL POLICY AND ASSET PRICE CYCLES: EVIDENCE FROM FOUR EUROPEAN COUNTRIES

Luca Agnello,[*] *Gilles Dufrénot*[**] *and Ricardo M. Sousa*[***]

We test for non-linear effects of asset prices on the fiscal policy of four major European economies (France, Italy, Spain and UK). We model government spending and revenue as time-varying transition probability Markovian processes (TVPMS), and find that: (i) in France and Italy, the impact of housing prices on government revenue is conditioned by the phase of the stock price cycle; (ii) a similar asymmetric pattern is found for the UK when considering the effect of stock price fluctuations on government revenue and spending vis-à-vis *the troughs and peaks of aggregate wealth; and (iii) for Spain, a fall in government revenue is typically associated with a negative performance of the housing market, while government spending does not seem to adjust to the dynamics of financial market. In addition, the magnitude of the contribution of housing prices to changes in government revenue appears to have dominated that of stock prices in France and the UK. As for government spending, changes in this policy instrument are correlated with changes in asset prices, but the effect depends on the magnitude of the price variation and the influence of the output cycle. Therefore, the empirical evidence corroborates the idea that accounting for the dynamics of asset markets provides a more accurate assessment of the fiscal stance.*

1 Introduction

Asset-related changes in revenues and spending appear to have been a factor explaining the temporary movements in the fiscal balance (in particular, the so-called "windfall revenue"), but also justifying the lack of confidence of academic and policymakers on the standard measures of the "structural" fiscal balance.

The effects of the asset price cycle on the different components of revenue and spending have been studied in the literature (Jaeger and Schuknecht, 2007; Tujula and Wolswijk, 2007). For instance, Agnello and Sousa (2012) show that fiscal policy is particularly effective during severe housing busts and the government's attempt to mitigate stock price developments may destabilize housing markets. In the same vein, Agnello *et al.* (2012a) find that fiscal policy has an expansionary effect on output, especially, in the context of a rise in financial stress. This, in turns, partially offsets the decline in wealth. Therefore, to target a given structural balance, governments also need to take into account the imbalances of asset markets.

Asset prices can affect the government budget via two major mechanisms: (i) the "direct" channel, whereby an increase in stock prices can have a positive impact on capital gains-losses related taxes, government revenue from households and corporations and turnover taxes; and (ii) the "indirect" channel, in which case higher stock prices can lead to a rise in consumer's confidence and household's wealth, boosting consumption and real economic activity and, thereby, increasing government revenue. In contrast, a sharp correction in stock prices and the design of

[*] Università di Palermo, Department of Economics, Business and Finance, Viale delle Scienze, 90128 Palermo, Italy. E-mail: luca.agnello01@unipa.it

[**] Banque de France, Service d'Étude des Politiques de Finances Publiques (FIPU), 31 Rue Croix des Petits Champs, 75001 Paris, France, and Aix-Marseille Université (AMSE) and CEPII. Château La Farge, Route des Milles, 13290 Les Milles Aix-en-Provence, France. E-mail: lopaduf@aol.com

[***] Universidade do Minho, Department of Economics and Economic Policies Research Unit (NIPE), Campus of Gualtar, 4710-057 Braga, Portugal, and London School of Economics, Financial Markets Group (FMG), Houghton Street, London WC2 2AE, United Kingdom. E-mails: rjsousa@eeg.uminho.pt, rjsousa@alumni.lse.ac.uk

fiscal stimulus packages can raise costs to governments and, therefore, deteriorate the public finances.

Another strand of the literature considers the role of asset prices on revenues and spending in order to better understand the adjustment made by the governments to keep public deficits and government debt on a sustainable path. The policy effort is conditioned by the fiscal space, which depends upon the taxation base. In this context, a bad juncture illustrated by an economic recession may generate a small shortfall in revenue if accompanied by changes in house and share prices that offset the impact on tax receipts. In contrast, a financial turmoil or a bubble burst can put pressure on public spending whenever a government takes actions to support the financial sector.

This paper contributes to the literature on the linkages between fiscal policy and asset markets (Castro, 2010; Sousa, 2010, 2012; Tagkalakis, 2011; Agnello and Nerlich, 2012). In particular, we examine whether changes in stock and housing prices have an impact on tax receipts and primary spending, with a specific focus on four European countries: France, Italy, Spain and UK. While asset market development play an important role in the economic activity of the Spain and UK, the other two countries (France and Italy) are major European countries and are considered for the purpose of comparison.

We propose to measure the influence of the asset prices cycles on government revenue and spending through the estimation of a new type of fiscal policy reaction function. Not only do we consider the asset price variables in addition to the traditional explanatory variables (such as the government debt and the output gap, but also allow the fiscal reaction to booms and busts to be asymmetric. Indeed, the omission of such asymmetry can underestimate the impact of financial imbalances on the state of the fiscal stance.

An interesting issue here is whether financial busts are more detrimental for fiscal deficits than booms are good for fiscal surpluses. And, if yes, why is it so? In order to address this question, we consider a regime-switching non-linear fiscal rule augmented with asset prices. This approach is new in comparison to those considered so far in the literature.

We use a novel econometric model – the Time-varying Transition Probability Markov-Switching (TVPMS) model – and extends the framework that was successfully applied for the case of the US by Agnello *et al.* (2012b) to a set of European countries (France, Italy, Spain and UK). This model allows us to show that: (i) financial wealth changes can help predicting forthcoming changes in fiscal variables; (ii) across the boom and bust phases of the financial wealth, the reaction of both government revenue and government spending to stock and housing prices can be asymmetric; and (iii) taking into account the impact of the financial developments on the fiscal balance yields information about the way in which they contribute to the dynamics in both the cyclical and structural fiscal balance. Therefore, we provide an answer to the problem of the so-called "omitted variables bias" problem, which is particularly sizeable and explains why the standard view about the fiscal stance may be distorted.

Our analysis is retrospective and does not include the recent financial crisis. One reason for limiting our attention to the pre-crisis period is to avoid the bias-selection problem. Indeed, the strength of the housing and stock market crisis that countries have recently experienced was such that one would surely capture an impact of the asset market development on the fiscal position. However, this would not necessarily tell us that there exists a systematic link between government spending, government revenue and asset markets regardless of the state of the economy. In other words, we would not be able to distinguish between the standard fiscal/asset cycle nexus and a rare event ("Great Recession") effect. Furthermore, a great proportion of the variance of our fiscal variables would be explained by the huge changes in the prices of both housing and stock prices that were observed since 2008.

The results suggest that, in order to assess the comovement between the cyclical fiscal balance and the swings in housing and equity prices, we need to take into account the asymmetry of asset price cycles, because governments adjust spending and revenue in different manners depending on whether prices are moving upwards or downwards, as well as whether they are evolving towards a peak or a trough.

In France, stock prices fuel tax increases during downturns and retrench revenue during downturns. Moreover, the phase of the stock price cycle conditions the impact of housing prices on government revenue.

For Italy, equity price changes at peaks reduce the revenues, while they bring higher tax receipts at troughs. Housing price increases raise revenues around a stock market peak, but reduce them when stock prices are near a trough.

In Spain, revenue falls are associated with less favorable developments in the housing markets, but price increases are not reflected into higher revenues. Furthermore, government spending does not react to stock price changes when it is already increasing above a threshold level.

For the UK, we find a similar asymmetric behavior when considering the impact of stock price fluctuations on taxes and spending according to the troughs and peaks of aggregate wealth. However, there are no signs of asymmetry with regard to the influence of house price fluctuations.

The remainder of the paper is organized as follows. Section 2 presents the empirical framework. Section 3 contains a discussion of our main findings. Finally Section 4 concludes.

2 The empirical model

2.1 A time-varying probability Markov-switching model

Following Agnello *et al.* (2012b), we estimate a regime-switching fiscal reaction function:

$$\begin{aligned} \Delta lnF_t = \\ + \sum_{i=1}^{M} \{\alpha_{1i}(s_t)\Delta lnF_{t-i} + \alpha_{2i}\Delta lnY_{t-i} + \alpha_{3i}\Delta lnB_{t-i} + \alpha_{4i}(s_t)\Delta lnHP_{t-i} + \\ \alpha_{5i}(s_t)\Delta lnSP_{t-i} + \alpha_0(s_t) + \varepsilon_t(s_t)\} \end{aligned} \quad (1)$$

where the fiscal policy instrument (F_t), either taxes (T_t) or government expenditure (S_t), is regressed on its lagged values, the lagged values of the GDP growth rate (ΔY_t) and debt to GDP ratio (ΔB_t). W add the housing prices (HP_t) and stock prices (SP_t) to the output and debt variables.

Given the limited number of degrees of freedom, we keep the model as parsimonious as possible by considering only two lags for each independent variable. As our final aim is to investigate whether fiscal policy reacts differently to asset prices (housing and equity) are allowed to switch between two different states, captured by a hidden variable $s_t \in \{1,2\}$. By contrast, we assume the relation between the fiscal policy indicators, output growth and public debt is always linear.

s_t is a first-order Markov-chain with the conditional probability of being in a given state at time t depending only on the state observed at the preceding time $P\{s_t \,/\, s_{t-1}\}$. We further assume that the transition from one regime to the other depends upon the lagged observation of a transition variable z_t described here by the aggregate wealth so that, $P\{s_t \,/\, s_{t-1}\} = P\{s_t / s_{t-1}, z_t\}$. The transition variable reflects the market environment which is assumed to condition the fiscal policy response. Assume for instance that a government is confronted to a burst in asset price and wants to prevent its negative effects on the real sector by activating support policies to the real estate and financial sector. One important concerned is that, while smoothing the asset price cycle, a

government may search to avoid feeding bubbles in asset markets. For ,this reason, the fiscal authorities needs to anticipate the investors' reaction, their behavior towards risk, their decisions on portfolio diversification, etc. It is known that their behavior is strongly related to their wealth (both housing and financial wealth). Therefore, if a government believes that the history of aggregate wealth convey information about the decisions that agents might take following a fiscal decision, it is useful to consider this information as conditioning the impact of the asset price fluctuations on spending and revenues.

The transition probabilities are defined as follows:

$$\begin{cases} p_{11}(z_{t-k}) = \frac{\exp(a_1+b_1 z_{t-k})}{1+\exp(a_1+b_1 z_{t-k})}, \quad p_{22}(z_{t-k}) = \frac{\exp(a_2+b_2 z_{t-k})}{1+\exp(a_2+b_2 z_{t-k})} \\ p_{12}(z_{t-k}) = 1 - p_{11}(z_{t-k}), p_{21}(z_{t-k}) = 1 - p_2(z_{t-k}), \end{cases} \tag{2}$$

where $p_{ij}(z_{t-k})$ is the probability of moving from regime *i* to regime *j* conditional on the dynamics of the transition variable *k* periods before. A key aspect of the empirical equation is modeling the asymmetric nature of the fiscal response to changes in asset prices with transitions between the different phases of the housing and stock price fluctuations being marked by differing sharpness at turning points. The implications is that a regime can be defined as corresponding to a specific correlation between asset prices and the fiscal variables which can vary across time. The regimes are not defined *a priori*, but selected endogenously by the data.

The coefficients b_1 and b_2 are used to compute the maximum marginal impact of one standard deviation in the transition variables on the probability of staying in or leaving respectively regimes 1 and 2. This serves to compare the duration of each regime and to see whether one is more persistent than the other. It can be shown that the derivative of the transition functions (2) with respect to the transition variables et the inflection point of the logistic function equal to $\sigma_z b_j/4$, j=1,2, where σ_z is the standard error or the transition variable.

The model is estimated using maximum likelihood (henceforth ML). We define the following vectors: $\Omega_t = (\mathbf{X}_t, z_{t-k})$ is the vector of observed independent variables and transition variables up to period t. Besides, $\xi_t = (y_t, y_{t-1}, \dots, y_1)$ is the vector of the historical values of an endogenous variable. Denoted θ the vector of parameters to estimate, the conditional likelihood function of the observed data ξ_t is defined as:

$$L(\theta) = \prod_{t=1}^{T} f(y_t/\Omega_t, \xi_{t-1}; \theta) \tag{3}$$

where:
$$f(y_t/\Omega_t, \xi_{t-1}; \theta) = \sum_i \sum_j f(y_t/s_t = i, s_{t-1} = j, \Omega_t, \xi_{t-1}; \theta) \times P(s_t = i, s_{t-1} = j/\Omega_t, \xi_{t-1}; \theta). \tag{4}$$

The weighting probability is computed recursively by applying Bayes's rule and finally one gets:

$$P(s_t = i/s_{t-1} = j, z_t) P(s_{t-1} = j/\Omega_t, \xi_{t-1}; \theta) = P_{ij}(z_t) P(s_{t-1} = j/\Omega_t, \xi_{t-1}; \theta) \tag{5}$$

We also have:

$$P(s_t = i \quad /\Omega_{t+1}, \xi_t; \theta) = P(s_t = i \quad /\Omega_t, \xi_t; \theta) \frac{1}{f(y_t/\Omega_t, \xi_{t-1}; \theta)} \sum_j f(y_t/s_t = i, s_{t-1} = j, \Omega_t, \xi_{t-1}; \theta) \times P(s_t = i, s_{t-1} = j/\Omega_t, \xi_{t-1}; \theta). \tag{6}$$

To complete the recursion defined by the equations (5) and (6), we need the regime-dependent conditional density functions:

$$f(y_t/\mathrm{s_t}=1,\mathrm{s_{t-1}}=\mathrm{j},\Omega_\mathrm{t},\xi_{\mathrm{t-1}};\theta)=\frac{\phi\left(\frac{y_t-x_t'\beta_1}{\sigma_1}\right)\Phi(a_j+z_t'b_j)}{\sigma_1 P_{1j}(z_t)} \tag{7a}$$

$$f(y_t/\mathrm{s_t}=2,\mathrm{s_{t-1}}=\mathrm{j},\Omega_\mathrm{t},\xi_{\mathrm{t-1}};\theta)=\frac{\phi\left(\frac{y_t-x_t'\beta_2}{\sigma_2}\right)\Phi(a_j+z_t'b_j)}{\sigma_2 P_{2j}(z_t)} \tag{7b}$$

The parameters of the TVPMS model are thus jointly estimated with ML methods for mixtures of Gaussian distributions. As compared with other estimators (for instance, the EM algorithm or the Gibbs sampler used by Diebold *et al.*, 1994, and Filardo and Gordon, 1998), the ML estimator has the advantage of computational ease. As shown by Kiefer (1978), if the errors are distributed as a normal law, then the ML yields consistent and asymptotically efficient estimates. Further, the inverse of the matrix of second partial derivatives of the likelihood function at the true parameter values is a consistent estimate of the asymptotic variance-covariance matrix of the parameter values.

2.2 Computing cyclical and cyclically-adjusted fiscal balance

Using our estimates, we compute cyclical revenues and spending using a gap approach. We also want to identify a structural effort of the government to adopt sustainable fiscal policy within an economic environment reflected by the fluctuations of both the output and the asset price fluctuations. Such an effort is captured by fiscal variables whose dynamics are corrected for the real and financial cycles. Our aim is thus not to discuss the issue as whether a government overestimate or underestimate the structural fiscal balance once the financial environment which conditions their action is taken into account. Since our benchmark equation is a fiscal response function, we only try to capture the induced variations in spending and revenues when government adjust the budget to maintain debts and fiscal balance on a sustainable level, given that they also have to cope with the stabilization of the output fluctuations and that they also try to accommodate the asset price cycles.

We follow Kanda (2010) and Bornhost *et al.* (2011) to adjust fiscal positions for the effects of the business and asset cycles. First, we take exponents of both sides of equation (1) to eliminate natural logs and express all the explanatory variables in levels, say M. Second, we employ an HP filtering technique to extract their corresponding structural part (M^*). Finally, we use the elasticities ($\hat{\alpha}_i$) as obtained from the TVP-MS models to calculate the so-called structural component of taxes and expenditures:

$$F_t^* = F_t\left(\frac{F_{1t-1}^*}{F_{1t-1}}\right)\prod_{i=2}^{5}\left(\frac{M_{it-1}^*}{M_{it-1}}\right)^{\widehat{\alpha}_i(\cdot)}\left(\frac{M_{it-2}^*}{M_{it-2}}\right)^{-\widehat{\alpha}_i(\cdot)} \tag{8}$$

where F_t^* denotes either the structural component of taxes (T_t) or the structural component of government expenditure (S_t) while the index i refers to the number of independent variables M (excluding the constant) in equation (1).

2.3 Data

We use quarterly data for France, Italy, Spain and the UK, for 1989Q4-2006Q4, 1985Q1-2007Q2, 1991Q1-2008Q2 and 1975Q1-2007Q4. All variables are expressed in difference of natural logarithms, seasonally adjusted and measured at constant prices unless stated otherwise.

Quarterly series of government spending and government revenue are taken from the national accounts in the case of the UK and are based on fiscal cash data for France, Italy, and

Spain. The government debt series are provided by the Office for National Statistics (ONS) in the case of the UK and by the Ministry of Finance for the other countries.

Aggregate wealth is the defined as the sum of net financial wealth and net housing wealth. Data are retrieved from the ONS in the case of UK, and the European Central Bank (ECB) for the remaining countries.

In what concerns asset prices, the housing price index corresponds to the residential property price index, while the stock price index is proxied by the share price index. Housing price data is seasonally adjusted and provided by the Bank for International Settlements (BIS). Stock price data is provided by the International Financial Statistics (IFS) of the International Monetary Fund (IMF).

Finally, data for real GDP is sourced from the IFS of the IMF.

3 Empirical results

3.1 UK

The estimation results are reported in Tables 1a-1e. The linear regressions suggest that revenues and spending do not respond to the output cycle, that debt has a stabilizing effect on the fiscal balance (since an increase in debt raises revenues but does not affect significantly public spending), that taxes are positively influenced by the housing prices, while an increase in the stock prices exerts a positive impact on government spending. However, the linear framework misleads as to the influence of the different variables. Indeed, once the asymmetries of the asset price cycles are taken into account in a TVPMS equation, some of the coefficients that were non-significant become statistically significant. For instance, the influence of lagged output changes is found to impact both tax receipts and primary spending. Specifically, the fiscal rule behaves in a counter-cyclical way on the revenue side (taxes decrease as output increases as shown by the negative sum of the coefficients on lagged output), but in a pro-cyclical manner in the spending side (primary spending decrease as the output increases, with a total impact of –1.29). As in the linear model, we retrieve a stabilizing effect of public debt (statistically significant coefficient of the second lag of public debt).

The statistics of the linearity test suggest that changes in aggregate wealth succeed to give an early warning of changes in both revenues and spending. Indeed, the *p*-values below 5 per cent yield to reject the null hypothesis that the fiscal cycle is independent of asset markets developments. Figures 1a and 1b suggest that the response of the fiscal variables to the asset price cycles (housing and stock prices) are related to two regimes reflecting the turning points of the aggregate wealth cycle. One regime corresponds to the peaks of the wealth cycle (it is identified as regime 1 for taxes and regime 2 for primary spending) and the second regime coincides with the troughs of the wealth cycle (regime 2 for taxes and regime 1 for primary spending). We propose to label revenues and spending that are related to the upturn of the wealth cycle "high-revenue" and "high-spending" regimes. Accordingly, "low-revenue" and "low-spending" regimes refer to tax receipts and spending in the troughs of the wealth cycle.

High revenues and primary spending are both positively correlated with changes in the stock and housing prices. The positive correlation with the stock prices is twice as high for primary spending (with a sum of coefficients equal to 0.08) as for taxes (the significant coefficient equals

Table 1a

UK: Linear Models

	Taxes				Primary Spending			
	(1)		(2)		(3)		(4)	
Constant	0.008*	*(0.67)*	0.02***	*(2.94)*	0.015***	*(3.20)*	0.02***	*(3.56)*
Lagged Output (–1)	0.22	*(0.71)*	0.07	*(0.20)*	–0.122	*(–0.50)*	–0.36	*(–1.34)*
Lagged Output (–2)	–0.08	*(–0.27)*	–0.46	*(–1.38)*	–0.16	*(–0.63)*	–0.17	*(–0.61)*
Lagged Dep. Var.	0.36***	*(3.98)*	0.33***	*(3.62)*	0.69***	*(9.97)*	0.68***	*(9.59)*
Lagged Public Debt (–1)	–0.11	*(–0.71)*	–0.21	*(–1.39)*	–0.13	*(–1.00)*	–0.16	*(–1.23)*
Lagged Public Debt (–2)	0.20	*(1.30)*	0.32**	*(2.12)*	0.05	*(–1.00)*	0.09	*(0.69)*
Lagged Housing Prices (–1)	-	-	–0.03	*(–1.43)*	-	-	0.11	*(1.17)*
Lagged Housing Prices (–2)	-	-	0.065***	*(2.84)*	-	-	–0.03	*(–0.38)*
Lagged Stock Prices (–1)	-	-	0.11	*(1.01)*	-	-	0.04*	*(1.86)*
Lagged Stock Prices (–2)	-	-	0.03	*(0.29)*	-	-	–0.02	*–(1.04)*
R^2	0.45		0.35		0.54		0.56	
Log–Likelihood	260.87		268.76		283.44		287.68	

Note: ***, **, * statistical significance at 1 per cent, 5 per cent and 10 per cent. *t*-values in square brackets.

Table 1b

UK: TVP-MS Models

	Taxes		Primary Spending	
Non–switching Parameters				
Lagged Output (–1)	0.92***	*(7.45)*	–0.52***	*(–3.35)*
Lagged Output (–2)	–1.08***	*(–5.86)*	–0.77***	*(–5.60)*
Lagged Public Debt (–1)	–0.13	*(–1.18)*	–0.14	*(–1.51)*
Lagged Public Debt (–2)	0.20**	*(1.82)*	–0.05	*(–0.53)*
σ	0.02***	*(14.18)*	0.02***	*(15.40)*
Switching Parameters				
	Regime 1 (*S*=1) Peaks of the wealth cycle		Regime 1 (*S*=1) Troughs of the wealth cycle	
Constant	0.004**	*(1.83)*	0.04***	*(10.90)*
Lagged Dependent Var.	0.58***	*(8.03)*	0.05	*(0.52)*
Lagged Housing Prices (–1)	0.02	*(0.52)*	0.20***	*(4.95)*
Lagged Housing Prices (–2)	0.19***	*(3.41)*	–0.11***	*(–3.04)*
Lagged Stock Prices (–1)	0.04***	*(2.64)*	0.03*	*(1.71)*
Lagged Stock Prices (–2)	–0.02	*(–1.20)*	–0.007	*(–0.43)*
	Regime 2 (S=2) Troughs of the wealth cycle		Regime 2 (S=2) Peaks of the wealth cycle	
Constant	0.014***	*(4.19)*	–0.0	*(–0.02)*
Lagged Dependent Var.	–0.81***	*(–6.95)*	–0.09	*(–0.93)*
Lagged Housing Prices (–1)	–0.08	*(–1.55)*	0.14**	*(2.35)*
Lagged Housing Prices (–2)	0.19***	*(3.41)*	0.02	*(0.38)*
Lagged Stock Prices (–1)	–0.11***	*(–5.93)*	0.03***	*(2.95)*
Lagged Stock Prices (–2)	0.08***	*(3.07)*	0.05***	*(4.65)*
Transition Function				
Transition variable/par	Aggregate Wealth (–4)		Aggregate Wealth (–1)	
a_1	2.91***	*(3.37)*	3.21***	*(4.66)*
a_2	0.65	*(0.67)*	2.47***	*(3.21)*
b_1	38.0**	*(2.22)*	–18.60**	*(–2.21)*
b_2	24.80*	*(1.67)*	–7.95	*(–1.04)*
Linearity Tests				
Statistics and *p*-value	7.14**	*(0.03)*	6.22**	*(0.04)*

Note: ***, **, * statistical significance at 1 per cent, 5 per cent and 10 per cent. *t*-values in square brackets. *p*-values in parenthesis.

Table 1c

UK: Changes in Cyclical and Cyclically-adjusted Tax Revenues

(annualized quarter-on-quarter changes, percent)

Contributions							
	Cyclical Revenue	**Lagged Revenue**	**GDP**	**Debt**	**Stock Price**	**House Price**	**CAR**
1978-80	4.22	4.31	0.65	1.02	–0.40	–1.35	7.75
1981-85	–3.18	–3.14	–0.21	–0.49	0.23	0.42	1.39
1986-90	–0.36	–1.20	–0.03	0.41	0.09	0.36	–8.27
1991-95	7.35	9.03	–0.39	–0.82	–0.10	–0.33	–2.68
1996-2000	–3.67	–3.92	0.14	0.20	–0.15	0.07	2.93
2001-07	–1.65	–1.99	–0.01	0.23	0.10	0.02	0.47

Note: CAR: cyclically-adjusted revenues (adjustment related to output and asset price fluctuations).

Table 1d

UK: Changes in Cyclical and Cyclically-adjusted Primary Spending

(annualized quarter-on-quarter changes, percent)

Contributions							
	Cyclical Spending	**Lagged Spending**	**GDP**	**Debt**	**Stock Price**	**House Price**	**CAS**
1978-80	–1.19	4.61	–2.82	–1.31	–0.10	–1.58	–3.28
1981-85	–0.05	–1.28	0.67	0.97	–0.75	0.34	2.49
1986-90	2.76	2.36	–0.28	–0.33	0.19	0.82	–1.21
1991-95	–2.34	–3.04	0.85	0.54	0.12	–0.81	6.86
1996-2000	1.42	2.50	0.01	–0.52	–0.31	–0.26	–7.75
2001-07	0.47	0.35	0.78	–0.47	–0.23	0.04	4.84

Note: CAS: cyclically-adjusted revenues (adjustment related to output and asset price fluctuations).

Table 1e

UK: Changes in Cyclically-adjusted Fiscal Balance

(annualized quarter-on-quarter changes, percent)

	Cyclical Spending	**Cyclical Revenues**	**Cyclical Balance**	**Structural Spending**	**Structural Revenues**	**Structural Balance**	**SP**	**HP**	**GDP**
1978-80	–1.19	4.22	5.41	–3.28	7.75	11.03	–	+	+
1981-85	–0.05	–3.18	–3.13	2.49	1.39	–1.1	+	+	–
1986-90	2.76	–0.36	–3.12	–1.21	–8.27	–7.06	–	–	+
1991-95	–2.34	7.35	9.69	6.86	–2.68	–9.54	–	+	–
1996-2000	1.42	–3.67	–5.09	–7.75	2.93	10.68	+	+	+
2001-07	0.47	–1.65	–2.12	4.84	0.47	–4.37	+	–	–

Note: +, – indicate that the contribution of a given variable to changes in cyclical balance is positive, respectively negative.

Figure 1a

UK: Regime 1 for Taxes and Wealth Growth

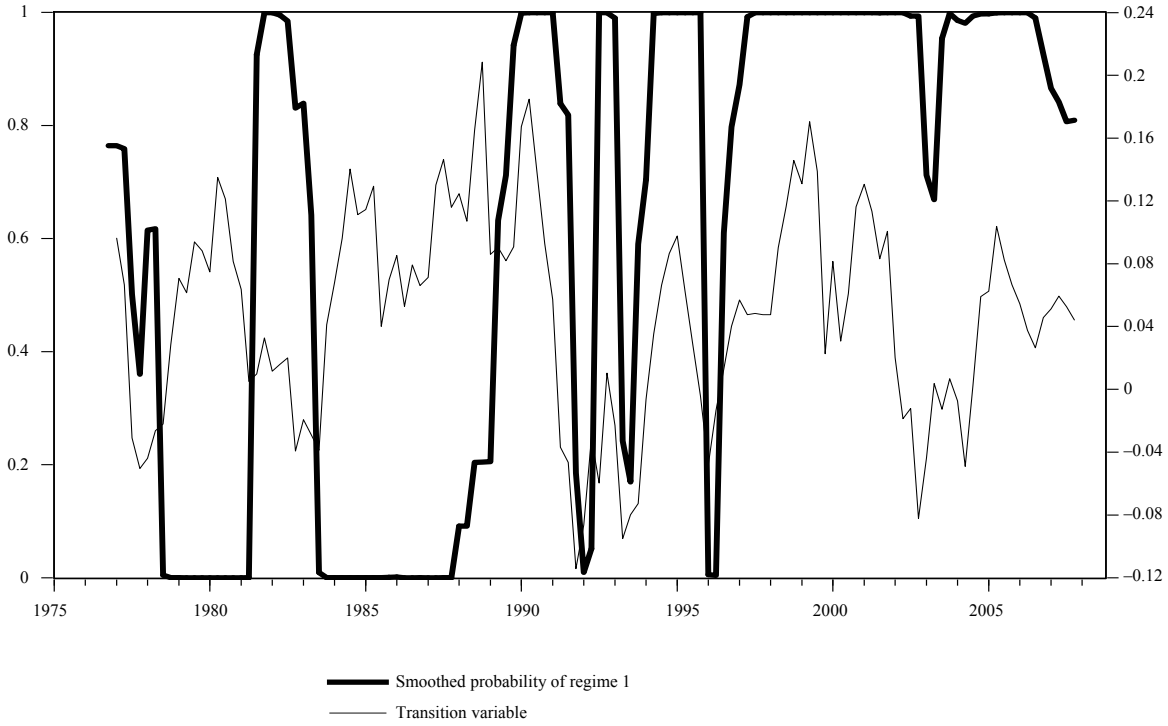
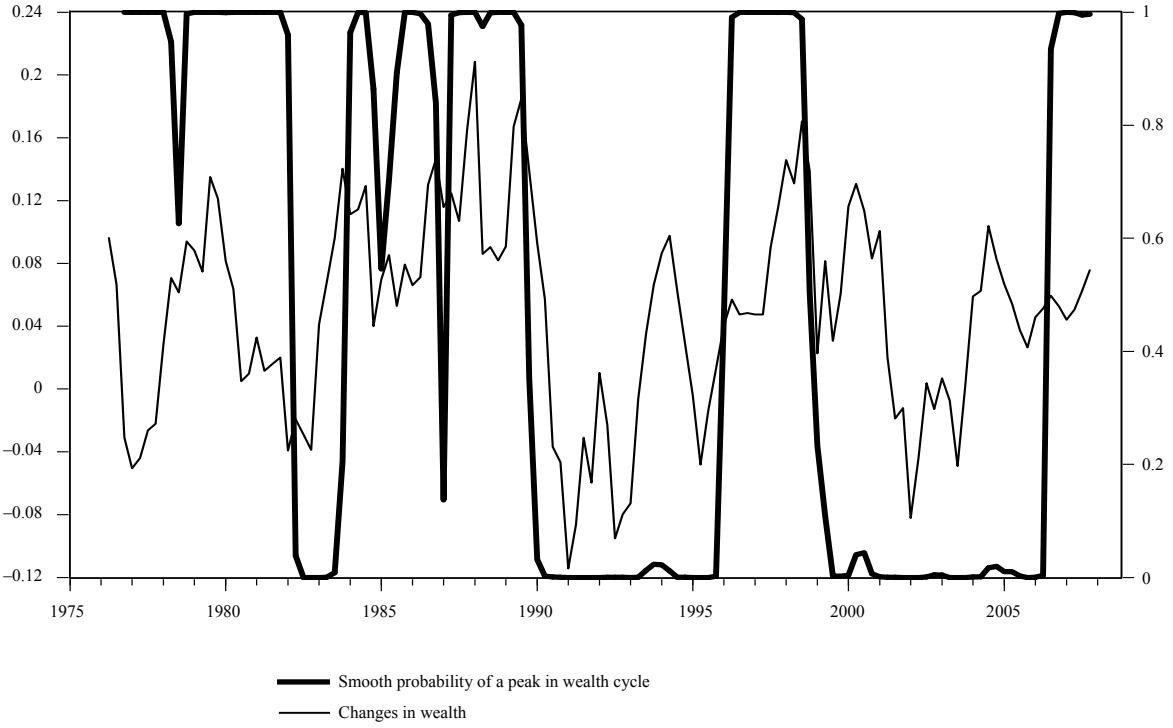


Figure 1b

UK: Regime 2 for Spending and Wealth Growth



0.04). The size of the effects of changes in housing prices is quite the same (0.19 for revenues and 0.14 for primary spending).

Low revenues and spending are positively correlated with the changes in housing prices, but the variations of the former are lower when compared with the latter (the total elasticity is 0.19 for tax receipts, but only 0.09 for primary spending).[1] Turning to the elasticities of revenues with respect to stock prices, we find that a positive immediate effect (0.08) is reversed over time (–0.11). One explanation may be that, during the downturns of the wealth cycle, revenues are very sensitive to the second round effects of changes in the stock market prices. A drop in stock prices reduces fiscal revenues. But since this happens at a trough of the wealth cycle, investors may expect future stock price increases and may thereby increase the size of their portfolio which raises tax revenues. Therefore, the bulk of the responsiveness of tax revenues to changes in stock prices seems to be generated by these second round effects. On the spending side, changes in stock price always involve a positive correlation (0.03).

One implication of the above observations is that relapses in the housing prices are likely to yield a deterioration of the fiscal balance that could be more accentuated in the troughs of the aggregate wealth cycle than at the peaks. A weak responsiveness of fiscal balance to changes in stock prices is expected at the troughs of the wealth cycle (a negative total effect of –0.03 for tax revenues compensates the positive effect of 0.03 on spending). Conversely at the peaks, an improvement of fiscal balance is to be expected following stock price relapses due to the strongest responsiveness of spending (0.08) as compared with that of revenues (0.04).

The elasticities indicate what could happen in terms of reaction of revenues and spending to changes in asset prices in different phases of the aggregate wealth cycle. A further question is: how likely are changes in phases to occur (from troughs to peaks or vice versa)? This question is important because the asset cycles are more volatile than the output cycle, thereby implying a potential more "volatile" fiscal balance. Indeed, the degree of sluggishness of the fiscal balance does not only depend upon the size or magnitude of asset price changes, but also upon the degree of persistence of the different regimes. Frequent changes may yield the fiscal authorities to frequently revise their actions to stabilize the asset market, or may render the revenue more buoyant.

The degree of persistence of the different regimes is obtained by computing the maximum marginal probability of staying in or leaving a regime following a one standard deviation in aggregate wealth. This maximum marginal probability change is given by the quantity $q_j = min\{0.25\sigma_z(b_j), 0.5\}$, where σ_z is the standard error of the transition variable (in our case 0.06) and j=1,2. From q_j, one concludes that, following a change of one standard deviation in the transition variable z, the probability of leaving an initial observed regime j is, at most, $p_{ij} = 0.5 - q_j$, $j \neq i$. For taxes, we obtain $p_{21} = 0$, $p_{12} = 0{,}13$, and, for primary spending, we find $p_{21} = 0{,}78$, $p_{12} = 0{,}5$. This implies a high inertia of revenues with regards to regime changes, while, conversely, the correlation between primary spending and asset prices is very sensitive to the aggregate wealth cycle. This is confirmed by the estimates of the coefficients of the lagged dependent variable in Table 1b. The coefficients are not significant in the case of spending, while they are highly significant and high in magnitude for revenues.

Changes in the cyclical and permanent components of revenues and spending are presented in Tables 1c and 1d. Table 1e shows the corresponding changes in fiscal balance. We apply the estimated elasticities from the TVPMS model to gap measures of the exogenous variables that enter the revenues and spending equations. We consider deviations of the variables from their long-run

[1] 0.09 is computed as the sum of the coefficients of the two lags for housing price changes, that is 0.20-0.11. For revenue, we only consider the coefficients of the lag which is statistically significant.

components captured by a HP filter. Changes are measured as annualized changes of a quarter to quarter point differences. We also report the permanent tax receipts and spending obtained by netting out the observed revenues and primary spending from the influence of the exogenous variables. We consider the average over different sub-periods.

The tables show that adjustments beyond the output gap may be warranted since changes in asset prices exert a significant influence on the cyclical revenues and spending. Comparing the contribution of the GDP and housing/stock prices, we observe that the coefficients are of the same magnitude, and sometimes higher. Therefore, the revenues or spending derived from financial and housing asset are not negligible and have an impact on the fiscal position. Data in the tables are read as follows. For instance, over the years 1978-80, the fiscal balance has increased by 5.41 per cent on average. Housing price changes are estimated to have a contribution of 0.23 per cent (e.g., –1.35 per cent–(–1.58 per cent)), while the contribution of stock prices is negative by –0.30 per cent (e.g. –0.40 per cent–(–10 per cent)). The contribution of the GDP is quite large with a magnitude of 3.57 per cent (0.65 per cent–(–2.82 per cent). In Table 1e we report the sign of the contributions of the housing price, stock prices and GDP to the changes in the cyclical balance over different sub-periods. The run-up or run-down in fiscal balance is either related to changes in the same direction of the asset prices, or works in the opposite direction of the effect of the GDP therefore contributing to dampen the reaction of revenues and spending to output fluctuations.

As far as the effort required to maintain debt on a sustainable level is concerned (captured here by the sign of the "structural" balance), it seems that the fiscal balance would not rapidly revert to an equilibrium level after a degradation (except during the interlude 1996-2000) since the "structural" balance diminishes even when the cyclical balance is negative. We observe that this does not happens over the years 1996-2000 when both the house and asset prices contributes positively to the dynamics of the cyclical fiscal balance. We can therefore presuppose the reaction of the governments to the asset cycles was part of the discretionary policy.

3.2 Spain

The results from the estimation for Spain are reported in Tables 2a and 2b. As for the other countries, we see that the linear model performs poorly, since many non-significant variables become significant once the asymmetry of the asset cycles is taken into account in a TVPMS equation. The statistics of the linearity tests indicates that aggregate wealth is a good predictor of the changing effects of the housing and stock prices on tax receipts and spending. Indeed, the estimated significance level of the tests is below 0.05, which yields to reject the null hypothesis that aggregate wealth is uninformative of the dynamics of revenues and spending. The output highly affects revenues with a total elasticity of 1.56. The fiscal balance remains quite unchanged following an increase in the debt ratio, since the latter results in a decrease in both revenues and spending by the same magnitude (0.12 per cent and 0.15 per cent following a 1 per cent increase in the debt ratio).

There is evidence of two regimes in the dynamics of revenues corresponding respectively to a decrease (regime 1 has a negative intercept) and a regime where they pick up (regime 2 with a positive constant). For spending, the model detects two regimes of increasing expenditure, one in which they raises more rapidly than in the other (the estimated constant is twice as high in regime 2 as in regime 1). This implies that they are two potential regime generating processes for fiscal balance: one related to a huge deterioration of fiscal balance (due to the combination of cuts in revenues and increasing spending) and the other characterized by a moderate degradation with spending increasing on average faster than revenues.

Table 2a

Spain: Linear Models

	Taxes				Primary Spending			
	(1)		(2)		(3)		(4)	
Constant	–0.005	*(–0.22)*	–0.006	*(–0.03)*	0.03	*(0.98)*	0.03	*(1.25)*
Lagged Output (–1)	–0.713	*(–0.72)*	0.198	*(0.19)*	–0.59	*(–0.55)*	0.35	*(0.28)*
Lagged Output (–2)	1.09	*(1.14)*	0.66	*(0.69)*	0.04	*(0.04)*	–0.39	*(–0.35)*
Lagged Dep. Var.	0.287**	*(2.29)*	0.15	*(1.14)*	0.235*	*(1.82)*	0.09	*(0.64)*
Lagged Public Debt (–1)	–0.28	*(–1.02)*	–0.50	*(–1.53)*	0.22	*(0.71)*	0.12	*(0.33)*
Lagged Public Debt (–2)	0.41	*(1.53)*	0.34	*(1.18)*	–0.36	*(–1.12)*	–0.54	*(–1.64)*
Lagged Housing Prices (–1)	-	-	–0.92	*(–1.56)*	-	-	–1.07	*(–1.59)*
Lagged Housing Prices (–2)	-	-	0.48	*(0.77)*	-	-	0.54	*(0.77)*
Lagged Stock Prices (–1)	-	-	0.36**	*(2.45)*	-	-	0.25	*(1.39)*
Lagged Stock Prices (–2)	-	-	–0.26*	*(–1.88)*	-	-	–0.19	*(–1.12)*
R^2	0.05		0.12		0.02		0.04	
Log-likelihood	65.20		69.82		58.74		61.68	

Note: ***, **, * statistical significance at 1 per cent, 5 per cent and 10 per cent. *t*-values in square brackets.

Table 2b

Spain: TVP-MS Models

	Taxes		Primary Spending	
Non–Switching Parameters				
Lagged Output (–1)	0.32	*(0.46)*	–0.79	*(–1.41)*
Lagged Output (–2)	1.24**	*(2.32)*	–0.35	*(–0.65)*
Lagged Public Debt (–1)	–0.99***	*(–5.69)*	0.29*	*(1.72)*
Lagged Public Debt (–2)	0.67***	*(4.24)*	–0.44**	*(–2.36)*
σ	0.05***	*(9.73)*	0.05***	*(11.86)*
Switching Parameters				
	Regime 1 (*S*=1) Decreases in tax revenues		Regime 1 (*S*=1) Moderate increases in spending	
Constant	–0.04***	*(–3.42)*	0.03***	*(2.62)*
Lagged Dependent Var.	–0.12	*(–1.44)*	–0.26**	*(–1.82)*
Lagged Housing Prices (–1)	–0.52*	*(–1.78)*	–0.70**	*(–2.24)*
Lagged Housing Prices (–2)	0.29	*(1.01)*	0.24	*(0.71)*
Lagged Stock Prices (–1)	0.06	*(0.91)*	0.31***	*(3.63)*
Lagged Stock Prices (–2)	0.24***	*(3.37)*	–0.44***	*(–4.60)*
	Regime 2 (*S*=2) Increases in tax revenues		Regime 2 (*S*=2) Higher increases in spending	
Constant	0.03*	*(1.94)*	0.06***	*(3.93)*
Lagged Dependent Var.	0.07	*(0.35)*	–0.40***	*(–3.24)*
Lagged Housing Prices (–1)	–0.31	*(–0.54)*	–0.68	*(–1.12)*
Lagged Housing Prices (–2)	0.23	*(0.41)*	0.25	*(0.38)*
Lagged Stock Prices (–1)	0.41***	*(4.05)*	–0.04	*(–0.34)*
Lagged Stock Prices (–2)	–0.66***	*(–6.38)*	0.63***	*(5.75)*
Transition Function				
Transition Variable/par	Aggregate Wealth (–3)		Aggregate Wealth (–2)	
a_1	0.23	*(0.41)*	0.23	*(0.43)*
a_2	–0.49	*(–0.69)*	–5.18*	*(–1.75)*
b_1	26.88**	*(2.01)*	8.79	*(1.25)*
b_2	–22.45	*(–1.37)*	54.29*	*(1.87)*
Linearity Tests				
Statistics and *p*-value	6.12**	*(0.04)*	7.36**	*(0.03)*

Note: ***, **, * statistical significance at 1 per cent, 5 per cent and 10 per cent. *t*-values in square brackets. *p*-values in parenthesis.

Both housing and stock prices explains episodes of decreasing tax receipts, while increasing revenues are related to stock prices only. Indeed, no significant coefficient for housing prices is found in regime 2. In regime 1, a steep drop in revenues can be observed in spite of house price increases, as indicated by the high negative coefficient (high relative to the other estimated coefficients in the same regime) of –0.52. The fact that housing price increases do not initiate a change in revenues is the consequence of significant lags between market values and assessed values of housing. This also reflects the concomitance of ascending price in the real estate sector and the policy makers' actions to reduce taxes related to the housing sector in order to support the building sector. The contractions in tax revenues seem to be driven by the stock market (as we obtained a positive coefficient of 0.24 in regime 1).

The stock price effects in the second regime are globally negative. Revenues are firstly negatively correlated with increases in the stock prices (the elasticity is –0.66) and then turn to be positive during the subsequent quarter (0.41). This dynamic effect can be easily explained because taxes are paid on accrued gains only. In a rising market, investors wait before taking the decision to sell their assets. On the contrary, in a falling market, they wait before deciding whether or to buy new assets. Because of this timing delay, over the asset cycle, increasing prices can result in reduced taxable gains.

Stock prices changes are negatively correlated with "moderate" increases in spending and positively correlated with stronger increases in spending. The total effects are indeed respectively equal to –0.14 and 0.63. Assume a situation of stock price decline yielding to a balance sheet deterioration of financial and corporate sectors. Our estimates suggest that, this burdens the government's budget (for instance through support measures to these sectors). The Government therefore adopts counter-cyclical actions to dampen the negative effects of the asset cycle, provided that this leads a moderate increase in spending. When spending growth too rapidly (regime 2), the policy tends to be pro-cyclical: no measure is undertaken to curb stock price decreases, but primary spending are adjusted downward (which leads to suppose that, if there are options for limiting any drop in stock prices, these operate through the revenue channel). The policy reaction to a drop in housing prices is also counter-cyclical in regime 1 (with an estimated elasticity of –0.70). Conversely, in regime 2 spending are not reactive to any change in the housing price cycle (no statistically significant coefficients are found).

The maximum marginal probabilities of regime shifts are, for revenues, $p_{12} = 0.5$ and $p_{21} = 0.16$ and for spending, $p_{12} = 0$ and $p_{21} = 0.5$. This implies that there is a low likelihood of switching from a regime of decreasing tax revenues, while, if the economy is initially in a regime of increasing revenues, there is no clear evidence that it will continue to evolve in the same regime (the probability is 0.5). We accordingly conclude that the regime in which the revenues fall is likely to appear more frequently. This implies two types of episodes in terms of the dynamics of fiscal balance. At best, a boom in the housing and stock markets will slow the decrease in revenues as well as the raising spending. At worst, a drop or a bubble burst will accentuate the degradation of revenues while rising primary spending, thereby causing a strong deterioration of the fiscal balance.

The estimates in Table 2e show that after improving during the years 1993-96, the cyclical fiscal balance has deteriorated in the course of the subsequent years. The deterioration relies on a progression of taxes below that of spending, or is based on revenues decaying faster than spending. The associate changes in house and stock prices suggest that the cyclical revenue increases during the first three years were positively affected by the dynamics of house and price changes (during the years 1993-96 bull markets were registered), that the lowering revenues were associated with a negative contribution of at least one asset between 1997 and 2004, and that the shortfall in revenues over the years 2005-07 was rather correlated with the negative contribution of the GDP. The positive signs of the contributions suggest that the bullish stock and house market may

Table 2c

Spain: Changes in Cyclical and Cyclically-adjusted Tax Revenues
(annualized quarter-on-quarter changes, percent)

	Contributions						
	Cyclical Revenues	**Lagged Revenue**	**GDP**	**Debt**	**Stock Price**	**House Price**	**CAR**
1993-96	7.76	10.96	–4.04	7.36	–8.04	1.6	–5.64
1997-2000	–2.24	–7.16	0.56	0.8	3.68	–0.36	–0.68
2000-04	6.68	7.32	3.24	–0.08	–3.64	–0.24	–29.4
2005-07	–8.76	–9.48	–1.56	0.96	2.88	–1.56	18.72

Note: CAR: cyclically-adjusted revenues (adjustment related to output and asset price fluctuations).

Table 2d

Spain: Changes in Cyclical and Cyclically-adjusted Primary Spending
(annualized quarter-on-quarter changes, percent)

	Contributions						
	Cyclical Spending	**Lagged Spending**	**GDP**	**Debt**	**Stock Price**	**House Price**	**CAS**
1993-96	0.88	1.48	0.008	1.64	–2.72	0.44	12.28
1997-2000	–1.48	–6.64	0.08	–1.84	6.2	–1.48	–9.76
2001-04	9.2	4.84	–0.12	0.68	2.96	1.00	–15.92
2005-07	–6.44	2.2	0.08	–0.96	–4.72	–3.00	–4.2

Note: CAS: cyclically-adjusted revenues (adjustment related to output and asset price fluctuations).

Table 2e

Spain: Changes in Cyclical and Cyclically-adjusted Fiscal Balance
(annualized quarter-on-quarter changes, percent)

	Cyclical Spending	**Cyclical Revenues**	**Cyclical Balance**	**Structural Spending**	**Structural Revenues**	**Structural Balance**	**SP**	**HP**	**GDP**
1993-96	0.88	7.76	6.88	12.28	–5.64	–17.92	+	+	–
1997-2000	–1.48	–2.24	–0.76	–9.76	–0.68	9.08	–	+	+
2001-04	9.2	6.68	–2.52	–15.92	–29.4	–13.48	–	–	+
2005-07	–6.44	–8.76	–2.32	–4.2	18.72	22.92	+	+	–

Note: +, – indicate that the contribution of a given variable to changes in cyclical balance is positive, respectively negative.

have contributed to dampen the declining trend of revenues. Compared with the case of UK, it is seen that the adjustment needed to keep debt on a sustainable path is stronger in Spain. Further that real estate and capital gain revenue were probably not used as buffer during the "good" years (for instance between 1993 and 1996) since the "structural balance" is strongly negative.

3.3 Italy and France

Tables 3a and 3b list the estimation for Italy. The statistics of the linearity test suggest that we cannot reject the null hypothesis that the primary spending are better described by a linear model, since the significance level of the test lies above 0.05.We therefore focus our comments on revenues. Figures 3a and 3b show that what the model identifies as regimes 1 and 2 can be related to the turning points of the asset price cycles. There is evidence that regime 1 corresponds to the peaks of the stock price cycle and regime 2 to the troughs. Further, we see that the estimated constants in regimes 1 and 2 are respectively negative and positive. Since the endogenous variable captures quarter-to-quarter changes, the model thus dichotomizes into one regime in which the revenues decrease after achieving a high level and one in which the increase after reaching a bottom. How variations in tax receipts are related to changes in housing prices is less evident (Figure 3b).

Table 3a

Italy: Linear Models

	Taxes				**Primary Spending**			
	(1)		(2)		(3)		(4)	
Constant	–0.006	*(–0.35)*	–0.005	*(–0.29)*	–0.09**	*(1.97)*	–0.09*	*(–1.78)*
Lagged Output (–1)	2.21**	*(2.00)*	2.31**	*(2.04)*	1.53	*(0.53)*	1.56	*(0.50)*
Lagged Output (–2)	–0.72	*(–0.68)*	–0.89	*(–0.83)*	0.75	*(0.26)*	0.65	*(0.22)*
Lagged Dep. Var.	–0.03	*(–0.28)*	–0.09	*(–0.82)*	0.50***	*(5.33)*	0.49***	*(4.94)*
Lagged Public Debt (–1)	1.04	*(1.33)*	0.81	*(1.01)*	1.66	*(0.79)*	1.66	*(0.74)*
Lagged Public Debt (–2)	–1.09	*(–1.40)*	–0.82	*(–1.02)*	–0.77	*(–0.37)*	–0.77	*(–0.35)*
Lagged Housing Prices (–1)	-	-	0.01	*(0.16)*	-	-	–0.06	*(–0.25)*
Lagged Housing Prices (–2)	-	-	–0.07	*(–0.94)*	-	-	0.04	*(0.21)*
Lagged Stock Prices (–1)	-	-	0.80	*(1.56)*	-	-	0.01	*(0.008)*
Lagged Stock Prices (–2)	-	-	–0.73	*(–1.43)*	-	-	–0.008	*(–0.006)*
R^2	0.02		0.03		0.32		0.28	
Log-likelihood	86.06		88.67		4.39		4.43	

Note: ***, **, * statistical significance at 1 per cent, 5 per cent and 10 per cent. *t*-values in square brackets.

Table 3b

Italy: TVP-MS Models

	Taxes		Primary Spending	
Non-switching Parameters				
Lagged Output (–1)	2.86***	*(4.73)*	–0.34	*(–0.28)*
Lagged Output (–2)	0.01	*(0.03)*	2.10*	*(1.86)*
Lagged Public Debt (–1)	1.17**	*(2.54)*	2.19**	*(2.28)*
Lagged Public Debt (–2)	–1.68***	*(–3.58)*	–0.66	*(–0.71)*
σ	0.05***	*(10.75)*	0.11***	*(17.33)*
Switching Parameters				
Regime 1 (*S*=1) Fall in Revenues at the Peaks of the Stock Price Cycle				
Constant	–0.08***	*(–9.64)*	–0.05***	*(–4.55)*
Lagged Dependent Var.	–0.23**	*(–2.30)*	–0.09	*(–1.20)*
Lagged Housing Prices (–1)	–0.35	*(–1.29)*	0.04	*(0.73)*
Lagged Housing Prices (–2)	0.76***	*(2.73)*	0.60**	*(2.42)*
Lagged Stock Prices (–1)	0.07*	*(1.68)*	–0.05	*(–0.89)*
Lagged Stock Prices (–2)	–0.13**	*(–2.33)*	0.04	*(0.73)*
Regime 2 (*S*=2) Upward-oriented Revenues at the Troughs of the Stock Price Cycle				
Constant	0.07***	*(8.99)*	–0.46	*(–1.10)*
Lagged Dependent Var.	–0.48***	*(–4.99)*	–0.01	*(–0.09)*
Lagged Housing Prices (–1)	0.77***	*(3.25)*	57.39***	*(5.48)*
Lagged Housing Prices (–2)	–0.88***	*(–3.67)*	–47.73***	*(–5.75)*
Lagged Stock Prices (–1)	–0.07	*(–1.40)*	1.77	*(1.26)*
Lagged Stock Prices (–2)	0.16***	*(3.59)*	–7.62***	*(–3.39)*
Transition Function				
Transition variable/par	Aggregate Wealth (–1)		Aggregate Wealth (–1)	
a_1	–1.79***	*(–2.77)*	5.23***	*(2.60)*
a_2	–1.70**	*(–2.47)*	3.43	*(1.03)*
b_1	23.11**	*(1.98)*	–15.20	*(–0.48)*
b_2	29.96**	*(2.53)*	–52.63	*(–0.83)*
Linearity Tests				
Statistics and *p*-value	5.27*	*(0.07)*	0.62	*(0.73)*

Note: ***, **, * statistical significance at 1 per cent, 5 per cent and 10 per cent. *t*-values in square brackets. *p*-values in parenthesis.

Table 3c

Italy: Changes in Cyclical and Cyclically-adjusted Tax Revenues

(annualized quarter-on-quarter changes, percent)

	Contributions						
	Cyclical Revenues	**Lagged Revenue**	**GDP**	**Debt**	**Stock Price**	**House Price**	**CAR**
1989-95	–2.39	2.02	–2.06	0.06	–1.38	–1.03	2.24
1996-99	1.63	–1.68	7.06	–1.00	–2.72	–0.008	18.53
2000-03	3.51	1.07	–0.31	0.95	1.35	0.44	9.49
2004-07	–8.39	–2.83	–3.58	–0.69	–1.43	0.14	6.10

Note: CAR: cyclically-adjusted revenues (adjustment related to output and asset price fluctuations).

Figure 3a

Italy: Regime 2 for Taxes and Stock Price Changes

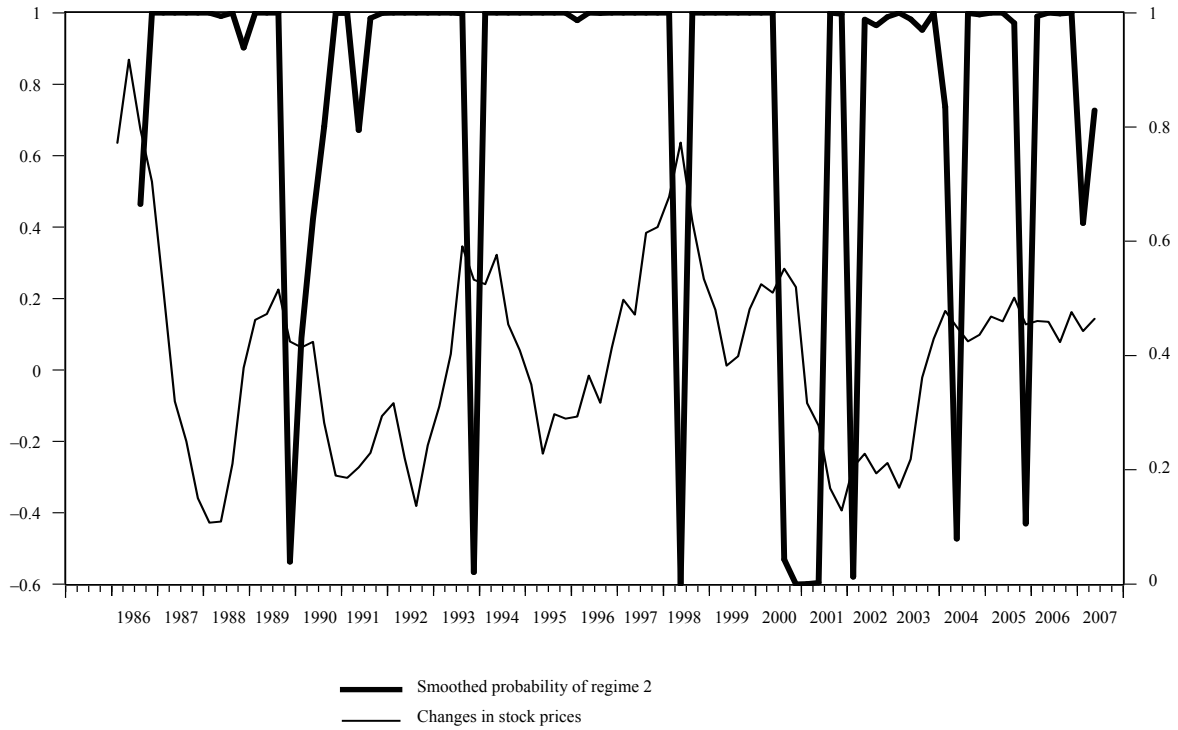
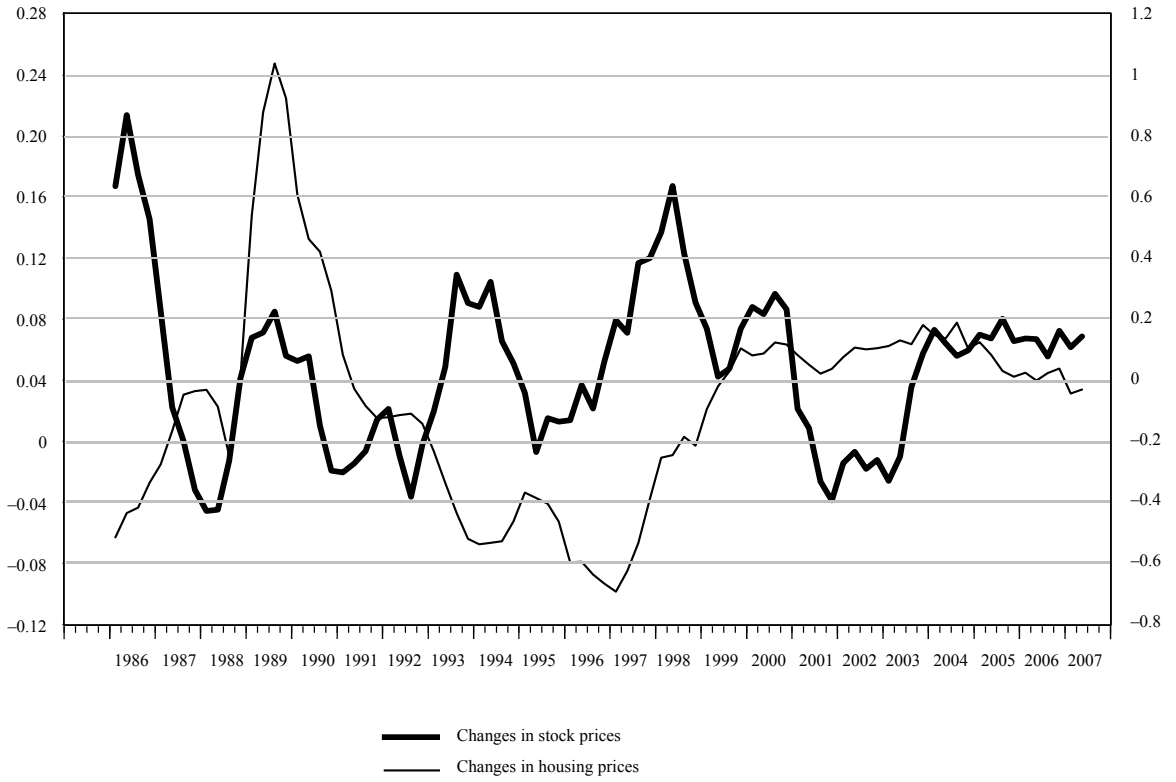


Figure 3b

Italy: Regime 2 for Taxes and Housing Price Changes

Figure 3c

Italy: House and Stock Market Cycles



An important feature is the information conveyed by the aggregate wealth variable when the stock price is evolving near its cyclical peaks (regime 1). This raises the probability of observing an overshoot of prices and therefore increases the probability of a bubble burst with a drop in revenues. The positive sign of b_1 can be viewed as evidence that wealth increases at the peaks of the stock price cycle is informative about the likelihood of the revenues to fall deeply. Similarly, any wealth increase at the troughs of the stock price cycle fuels forthcoming price increases and an upward trend in revenues. This is consistent with the positive sign of the coefficient b_2. It is accordingly found that an increase in the stock price is overall negative in regime 1 with an elasticity of –0.06 (e.g., 0.07 – 0.13), and conversely positive in regime 2 (with the sum of the estimated lagged coefficients equal to 0.09). However, the fall or increase in revenues occurring in either regime or the other may be dampened by the influence of the development in the housing prices. Indeed, it is seen that the sum of the house price coefficient carries an opposite sign to the sum of the coefficients of stock price in each regime. This reveals that, in Italy, the real estate and stock market cycles do not necessarily impact the fiscal revenues in the same direction, which could be explained by the fact that there is no synchronization between their cycles (as suggested by Figure 3c).

As regards the other influences, we find that the GDP strikingly positively affect the revenues, while there seems to be a substitution between revenues and debt (the sum of the lagged coefficients is negative).

Table 3c shows the impact of different changes patterns of the explanatory variables on the cyclical and cyclically-adjusted revenues. It is seen that, in general, the revenues swings is related

to the stock price cycle. Temporary tax buoyancy arises from higher asset prices (and the converse) and its influence overweighs that of the housing prices (the contributions are, in absolute value, of a higher magnitude). Furthermore, it is seen that governments seem to act in such a way that structural fiscal policy maintain the debt ratio on a sustainable path, as reflected by the positive variations in the cyclically-adjusted revenues, whether or not the cyclical component fall or augments.

We finally proceed to comment upon the estimated results for France. Tables 4a and 4b list the estimates. As is suggested by Figure 4a, the estimated probabilities yield to a distinction between two regimes of revenue changes characterized by upturns (regime 1) and downturns (regime 2) of the stock price cycle. The main difference with Italy comes from the fact that the data yield to a distinction between two regimes of decreasing revenues (as reflected by the negative signs of the intercept). Regime 1 refers to huge drops, while regime 2 characterizes more moderate revenue falls. An increase in the stock prices at the upturns of the price cycles results into a reduction of tax receipts (we find a negative coefficient of –0.39), while when the increase happens at a downturn of the cycle, governments can reached higher revenues (as illustrated by the positive coefficient of 0.30. As for the Italian case, the effects of stock prices on revenues are tempered by those of the housing prices, but only in regime 1 where the dynamics of revenues is characterized by high falls the sum of the estimated coefficients for house prices equals 0.96). In regime 2, the influence of the house price works in the same direction from that of the stock price.

It seems that the TVPMS model also helps identify one regime related to high falls in aggregate wealth (with troughs) associated with a positive response of the primary spending (positive intercept in regime 1). This suggests that there is a discretionary spending policy response to aggregate wealth decreases (se also Figure 4b). The signs of the estimated coefficients indicate that governments increase spending when stock price falls (the sum of the elasticities in regime 1 is negative and around –0.23) and reduce them otherwise (the sum of the coefficients equals 0.14 in regime 2). As in the Italian case, the response to the changes in the house price operates in the opposite direction from that of the stock prices

Changes in aggregate wealth provide a signal with regards to predicting a shift in the revenue policy from a state of moderately decreasing tax receipts to highly decreasing taxes. Although this may appear counter-intuitive at first glance (normally, we would expect these changes to fuel raises in stock prices and thus to increase revenues). But this result can be explained as follows. In France, taxes on gains from investments in the real estate has generally been more advantageous, since many years, compared those on gains from equity investments. When a rise in stock prices happens, investors may be hesitant before buying new assets until the increase is really confirmed. In addition, as shown in Figure 4c, the turning points of the asset and housing price cycles are not synchronized. Therefore, the reaction of investors to an increase in wealth is the result of how they react to both cycles. A trough in the price cycle may correspond to a peak the house price cycle, thereby implying a fall in revenue because investors get rid of their assets in the real estate market.

Tables 4c, 4d and 4e report the results of the cyclical and cyclically-adjusted revenues and spending for France. Unlike the other countries, all the variables that influence governments' decision to raise or reduce spending and taxes are found to induce sharper fluctuations in the cyclical revenues and spending. We find that, in general, burst phases in the stock and housing markets coincide with deteriorating cyclical fiscal balances (in Table 4e, the changes in the cyclical balance and stock/housing prices carry the same sign, except over the years 1993-96). Fiscal cyclical balances tend to improve during the boom phases (see Table 4e, where the signs are positive). A procyclical expenditure reduction effort is observed during in times of falling prices. Finally, it is seen that cyclical and structural fiscal balances evolve in opposite directions, thereby indicating that governments have adopted sustainable fiscal policies.

Table 4a

France: Linear Models

	Taxes				Primary Spending			
	(1)		(2)		(3)		(4)	
Constant	–0.24***	*(–3.47)*	–0.28***	*(–3.57)*	–0.16*	*(–1.71)*	–0.19*	*(1.84)*
Lagged Output (–1)	6.46**	*(2.36)*	9.73***	*(3.32)*	3.85	*(1.08)*	9.22**	*(2.35)*
Lagged Output (–2)	–0.75	*(–0.68)*	–0.68	*(–0.26)*	0.76	*(0.21)*	–1.06	*(–0.29)*
Lagged Dep. var	–0.13***	*(–2.83)*	–0.23*	*(–1.81)*	0.15	*(1.12)*	0.002	*(0.013)*
Lagged Public Debt (–1)	–0.92	*(–0.99)*	–1.91*	*(–1.92)*	0.46	*(0.35)*	–0.78	*(–0.58)*
Lagged Public Debt (–2)	2.66***	*(2.83)*	3.68***	*(3.77)*	0.55	*(0.42)*	1.89	*(1.42)*
Lagged Housing Prices (–1)	-	-	0.97	*(0.78)*	-	-	–0.62*	*(2.57)*
Lagged Housing Prices (–2)	-	-	–1.31	*(–1.00)*	-	-	0.23	*(0.95)*
Lagged Stock Prices (–1)	-	-	–0.135	*(–0.77)*	-	-	–0.68	*(–0.40)*
Lagged Stock Prices (–2)	-	-	–0.18	*(–1.05)*	-	-	0.10	*(0.06)*
R^2	0.05		0.12		0.02		0.04	
Log–Likelihood	65.20		69.82		58.74		61.68	

Note: ***, **, * statistical significance at 1 per cent, 5 per cent and 10 per cent. *t*-values in square brackets.

Table 4b

France: TVP-MS Models

	Taxes		Primary Spending	
Non–switching Parameters				
Lagged Output (–1)	12.00***	*(6.61)*	15.36***	*(6.19)*
Lagged Output (–2)	–3.98***	*(–2.30)*	–5.93***	*(–3.08)*
Lagged Public Debt (–1)	–2.00***	*(–3.59)*	–3.19***	*(–25.18)*
Lagged Public Debt (–2)	3.86***	*(7.66)*	4.32***	*(18.79)*
σ	0.07***	*(9.61)*	0.09***	*(10.96)*
Switching Parameters				
	Regime 1 (*S*=1) Upturns of the Stock Price Cycle		Regime 1 (*S*=1) Troughs of the Wealth Cycle	
Constant	–0.152***	*(–5.46)*	0.21***	*(–13.38)*
Lagged Dependent Var.	–2.00***	*(–2.80)*	–2.25***	*(–2.14)*
Lagged Housing Prices (–1)	1.44**	*(2.04)*	3.49***	*(2.94)*
Lagged Housing Prices (–2)	–0.48***	*(–3.94)*	–1.25***	*(–7.12)*
Lagged Stock Prices (–1)	–0.03	*(–0.24)*	0.20**	*(2.12)*
Lagged Stock Prices (–2)	–0.39***	*(–4.67)*	–0.43***	*(–3.61)*
	Regime 2 (*S*=2) Downturns of the Stock Price Cycle		Regime 2 (*S*=2) Alternative Regime	
Constant	–0.09***	*(–3.63)*	0.008	*(0.74)*
Lagged Dependent Var.	2.21***	*(2.72)*	–1.94*	*(–1.86)*
Lagged Housing Prices (–1)	–1.74*	*(–2.03)*	0.69	*(–0.69)*
Lagged Housing Prices (–2)	–0.05	*(–0.45)*	–0.48***	*(–5.16)*
Lagged Stock Prices (–1)	0.30**	*(2.54)*	0.54***	*(2.62)*
Lagged Stock Prices (–2)	–0.17	*(–1.34)*	–0.43***	*(–4.13)*
Transition Function				
Transition variable/par	Aggregate Wealth (–1)		Aggregate Wealth (–1)	
a_1	–2.15*	*(–1.82)*	2.38***	*(3.14)*
a_2	0.42	*(0.49)*	0.74	*(1.08)*
b_1	17.18	*(1.24)*	–7.36	*(–0.76)*
b_2	–45.34***	*(–2.58)*	34.86*	*(1.85)*
Linearity Tests				
Statistics and *p*-value	6.64**	*(0.036)*	5.02*	*(0.08)*

Note: ***, **, * statistical significance at 1 per cent, 5 per cent and 10 per cent. *t*-values in square brackets. *p*-values in parenthesis.

Table 4c

France: Changes in Cyclical and Cyclically-adjusted Tax Revenues
(annualized quarter-on-quarter changes, percent)

	Contributions						
	Cyclical Revenues	**Lagged Revenue**	**GDP**	**Debt**	**Stock Price**	**House Price**	**CAR**
1993–96	0.34	–0.51	15.85	–15.64	3.61	–2.96	14.18
1997–99	–12.00	15.82	–16.30	–1.14	–3.54	–6.83	24.24
2000–03	23.09	–5.12	13.26	3.74	6.38	4.81	–2.85
2004–06	–29.12	12.23	–5.10	–12.80	–2.14	–11.42	–2.51

Note: CAR: cyclically-adjusted revenues (adjustment related to output and asset price fluctuations).

Table 4d

France: Changes in Cyclical and Cyclically-adjusted Primary Spending
(annualized quarter-on-quarter changes, percent)

	Contributions						
	Cyclical Spending	**Lagged Spending**	**GDP**	**Debt**	**Stock Price**	**House Price**	**CAS**
1993–96	–18.15	–10.63	29.60	–31.81	–6.87	1.57	21.96
1997–99	–7.37	21.77	–30.91	–3.07	4.46	0.37	16.33
2000–03	20.14	–8.22	25.10	4.86	–3.78	2.18	8.55
2004–06	–17.45	–1.82	–23.96	3.57	10.46	–5.70	–1.69

Note: CAS: cyclically-adjusted revenues (adjustment related to output and asset price fluctuations).

Table 4e

France: Changes in Cyclical and Cyclically-adjusted Fiscal Balance
(annualized quarter-on-quarter changes, percent)

	Cyclical Spending	**Cyclical Revenues**	**Cyclical Balance**	**Structural Spending**	**Structural Revenues**	**Structural Balance**	**SP**	**HP**	**GDP**
1993–96	–18.15	0.34	18.49	21.96	14.18	–7.78	+	–	–
1997–99	–7.37	–12.00	–4.63	16.33	24.24	7.91	–	–	+
2000–03	20.14	23.09	2.95	8.55	–2.85	–11.91	+	+	–
2004–06	–17.45	–29.12	–11.67	–1.69	–2.51	–0.82	–	–	+

Note: +, – indicate that the contribution of a given variable to changes in cyclical balance is positive, respectively negative.

Figure 4a

France: Regime 1 for Taxes and Stock Price Changes

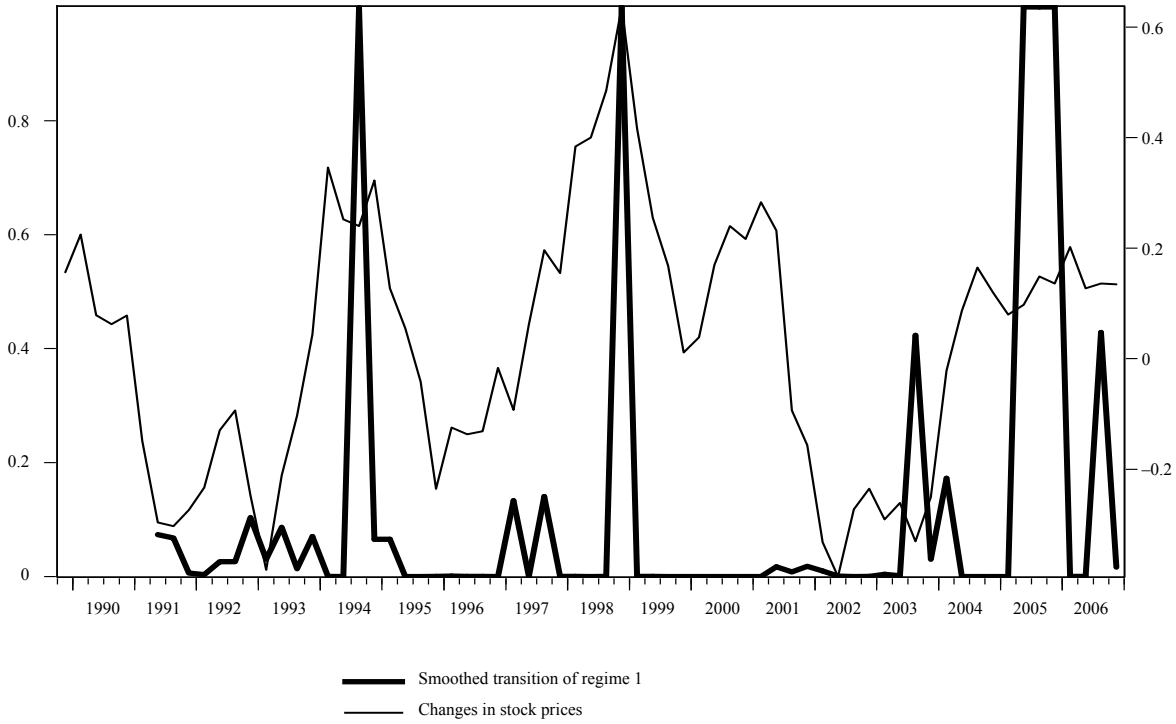


Figure 4b

France: Regime 1 for Spending and Wealth Growth

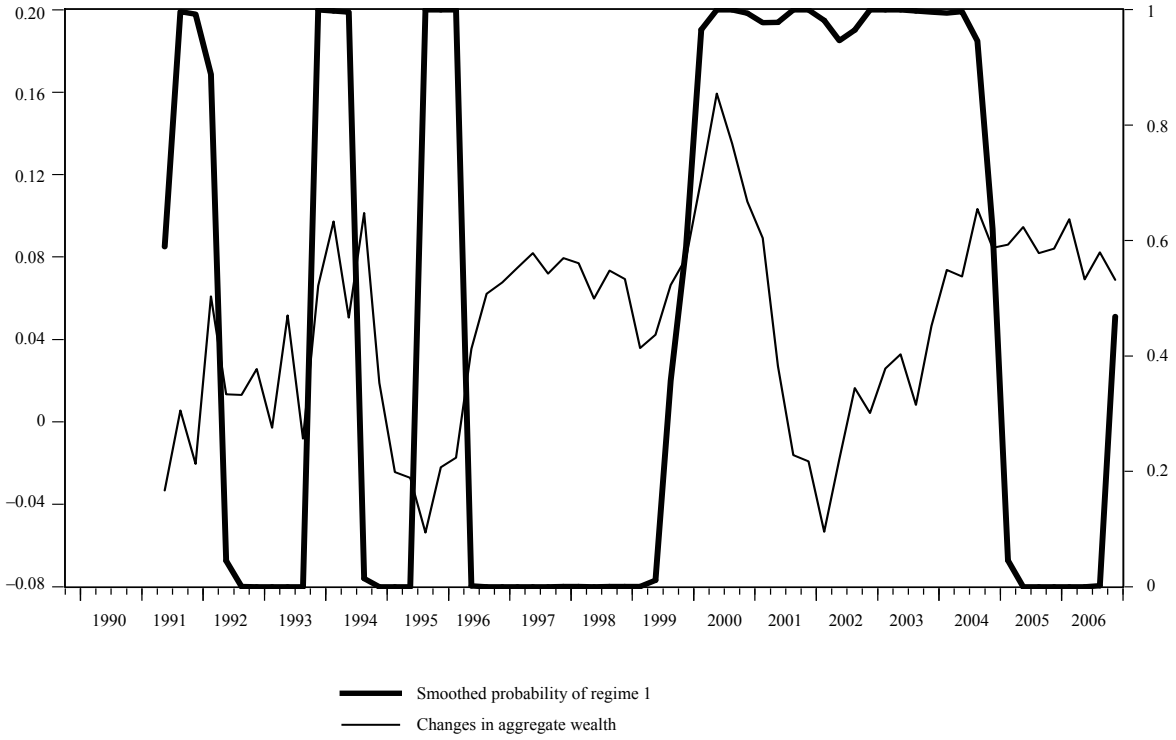
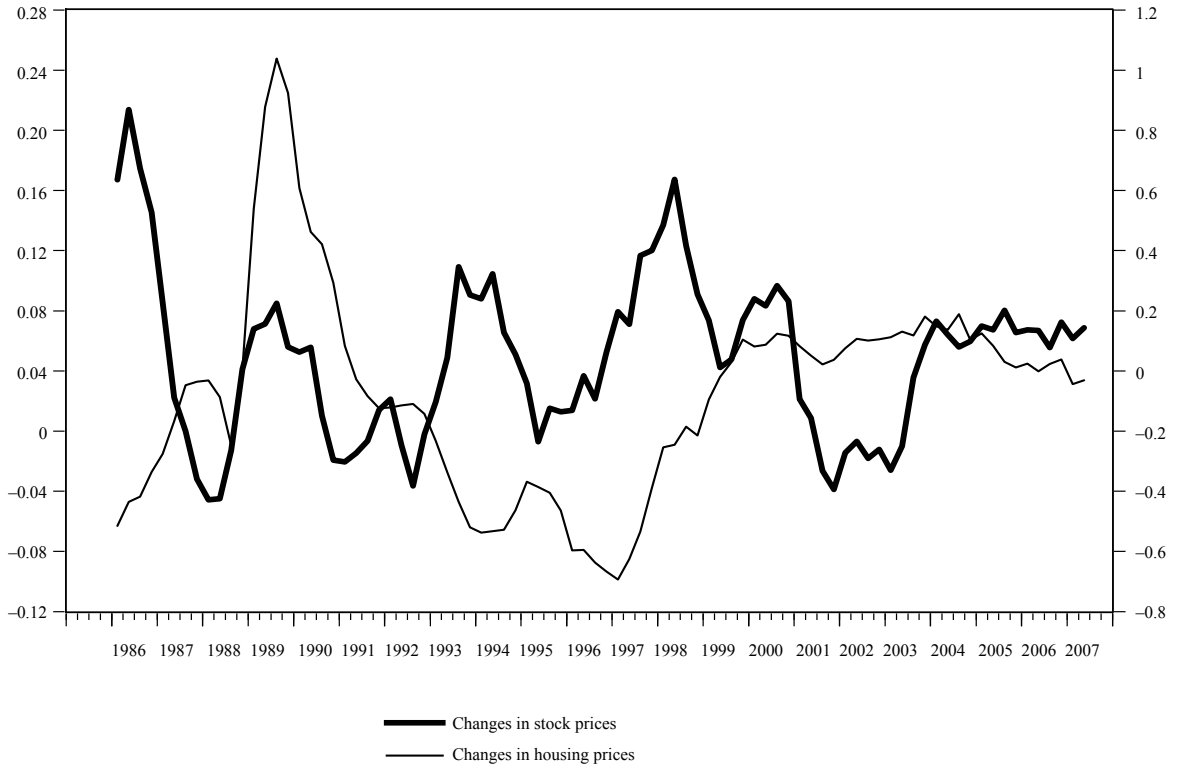


Figure 4c

France: House and Stock Market Cycles



3.4 Summarizing our main findings

We now summarize our main findings by looking at the lessons that can be gleaned from the preceding observations as regards the fiscal policy reactions to the dynamics of the asset price cycles.

A first question is whether we observe co-movements between the cyclical fiscal balance and the swings in housing and equity prices? The paper suggests that, to answer this question, one needs to take into account the asymmetries inherent to the asset price cycles, because governments adjust spending and revenues to the price fluctuations in different manners depending upon whether prices are upward or downward oriented. Furthermore, they also need to anticipate the reactions of the investors when markets are evolving towards a peak or troughs (the regimes identified by the TVPMS equations). The regressions indicate that, the omission of such asymmetries may result into strong biases and yield false interpretations of the magnitude of unexpected revenues or spending. It could also give government false benchmarks as regards the size of the change in financial and real estate that triggers their intervention (for instance to deflate a bubble). Indeed, the linear models do not a good job in explaining the dynamics of the fiscal variables (very often, no significant effects is found at a quarterly frequency, neither for the usual variables that enter the fiscal reaction function, nor for the equity and house prices). It could be more appropriate to work with non-linear reaction functions having the property that is time-varying and regime-switching.

The effects of the asymmetries in the fiscal response to assert market development are well documented within the TVPMS framework.

In Spain, revenue falls are associated with less favorable developments in the housing markets (prices decreases), but price increases are not reflected into higher revenues. Furthermore, spending becomes not reactive to stock price changes when public expenditure is already augmenting above a threshold level.

In Italy, the fiscal effects of changes in stock prices are conditioned by the turning points of the asset price cycles. Equity price changes at peaks reduce the revenues, while they bring higher tax receipts at troughs. Housing price increases raise revenues when a burst phase is developing at the same time in the stock market, but reduce them as a new boom is likely to appear in the stock market (when prices are near a trough).

In France, stock price increases exert an asymmetric effect on revenues at the downturns and upturns of the stock price cycle. In one case, they fuel tax increases, while in the other case, revenues are retrenched. Like in the Italian case, the phases of the stock price cycle condition the impact of housing prices. We find similar asymmetries in the UK, when considering the impact of stock price fluctuations on taxes and spending according to the troughs and peaks of the aggregate wealth itself (negative effects on revenues at the troughs, positive effects near the peaks). However, the influence on spending plays in the same direction, whichever the observed turning points of the wealth cycle. Finally, in the UK, there are no signs of asymmetric effects as regards the influence of house price fluctuations (higher house prices yield an increase in both revenues and spending).

A second issue is the following. Within the framework of such non-linear fiscal reaction functions, what is the behavior of fiscal variables during the boom-bust phases in the asset prices? As regards revenues, there is some evidence that contractions in both the stock and housing prices tend to reduce taxes (and vice versa) in the United Kingdom and France (fiscal and asset variables change in the same direction as shown in Tables 1c and 4c). In Spain, the positive correlation between the asset price cycle and revenues is true for house prices only, while the policy response to stock prices appears to be counter-cyclical (see Table 2c. Stock prices and revenues very often evolve in opposite directions). This could be explained by the fact that, during the stock market booms, governments have accommodate the price cycle by reducing taxes on capital gains. In Italy, revenues move in line with stock prices (in Table 3c, both variables moves in the same direction), while the links with the house price varies across years yielding alternatively a positive and a negative correlation. If we compare the magnitude of the contributions of both the equity and house prices to revenue changes, since the beginning nineties, it seems that the influence of stock prices dominates that of housing prices in Spain and Italy, while in the UK and France, there are periods of more significant contribution of the housing cycles to the changes in tax receipts.

On the spending side, the evidence in favor of the claim that changes in primary spending are correlated with the changes in asset prices and this affects the fiscal position depending on the size of the price changes and the influence of the output cycle on revenues. We consider the examples of the UK and Spain, two countries in which asset market development have a high contribution to the fiscal balances as regards the share of the real estate sector and equity markets in the economy.

A first illustration is what happened in the UK over the years 1986-90 (Table 1d). We observe an increase in cyclical spending – in spite of a declining GDP – with 36 per cent of these higher revenues being attributable to higher house and real estate prices (36 per cent is obtained by dividing 0.89 per cent + 0.19 per cent by 2/76 per cent). But, there is also evidence that in the subsequent years (1991-95), as the revenues from house price experienced a fall – higher in magnitude than the increased revenues from the stock market prices – the fiscal authorities decided to reduce spending. What could be interpreted as a time-consistent behavior in order to maintain the fiscal sustainability over time in the course of the decade 1986-95, turned to a counter-cyclical spending policy with the government increasing public expenditure between 1996 and 2000 in a

context of declining financial and real estate price and very low output growth rate (compare the coefficients in Table 1d). As seen in Table 1e, this left the fiscal balance in a weaker position.

In Spain, the cyclical fiscal balance deteriorates over the years from 1993 to 2007 due to a differential in the respective changes in revenues and spending. For instance, as seen in Table 2c, during the years 2001-04, in times of downward oriented house and stock prices, governments may activate support policies via spending increases, even in a case of a favorable juncture , with the GDP growth augmenting the revenues, the total effect on fiscal balance can be deterioration. A similar deterioration can also occur in the symmetrical situation (see Table 2c, the years from 2005 until 2007). A boom phase in the asset markets brings a decrease in primary spending that, however, translates into a higher deficit or a lower fiscal surplus, if, at the same time, tax revenues reduce as the consequence of a decline in the GDP.

4 Conclusion

This paper tests for non-linear effects of asset prices on the fiscal policy of a set of major European countries: France, Italy, Spain and UK. We model government spending and revenue as time-varying transition probability Markovian processes.

We find that, in France and Italy, the impact of housing prices on government revenue is conditioned by the phase of the stock price cycle. A similar asymmetric pattern is found for the UK when considering the effect of stock price fluctuations on taxes and spending according to the troughs and peaks of aggregate wealth. However, no sign of asymmetry was found with regard to the influence of house price fluctuations. As for Spain, a fall in government revenue is typically associated with a negative performance of the housing market, but the same kind of link does not emerge for positive developments. Moreover, government spending does not seem to adjust to the dynamics of financial markets when it is already increasing above a threshold level.

Additionally, the magnitude of the contribution of housing prices to changes in government revenue appears to have dominated that of stock prices in France and the UK. With regard to government spending, changes in this policy instrument are correlated with changes in asset prices and the effect depends on the size of the price variation and the influence of the output cycle.

From a policy perspective, our work highlights that fiscal policy can play an important stabilizing role at times of financial distress. Castro and Sousa (2012) suggest that the conduct of monetary policy based on a single policy instrument may cause disruptions in asset markets, because of the different nature of the response of housing and financial markets. Agnello *et al.* (2012a) also find that an optimal monetary and fiscal policy mix can help boosting an economy hit by severe housing busts. In addition, Agnello *et al.* (2012b) argue that by correcting the revenue side of the fiscal stance for time-varying effects of asset prices, one obtains a more accurate assessment of the fiscal stance and its sustainability. The current paper shows that governments in major European countries can indeed successfully counteract sharp declines in asset markets.

REFERENCES

Agnello, L., V. Castro and R.M. Sousa (2012a), "How Does Fiscal Policy React to Wealth Composition and Asset Prices?", *Journal of Macroeconomics*, Vol. 34, No. 3, pp. 874-90.

Agnello, L., G. Dufrénot and R.M. Sousa (2012b), "Using Time-varying Transition Probabilities in Markov Switching Processes to Adjust US Fiscal Policy for Asset Prices", *Economic Modelling*, forthcoming.

Agnello, L. and C. Nerlich (2012), "On the Severity of Economic Downturns: Lessons from Cross-country Evidence", *Economics Letters*, Vol. 117, No. 1, pp. 149-55.

Agnello, L. and R.M. Sousa (2012), "Fiscal Policy and Asset Prices", *Bulletin of Economic Research*, forthcoming.

Bornhorst, F., G. Dobrescu, A. Fedelino, J. Gottschalk and T. Nakata (2011), *When and How to Adjust Beyond the Business Cycle? A Guide to Structural Fiscal Balances. Technical Notes and Manuals*, International Monetary Fund, April.

Castro, V. (2010), "The Duration of Economic Expansions and Recessions: More than Duration Dependence", *Journal of Macroeconomics*, No. 32, pp. 347-65.

Castro, V. and R.M. Sousa (2012), "How Do Central Banks React to Wealth Composition and Asset Prices?", *Economic Modelling*, Vol. 29, No. 3, pp. 641-53.

Diebold, F., J.H. Lee and G. Weinbach (1994), "Regime Switching with Time-varying Transition Probabilities", in C. Hargreaves (ed.), *Non-stationary Time Series Analysis and Cointegration*, Oxford University Press, Oxford (UK).

Filardo, A.J. and S.F. Gordon (1998), "Business Cycle Durations", *Journal of Econometrics*, Vol. 85, No. 1, pp. 99-123.

Jaeger, A. and L. Schuknecht (2007), "Boom-bust Phases in Asset Prices and Fiscal Policy Behavior", *Emerging Markets Finance and Trade*, Vol. 43, No. 6, pp. 45-66.

Kanda, D. (2010), "Asset Booms and Structural Fiscal Positions: The Case of Ireland", International Monetary Fund, Working Paper, No. 57.

Kiefer, N.M. (1978), "Discrete Parameter Variation: Efficient Estimation of a Switching Regression Model", *Econometrica*, Vol. 46, No. 2, pp. 427-34.

Sousa, R.M. (2010), "Housing Wealth, Financial Wealth, Money Demand and Policy Rule: Evidence from the Euro Area", *The North American Journal of Economics and Finance*, Vol. 21, No. 1, pp. 88-105.

Sousa, R.M. (2012), "Wealth, Asset Portfolio, Money Demand and Policy Rule", *Bulletin of Economic Research*, forthcoming.

Tagkalakis, A. (2011), "Fiscal Policy and Financial Market Movements", *Journal of Banking and Finance*, No. 35, pp. 231-51.

Tujula, M. and G. Wolswijk (2007), "Budget Balances in OECD Countries: What Makes Them Change", *Empirica*, No. 34, pp. 1-14.

PURE OR WAKE-UP-CALL CONTAGION?
ANOTHER LOOK AT THE EMU SOVEREIGN DEBT CRISIS

Raffaela Giordano,[*] *Marcello Pericoli*[*] *and Pietro Tommasino*[*]

We test whether the sharp increase in sovereign spreads of euro-area countries with respect to Germany after the explosion of the Greek crisis was due to deteriorating macroeconomic and fiscal fundamentals or to some form of financial contagion. Our analysis includes indicators of domestic and external imbalances which were mostly disregarded by previous studies, and distinguishes between investors' increased attention to the variables which ultimately determine the creditworthiness of a sovereign borrower (wake-up-call contagion) and behaviour not linked to fundamentals (pure contagion). We find evidence of wake-up-call contagion but not of pure contagion.

1 Introduction

At the beginning of 2009, ten years after the launch of the euro, many commentators viewed the single currency as a major success. In the run-up to the euro's introduction, interest rates had rapidly converged towards the low levels of the most creditworthy member states: in the period 1992-98, the average spread of long-term government bond yields with respect to the German one had declined from about 200 to 24 basis points. From 1999 onwards spreads continued to narrow, and at the end of 2007 they were negligible (16 basis points on average). Due to the financial turmoil triggered by the Lehman Brothers bankruptcy, some tensions started to surface in September 2008, but at the end of that year the average yield spread in the euro area was still about 100 basis points. Strains on government securities markets became worrisome only towards the end of 2009 (Figure 1). The focus of concern was Greece. After a series of upward deficit revisions, the last of which equal to nearly 3 percentage points of GDP in October 2009, the Greek government estimated the deficit at 12.7 per cent of GDP in 2009, up from 7.7 per cent in 2008. The tensions spilled over from Greece to the government securities of other euro-area countries, notably Ireland, Portugal and, to a lesser extent, Spain and Italy. Three years after these events, some countries still are basically shut out of the bond market[1] and sovereign debt strains in the euro area remain worrisome and widespread, despite important progresses in fiscal adjustment by national governments.

The debate concerning the causes of the European sovereign debt crisis inflames both politics and academia. While some argue that fiscal deterioration and fundamental macroeconomic weaknesses are at the root of the crisis, others claim that spreads are well above the levels justified by fundamentals, and invoke forms of "market irrationality" and/or "contagion". The aim of the present paper is to assess the relative merits of these competing opinions through a formal econometric analysis.

---

[*] Bank of Italy, Economic Research and International Relations Area.

Corresponding author: Pietro Tommasino. Email: pietro.tommasino@bancaditalia.it

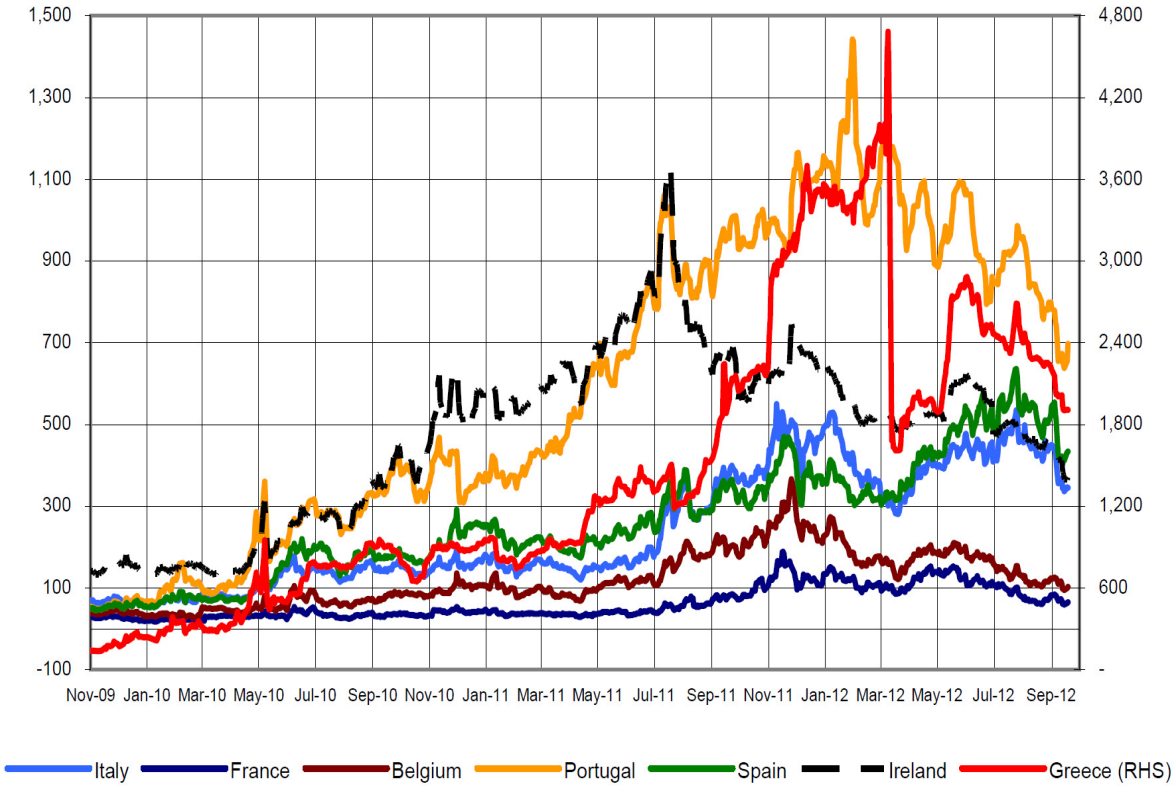
The views expressed in the paper do not necessarily reflect those of the Bank of Italy. We are indebted to Domenico Depalo, Michael Ehrmann, Carlo A. Favero, Eugenio Gaiotti, Giuseppe Grande, Marco Taboga, and participants in the Bank of Italy workshop *The Sovereign Debt Crisis and the Euro Area*, in the 24th Conference of the Italian Public Economics Society (SIEP), and in the Bocconi-CEPR conference *Fiscal Policy and Growth* for valuable comments and suggestions.

[1] Greece applied for financial support in May 2010, followed by Ireland (November 2010) and Portugal (April 2011).

Figure 1

Yield Spreads Between 10-year Government Bonds and the German Bund

(basis points)



Needless to say, the answer to this question has significant policy implications. Evidence of sizable and systematic mispricing of sovereign credit risk would imply that it is ill-advised to rely on markets to induce fiscal and macroeconomic discipline. Furthermore, it would strengthen the case for interventions by European Union institutions such as the European Financial Stability Facility (EFSF), the European Stability Mechanism (ESM) and the European Central Bank (ECB) in the sovereign bond markets. In fact, the Eurogroup summit of 29 June 2012 decided to use the EFSF/ESM instruments in order to stabilize the markets of member states honouring all their European commitments on schedule. Soon afterwards, the ECB decided to undertake Outright Monetary Transactions (OMT) in the secondary markets for sovereign bonds in the euro area "to address severe distortions which originate from, in particular, unfounded fears of the reversibility of the euro" (press conference following the meeting of the Governing Council on 6 September 2012).

While several other papers have studied the relationship between spreads and fiscal fundamentals in European Monetary Union (EMU), ours contributes to the discussion in three ways. First, it considers a broader set of fundamentals. One lesson of the EMU crisis is that even countries with low levels of public debt and deficits can suffer a sudden deterioration of their fiscal position, for example as an effect of financial sector bailouts (which may transform private liabilities into public debt). This risk was considered obvious for emerging markets at least since the Asian crisis of the late nineties, but it was not taken into account by the EMU rules and – as we show here – by investors. Our second contribution to the literature is to distinguish between different forms of contagion and to measure their relative importance in explaining the post-crisis

behaviour of European sovereign spreads.[2] Our third contribution is methodological: for the first time we apply to sovereign spreads panel methodologies designed to detect and tackle non-stationarity and cointegration.

To give a preview of our results, we find that the explosion of the Greek crisis had a systematic impact on the other euro area countries' sovereign spreads. However, this impact differed across borrowers. In particular, investors penalized governments with weaker fiscal and macroeconomic fundamentals more heavily.

The rest of the paper proceeds as follows. In Section 2 we review the literature and clarify our definition of contagion. In Section 3 we present our dataset and in Section 4 we discuss our empirical strategies and show our results. In Section 5 we discuss several robustness checks. In Section 6 we provide numerical estimates of the long-run values of the spreads, derived from our empirical analysis. Finally, in Section 6 we draw some tentative conclusions and policy implications.

2 Literature review

Several papers assess the determinants of sovereign spreads in EMU. Starting from Codogno *et al.* (2003), the literature has expanded significantly in the last few years (see, among others, Favero *et al.*, 2010; Beber *et al.*, 2010, Schuknecht *et al.*, 2009 and 2011; Attinasi *et al.*, 2009; Sgherri and Zoli, 2009; Hallerberg and Wolff, 2008). Typically, these studies explore the role of (a) country-specific factors, namely fiscal fundamentals and market liquidity, and (b) common factors, such as the market appetite for risk. In particular, they bring to the data an empirical model such as:

$$s_{it} = \alpha_0 + \alpha_1 s_{it-1} + \beta_0 Z_{it} + \beta_1 F_t + \varepsilon_{it} \ , \ |\alpha_1| < 1 \tag{1}$$

where *Zit* is a vector of country-specific variables and *Ft* is a vector of variables that are common across countries. The above-mentioned papers differ from one another in terms of data frequency (from daily to yearly), the regressors included and estimation method (in particular, some adopt a pooled cross-section/time-series approach, others provide country-specific estimates). Of course, studies using high-frequency data, such as Favero *et al.* (2010) and Beber *et al.* (2010), do not consider the role of fiscal and macro fundamentals, which are available only at lower frequencies.

Bernoth *et al.* (2012) consider a slightly different dependent variable (primary instead of secondary market spreads); their sample period ends in 2009, so it does not include the post-Greek-crisis period. Although their analysis focuses on the structural break due to the introduction of EMU in 1999, it also discusses the possible effects of the Lehman bankruptcy in September 2008. Using an approach similar to ours, Bernoth *et al.* (2012) find that the Lehman bankrupcy increased the sensitivity of spreads to country-specific fundamentals and global factors.

Few papers consider instead the issue of contagion among sovereign securities within EMU. Some papers simply augment equation (1) with a further Z_{it} variable, which captures developments in all the other EMU countries different from *i*. In particular, Cáceres *et al.* (2010) employ a measure of "distress dependence", which is built by extracting from the vector of CDS premia the unconditional marginal probability of default for each country. They then infer from those marginal distributions the joint probability of default, and build and add-up the default probability of country *i* conditional on the default of the other countries. Similarly, Hondroyiannis *et al.* (2012) add a

[2] Of course, the two contributions are related: to understand whether spreads are excessive with respect to fundamentals, it is necessary to take a stance concerning the relevant fundamentals.

"contagion variable", defined as a weighted combination of other countries' spreads. Neither Cáceres *et al.* (2010) nor Hondroyiannis *et al.* (2010) consider the more recent years.

Our contribution borrows from a different strand of the literature, which discusses contagion concentrating on developing countries. In this literature, more precise and circumscribed definitions of contagion are used.[3] We follow, in particular, Eichengreen *et al.* (1996), Masson (1998) and Goldstein *et al.* (2000), who distinguish between three kinds of circumstances:[4]

- Wake-up-call contagion, a situation in which a crisis initially confined to one country provides new information that prompts investors to reassess the default risk of other countries (this concept is used, for example, by Goldstein, 1998, Masson, 1999, Goldstein *et al.*, 2000). In this case, domestic fundamentals justified a flight from sovereign debt even before the crisis event, but investors did not price/perceive the risk correctly. The wake-up-call hypothesis was first put forward by Goldstein (1998) to explain contagion from Thailand (a relatively small and closed economy) to other Asian countries in the Asian crisis of the late nineties. He argues that the other countries were affected by the same structural and institutional weaknesses as Thailand (crony capitalism, weak banking system, etc.), but investors ignored those weaknesses until the Thai "wake-up call". Such behaviour is also consistent with forms of "rational inattention" (Tutino, 2011, and Wielderholt, 2010). According to rational inattention theory, given the existence of costs in acquiring and processing information, rational agents could optimally choose to ignore some information, for example concerning fundamentals.
- Shift contagion, which occurs when the normal cross-market channel intensifies after a crisis in one country. It can be seen as analogous to wake-up-call contagion except that it is due to increased sensitivity to common factors such as global risk aversion – the F_t term in equation (1) – instead of country-specific factors. We borrow the term and the concept from the work of Forbes and Rigobon (2002).
- Pure contagion. This residual category covers any instance of contagion that is completely unrelated not only to changes in fundamentals (as in the case of wake-up-call and shift contagion) but also to the level of fundamentals, be they country-specific (as in the case of the wake-up-call contagion) or global (as in the case of shift-contagion). Pure contagion may arise from self-fulfilling (and therefore individually rational) loss of confidence (Calvo, 1988), from irrational herding behaviour (Chari and Kehoe, 2003), or from margin calls and other wealth effects for investors, triggered by capital losses in the country which originated the crisis (Kodres and Pritsker, 2002; Kyle and Xiong, 2001; Calvo and Mendoza, 2000; Schinasi and Smith, 2000).

In distinguishing between the three types of contagion, our contribution is similar to the paper by Bekaert *et al.* (2011). They use an international asset pricing framework with global and local factors to predict equity returns, defining unexplained increases in factor loadings as indicative of contagion, and find evidence of systematic contagion whose severity is inversely related to the quality of countries' economic fundamentals and policies. They conclude that the wake-up-call hypothesis holds for equity markets, with markets and investors paying substantially more attention to country-specific characteristics during the crisis.

We also see the approach pioneered by Gande and Parsley (2005) as very relevant and complementary to ours. They consider a sample of emerging countries and allow rating news concerning any one of them to influence the sovereign spreads in the others. In the present paper,

---

[3] This literature is surveyed in Pericoli and Sbracia (2003), and Dungey *et al.* (2005).

[4] While our contagion definitions are quite widespread in the literature, other papers use the word "contagion" differently (as discussed in the recent survey by Forbes, 2012).

we likewise consider a unidirectional version of their methodology, substituting our crisis dummy with a variable summarizing Greek rating developments.[5]

Finally, let us remark that in our regressions, while taking into account the possibility that the situation of banks may have an impact on sovereign spreads, we focus on contagion across sovereign bond markets, leaving aside the issue of contagion from sovereign to other financial markets or to the banking sector (on this, see, among others, Acharya *et al.*, 2011; Alter and Schuler, 2011; Angeloni and Wolff, 2012).

3 Data and descriptive statistics

Our dataset covers nine euro-area countries (Austria, Belgium, Finland, France, Ireland, Italy, Portugal, Spain and the Netherlands) using monthly data from January 2000 to December 2011. As is customary in the literature, we exclude Greece (the "ground-zero" country) from the analysis.[6] Our dependent variable is the 10-year government bond yield spread with respect to the corre sponding German bund.[7]

In our baseline specification we consider as common factor the F_t variable in equation (1) the VIX, the most common indicator of the propensity of investors to bear credit risk.[8] Data on government bond yields and on the other financial market variables are taken from Thomson Financial Reuters. These data are released daily, and we compute monthly averages of them.

Like our dependent variable, country-specific fundamentals – the Z_{it} vector in equation (1) – are in differences with respect to the corresponding German variables. They include GDP growth and the ratios with respect to GDP of general government debt, private sector debt, defined as household plus non-financial corporation debt, and the current account surplus.

We also control for liquidity, measured by the difference between the country's bid-ask spread on government bonds and the German one.[9] We do not control instead for differences in debt characteristics such as inflation-indexation and currency denomination. Indeed, unlike in emerging countries, in our sample public debt is mostly in nominal terms and denominated in euros.[10]

---

5 Two recent papers on the EMU sovereign debt crisis use multi-equation econometric techniques and can be seen as multi-equation extensions of Gande and Parsley (2005). Arezki *et al.* (2011) estimate a VAR model allowing for the mutual inter-dependence of sovereign debt markets and the stock market. De Santis (2012) allows for a long-run co-integrating relationship between spreads and other variables. Chudik and Fratzscher (2013) use the VAR methodology to study yields (not spreads) and consider stocks and foreign currencies in addition to sovereign bonds.

6 We have verified that our main results do not change if Greece is included in the regressions. We excluded Luxembourg because, for most of the sample period, it essentially had no public debt. We had to exclude the remaining five countries because, as recent entrants to the euro, the pre-crisis period was clearly too short for us to estimate reliably our model (Estonia and Slovakia joined the union in 2011 and 2009 respectively, Cyprus and Malta in 2008, Slovenia in 2007). Moreover, private debt data are missing for the late-accession countries.

7 An often-used alternative measure for the default risk is the credit default swap (CDS) premia. However, for our purposes it suffers from several shortcomings. First, a well-developed CDS market exists only for few countries in our sample, and even for those countries data are available only for the more recent years. Second, CDS premia are driven not only by credit risk considerations but also by counterparty risk. Third, during the crisis in some countries CDS markets were subject to policy interventions, such as short-selling bans, which are likely to have had an impact on CDS premia.

8 The VIX, the Chicago Board Options Exchange Market Volatility Index, is a measure of the implied volatility of the S&P 500 stock index; it is considered a good indicator of the level of risk aversion in global capital markets.

9 This measure of liquidity is common in the literature (see, among others, Codogno, Favero and Missale, 2003, and Favero, Pagano and von Thadden, 2010). Our variable is computed as the difference between the minimum bid yield and the maximum ask yield observed at daily frequencies for benchmark bonds; this computational method implies limited variability over time of this difference. Favero, Pagano and von Thadden (2010) use instead the best five bid and ask prices.

10 As is well known this is not true of emerging economies (see, e.g., the contributions in Eichengreen and Hausmann, 2004). Concerning debt duration, in our sample we observe moderate cross-country differences, but they are basically time-invariant and therefore mostly captured by the country fixed effects.

The inclusion of private debt and the current account balance, while non-standard in the literature on advanced economies (an exception is Gourinchas and Obstfeld, 2012), is frequent in studies concerning emerging countries and has strong economic rationale inasmuch as these are indicators of the domestic and external leverage of an economy. While a current account deficit does not mean per se a higher sovereign vulnerability, it is often associated with competitiveness imbalance and problematic macroeconomic developments. Furthermore, external capital inflows (the mirror image of the current account deficit) may trigger a boom in the non-tradable sector (particularly the housing market), increasing the risk of a subsequent bust.[11] A similar line of reasoning can be applied to private sector debt: if households and firms turn out to be unable to repay their debt, this might jeopardize public finances, either because the government may bail them out directly or as often happens – because it bails out the domestic banks that lent to households and firms in the first place. In any case, in the presence of substantial private liabilities, public debt might increase significantly and overnight. Notice that both variables are to be monitored at the European level under the new Macroeconomic Imbalances Procedure (European Commission, 2012).[12]

Fiscal and macroeconomic variables are taken from the Eurostat quarterly database. These data are generally released with a delay of one quarter. Our monthly series are obtained keeping the value of the variable constant in each month of the quarter. In our specification we thus assume that spreads react simultaneously to liquidity and volatility factors and with a 3-month lag to fiscal and macroeconomic variables. This also limits endogeneity problems and thus concerns about possible reverse causation between the current spread and the independent variables.

In Table 1 we report some descriptive statistics of the variables used in our benchmark specification, distinguishing between two sub-periods (before and during the crisis). In the upper part of each panel we summarize the evolution of our dependent variable, *i.e.*, the average yield spread, and the financial factors that in our specification are assumed to influence it. In the bottom part we summarize the development of fiscal and macroeconomic fundamentals. Statistics refer to all countries except Germany and Greece.

The spread between the government bond yields of these nine euro-area countries and the German one increased on average from 19 basis points in the period before the crisis to 175 basis points from October 2009 onwards. The increase was significantly larger in the sub-group of peripheral countries (Portugal, Ireland, Italy and Spain), from 25 to 330 basis points. Liquidity, measured by the bid-ask spread, worsened on average in the second part of our sample period (on average the spread increased from 1 to 6 basis points). The evolution of the VIX shows that global risk aversion increased during the euro-area sovereign crisis; however, as acute financial markets tensions had already emerged following the Lehman Brothers bankruptcy, the difference across sub-periods is not appreciable.

Turning to fundamentals, both fiscal and macroeconomic conditions deteriorated significantly during the sovereign debt crisis. Among domestic imbalances, the average general government debt increased by 17 percentage points of GDP (almost 30 in the peripheral countries); the increase in private debt was even larger (42 percentage points in the entire sample and 57 in the peripheral countries). GDP growth slowed on average from 1.8 to 1.1 per cent, reflecting a negligible acceleration in the "virtuous" countries and a marked slow-down in the others (from 2 to

---

[11] This, in turn, would induce sizable output gaps and revenue shortfalls, increasing public debt and jeopardizing its sustainability. This is how Spaventa and Giavazzi (2011) interpret the EMU crisis.

[12] Concerning external imbalances, the European scoreboard also includes the net investment position (the stock counterpart of the current account balance), the change in export market shares, the change in unit labour costs, and the change in the real effective exchange rate. Concerning domestic imbalances, the scoreboard includes the private-sector credit flow (the flow counterpart of domestic debt), the change in the house price index, and the unemployment rate.

Table 1

Descriptive Statistics

	Mean	**St. dev**	**Min.**	**Max**	**Mean**	**St. dev**	**Min.**	**Max**
	January 2000-October 2009				**November 2009-December 2011**			
Overall sample								
Sovereign spread *(bp)*	19.3	27.9	22.1	242.4	174.9	220.0	12.3	1109.3
Bid-Ask spread *(bp)*	1.0	0.8	0.2	6.0	5.5	14.8	0.3	85.4
Risk aversion (VIX)	25.9	10.9	12.6	63.3	28.0	7.1	20.1	45.6
Public debt/GDPx100	64.0	24.5	24.5	117.0	81.3	22.0	43.5	121.0
Private debt/GDPx100	162.0	42.8	75.2	303.1	204.4	49.3	125.3	303.4
GDP growth *(percent)*	1.8	3.0	9.8	12.4	1.1	2.0	6.5	5.8
Current account surplus/GDPx100	0.5	5.5	13.3	11.9	0.7	5.0	13.3	11.7
Ireland, Italy, Spain and Portugal								
Sovereign spread *(bp)*	25.7	35.6	22.1	242.4	328.1	253.5	52.7	1109.3
Bid-Ask spread *(bp)*	1.3	0.9	0.3	3.7	11.0	20.9	0.6	85.4
Risk aversion (VIX)	25.9	10.9	12.6	63.3	28.0	7.1	20.1	45.6
Public debt/GDPx100	63.2	28.8	24.5	117.0	92.1	22.2	3.9	121.0
Private debt/GDPx100	164.8	52.6	75.2	303.1	222.2	61.1	125.3	303.4
GDP growth *(percent)*	2.0	3.3	8.3	12.4	0.1	1.5	5.5	2.2
Current account surplus/GDPx100	4.8	4.1	13.3	1.9	3.9	4.0	13.3	4.2
Austria, Belgium, Finland, France and the Netherlands								
Sovereign spread *(bp)*	14.2	18.3	15.8	108.2	52.4	45.8	12.3	292.0
Bid-Ask spread *(bp)*	0.9	0.6	0.2	6.0	1.2	0.9	0.3	4.1
Risk aversion (VIX)	25.9	10.9	12.6	63.3	28	7.1	20.1	45.6
Public debt/GDPx100	64.7	20.4	29.9	115.6	72.7	17.7	43.5	100.0
Private debt/GDPx100	159.8	34.2	16.2	98.7	190.1	30.8	156.8	242.3
GDP growth *(percent)*	1.7	2.6	9.8	6.4	1.9	1.9	6.5	5.8
Current account surplus/GDPx100	2.9	3.6	8.6	11.9	1.9	4.2	6.0	11.7

almost 0). External positions also worsened: on average the current account deficit increased from 0.5 to 0.7 per cent of GDP; with respect to Germany the deterioration was greater (about 2.5 percentage points of GDP), reflecting strongly diverging competitiveness paths between Germany, on one side, and the other countries, on the other.

4 Empirical analysis

We use two alternative empirical models. The first (Section 4.1) is akin to equation (1), as it assumes that the spread is a stationary variable, even if it has an auto-regressive component. As stationarity is assumed by all the previous literature, we provide estimates of this model mainly for the sake of comparability. However, as we will argue below, there are good empirical reasons to question the stationarity hypothesis and also to conjecture the existence of a long-run cointegrating relationship between the spread and the other covariates (Section 4.2). Therefore, we will subsequently focus on the estimation of that long-run relationship (Section 4.3).

4.1 Stationary case

The empirical model – We enrich the specification in (1) in order to take into account the three different kinds of contagion effects outlined in Section 2. We estimate the following model:

$$s_{it} = \alpha_{i0}+\alpha_1 s_{it-1}+\beta_0 Z_{it}+\beta_1 F_t+\gamma_0 D_t+\gamma_1 D_t s_{it-1}+\gamma_2 D_t Z_{it}+\gamma_3 D_t F_t+\varepsilon_{it},\ |\alpha_1|, |\alpha_1+\gamma_1|<1 \quad (2)$$

where the error term is assumed zero-mean, stationary and independent across countries (but we allow for heteroskedasticity and auto-correlation), and D_t is a dummy variable taking value one after the outbreak of the Greek crisis, which in our model coincides with the revision of the official public finance figures by the new government in October 2009.

Therefore, γ_0 captures "pure contagion", the vector of coefficients γ_2 captures the wake-up-call effect (a more pronounced post-crisis sensitivity to country-specific fundamentals), and γ_3 captures shift-contagion (an increased sensitivity to common factors).

Notice that in our specification we allow for country-specific fixed effects, to control for time-invariant unobserved characteristics. Indeed, the previous literature has pointed to some very slow-moving features that influence a sovereign's creditworthiness, such as the political system (Akitoby and Stratmann, 2008) or debt intolerance (Quian *et al.* 2011). We also allow for a change in the auto-correlation coefficient in the post-crisis period (γ_1).

Baseline results – The Least Square Dummy Variables (LSDV) estimates of equation (2) shows that in the pre-crisis period the only statistically significant coefficients are those of GDP growth and of the VIX: both a slowdown in GDP and a decrease in global risk appetite widen the spread (Table 2, column 1).

Instead, during the crisis the relationship becomes significant for all the fundamental variables except private debt and the bid-ask spread. This suggests that a wake-up-call effect exists for EMU countries. In particular, current account imbalances and public debt are not relevant in the pre-crisis period, whereas in the crisis period they become positively related to the sovereign spreads. By contrast, neither "pure contagion" nor "shift-contagion" effects are present (both γ_0 and γ_3 are insignificant). Finally, the estimated auto-correlation parameter is relatively high (with no change in the coefficient after the Greek crisis), which points to possible non stationarity.

Table 2

Regression Results

	(1)	(2)	(3)	(4)	(5)
spread*(t–J)*	0.927 ***	0.930 ***			
	(0.035)	*(0.037)*			
general government debt	–0.018	–0.088	1.211 ***	1.120 ***	0.337 ***
	(0.116)	*(0.147)*	*(0.295)*	*(0.258)*	*(0.0671)*
private debt	0.050	0.043	0.926 ***	0.939 ***	0.167 ***
	(0.040)	*(0.031)*	*(0.077)*	*(0.080)*	*(0.039)*
GDP growth	–0.542 **	–1.062 ***	–0.077	–1.276	–2.341 ***
	(0.27)	*(0.408)*	*(0.639)*	*(0.783)*	*(0.825)*
current account surplus	0.147	0.416	2.610 ***	2.619 ***	–0.351
	(0.135)	*(0.308)*	*(0.369)*	*(0.392)*	*(0.246)*
liquidity (bid-ask)	0.422	1.480 *	7.751 ***	7.659 ***	10.998 ***
	(0.561)	*(0.835)*	*(1.342)*	*(1.454)*	*(1.824)*
VIX	0.152 ***	0.191 ***	0.676 ***	0.603 ***	0.960 ***
	(0.027)	*(0.046)*	*(0.077)*	*(0.107)*	*(0.131)*
Dummy crisis	–15.128	–43.819	–84.738 ***	–85.365 ***	–95.619 ***
	(10.377)	*(35.894)*	*(25.716)*	*(23.346)*	*(15.467)*
spread*(t–J)* x crisis	0.083	0.061			
	(0.052)	*(0.073)*			
public debt x crisis	0.151 *	0.543 *	1.381 ***	1.300 ***	1.388 ***
	(0.091)	*(0.294)*	*(0.275)*	*(0.247)*	*(0.168)*
private debt x crisis	0.044	0.139	0.337 **	0.293 **	0.649 ***
	(0.047)	*(0.115)*	*(0.138)*	*(0.121)*	*(0.080)*
GDP growth x crisis	–3.193	–7.274	–26.123 ***	–21.603 ***	–29.393 ***
	(2.090)	*(5.019)*	*(3.614)*	*(3.231)*	*(1.965)*
current account surplus x crisis	–0.871	–1.909	–4.597 ***	–4.249 ***	–5.282 ***
	(0.524) *	*(1.333)*	*(1.219)*	*(1.124)*	*(0.673)*
liquidity x crisis	–0.594	–1.657	0.065	0.064	–2.470
	(0.769)	*(1.018)*	*(1.507)*	*(1.463)*	*(1.840)*
VIX xcrisis	0.198	0.192	2.174 **	2.204 ***	2.007 ***
	(0.345)	*(0.893)*	*(0.882)*	*(0.825)*	*(0.462)*
R^2	0.98	0.98	0.87	0.89	0.85
Observations	1,269	564	1,269	1,242	1,269

Notes: Columns 1,2,3: LSDV; Column 4: DOLS (1 lead and 1 lag added for each variable; country dummies incl.); Column 5: FGLS. All estimations except column 5: Huber-white robust standard errors in parentheses. All estimations except column 2: full sample (Column 2: sample limited to the periphery countries: PT, IT, IR, ES). *: significant at the 10 per cent level; ** at the 5 per cent; *** at 1 per cent.

Considering only the peripheral countries – The results could be different if one only considers peripheral euro area countries. First, it is more likely that investors' attention to these countries was already high before the crisis, given that their fiscal reputation was already undeniably worse. This reduces the probability of observing wake-up-call contagion. Second, the probability of observing pure contagion should increase as investors possibly consider these countries more similar to Greece.

However, even when we restrict the sample to Portugal, Spain, Ireland and Italy, we find no pure contagion. The results are quite similar to the baseline estimation (Table 2, column 2). While Portugal, Spain, Ireland and Italy are conventionally considered the "periphery" of the euro area, the results are qualitatively unchanged when we include Belgium or both Belgium and France together in the periphery.

Bias-corrected estimates – Since Nickell (1981), it is well known that the LSDV estimator is biased when used in dynamic panels. While the fact that this bias decreases with the length of the panel should be reassuring, given our very long sample period, we also experimented with the Kiviet (1995) estimation technique, which appears to be particularly appropriate for macroeconomic (*i.e.*, big T/small N) panels (Judson and Owen, 1999). It turns out that the bias-corrected estimates are basically identical to our baseline.[13]

4.2 Testing for unit roots and cointegration

A legitimate issue with the econometric analysis presented in Section 4.1, given the observed high persistence of the spreads, is that they could actually be non-stationary. Indeed, performing common panel unit root tests such as those proposed by Levin Lin and Chu and by Pesaran, Im and Shin (see Banerjee, 1999; Baltagi, 2008; and Choi, 2006), we could not reject the null of integration for the sovereign spreads (Table 3, top panel). This result is robust even if we compute the relevant test statistics using different lag structures and different time spans. In particular, unit roots appear to be present not only if we look at the full sample, or at the post-crisis period, but also when we restrict the analysis to the pre-crisis period.[14]

We also tested for the existence of a cointegrating relationship between the spread and its determinants. In particular, we adopted the residual-based approach by Kao and Pedroni (see Banerjee, 1999; and Baltagi, 2008). While the results are consistent with the existence of a cointegrating vector, they are not very clear-cut (Table 3, bottom panel).

4.3 Non-stationary case

In this section we model the long-run relationship between spreads and fundamentals as:

$$s_{it} = \alpha_{i0} + \beta_0 Z_{it} + \beta_1 F_t + \gamma_0 D_t + \gamma_1 D_t Z_{it} + \gamma_2 D_t F_t + \varepsilon_{it}, \tag{3}$$

therefore allowing for a structural change in the relationship in the post-crisis period, and for the different kinds of contagion effects highlighted in the previous sections. As before, the error term is assumed independent across countries but possibly heteroskedastic and auto-correlated.

---

[13] Results are not shown.

[14] This suggests some caution in interpreting the results of previous papers, which did not consider the issue.

Table 3

Unit Root and Cointegration Tests

Panel Unit Root Tests	
*Levin, Lin and Chou t**	15,940
H0: unit roots for all *i*'s (H1: no unit root)	(1.000)
Im, Pesaran and Shin W-stat	11,970
H0: unit roots for all *i*'s (H1: some unit roots)	(1.000)
Panel Cointegration Tests	
ADF statistic (Pedroni 1)	–1,642
H0: no cointegration (H1 assumes common autocorr. coefficient)	(0.0503)
ADF statistic (Pedroni 2)	–1,170
H0: no cointegration (H1 allows country-specific autocorr. coefficients)	(0.121)

Notes: *p*-values in parentheses; number of lags =1.

To estimate equation (3), we resort to different methods, in order to check the robustness of the results to different statistical assumptions.

First, we run a simple LSDV regression. Indeed, if spreads are $I(1)$ and there is no cointegrating relationship between spreads and fundamentals, *i.e.*, ε_{it} in equation (3) is $I(1)$, the LSDV estimator delivers consistent estimates of the long-run average relationship between them, contrary to the pure time-series case (Phillips and Moon, 1999, Phillips and Moon, 2000, and Baltagi, 2008).

The results are qualitatively similar to those obtained with the stationary model, but much more pronounced and clear-cut (Table 2, column 3). Before the crisis, all the fundamentals are significant with economically meaningful signs, except GDP growth (which is not significant) and the current account surplus (which has the wrong sign). After the start of the crisis, the effect on the spread is magnified and with the expected sign for all the fundamentals. In particular, the effect of GDP growth and of the current account surplus becomes significant and negative, as it should be if markets correctly assess sovereign creditworthiness. Also, shift contagion (*i.e.*, an increased post-crisis role of the VIX) emerges.

If spreads are $I(1)$ but there exists a cointegrating relationship between spreads and fundamentals, *i.e.*, ε_{it} in equation (3) is $I(0)$, it can be shown that OLS estimates are inconsistent. We therefore estimate equation (3) using the panel dynamic least square (DOLS) estimator proposed by Kao and Chiang (2000), which extends to panel data the approach of Saikkonen (1991) and Stock and Watson (1993). That is, estimates of the coefficients of interest are found by running the following OLS regression:

$$s_{it} = \alpha_{i0} + \beta_0 Z_{it} + \beta F_t + \gamma_0 D_t + \gamma_2 D_t Z_{it} + \gamma_3 D_t F_t + \sum_{j=-2}^{2} \delta_{0j} \Delta Z_{it+j} + \sum_{j=-2}^{2} \delta_{1j} \Delta F_{t+j} + \varepsilon_{it}, \quad (4)$$

where the inclusion of ΔZ_{it+j} and ΔF_{t+j} among the regressors helps to get a consistent estimate of the βs and the γs. The results are remarkably similar to those of the previous exercise (Table 2, column 4).

As a final exercise, we consider a model with random, instead of fixed, individual effects. As shown by Baltagi *et al.* (2008, 2011), to this end the best available option is to estimate equation (3) with feasible generalized least squares (notice that this holds irrespective of whether ε_{it} is $I(0)$ or $I(1)$). The results are qualitatively similar to those obtained with the fixed-effects specification (Table 2, column 5).

5 Robustness checks

5.1 Using different proxies

As a first robustness exercise, we consider two alternative measures of liquidity. One, used by Attinasi *et al.* (2009), among others, is the country's share of the euro-area long- and medium-term sovereign bond issuance. The other is the monthly average of the traded volumes of the country's government securities with maturity between nine and eleven years relative to Germany's, used for example by Codogno *et al.* (2003). In both cases, we found liquidity to be statistically insignificant, both alone and interacted with the crisis dummy.

As a second check, we experiment with a different proxy for global risk aversion and, following Codogno *et al.* (2003) and Bernoth *et al.* (2012), we substitute the VIX with the yield spread between low-rated (BBA) US corporate bonds and the US Treasuries of corresponding maturity, without any notable effect on the results.

5.2 Controlling for banking sector stress

As is commonly acknowledged, in several EMU countries worries about public debt sustainability were magnified by concerns about the state of the banking sector. While the role of banks in the EMU crisis is not the focus of this paper, it is important to control for this channel.

To do this, we first add to our baseline regressions a measure of domestic banks' credit risk, proxied by the CDS banking index, to account for the negative feedback effects from the banking to the government sector.[15] Both in the stationary and in the non-stationary models, the absence of pure contagion and the presence of wake-up-call contagion are robust to the inclusion of the new variable. The latter is significant and has the expected sign, except for the stationary specification. That is, an increase in the country's CDS banking index increases the country's sovereign spread as well. However, the effect does not appear to have increased in the post-crisis period.

Alternatively, we introduced in our regressions, as a factor common to all countries (therefore included in the *Ft* vector together with the VIX), the spread between the three-month euro interbank offered rate (Euribor) and the corresponding OIS swap rate (which captures the market's expectations of the overnight funds rate). This difference is considered a gauge of fears of bank insolvency (see, *e.g.*, Thornton, 2009). Contrary to country-specific CDS premia, this regressor becomes much stronger after the crisis, suggesting that the crisis gave rise to widespread concern about the health of the European banking system as a whole. In any case, even in these richer specifications we still find wake-up-call contagion, while we do not find pure contagion.

---

[15] We define the CDS banking index as the simple average of all the CDS premia on banks resident in a given country which are available in the Thomson Financial Reuters database. Due to lack of banks' CDS data, we drop Finland from the sample.

5.3 The definition of the contagious event

A possible pitfall of our analysis is that it relies on a sharp hypothesis concerning the start of the EMU sovereign crisis, although we do find that changing the moment of the structural break from October 2009 to May 2010 (when the euro area countries launched the first Greek bailout programme) or to November 2010 (when for the first time EU authorities officially envisaged the possibility of private sector involvement in sovereign debt crises resolution) does not drastically change the estimation results. Moreover, a dichotomous crisis dummy cannot capture changes in the intensity of the crisis.

We address both problems by using, instead of our crisis dummy, a variable summarizing the Greek credit rating; we borrow this approach from Gande and Parsley (2005) and De Santis (2012). In particular, we transform the sovereign credit rating information (expressed in letters) of the three major credit rating agencies (Fitch, Moody's and Standard & Poor's) into a numerical variable using a linear scale. The variable takes 22 values from 1 (triple-A) to 22 (selective default). We also take credit-watch changes into consideration: a negative credit watch increases the value of the variable by 0.5 while a positive credit watch corresponds to a decrease of 0.5. We use the average of the numerical indicators computed for the three main rating agencies.

The results are analogous to our baseline regressions (Table 4, columns 1-4). In particular, the only fundamental variable which is statistically significant when taken in isolation is GDP growth. When interacted with the Greek rating variable, instead, government debt and the current account surplus also become significant, as in the baseline regression. In particular, the analysis shows that a worsening of the situation in Greece magnifies the positive effect of a current account surplus and the negative effect of public debt on the spreads of the other EMU countries. Finally, as in our baseline model, the Greek fiscal situation index, taken alone, has no effect on other countries' spreads.

5.4 EU policy-makers at work

In the months following the crisis, EU authorities announced and implemented several crisis-management interventions. While the efforts to improve the euro-area crisis management framework have continued after the end of our sample period (see, e.g., the ECB's OMT, announced in August 2012), during our sample period three major policy episodes can be singled out.

- After several weeks of discussion, the turning-point in the EU authorities' approach to the Greek crisis came in the spring of 2010. On 2 May the euro-area countries agreed on a three-year financial support plan that provided bilateral loans to Greece. On 10 May, the EU Council established the EFSF, a vehicle empowered to issue securities guaranteed by euro-area countries and to provide loans to countries experiencing severe financial disturbance (loans are provided under conditions similar to those applied by the IMF). On the same day, the ECB launched the SMP, a programme of purchases of public and private debt securities issued in the euro area to support segments of the market especially hard hit by the crisis.
- On 28 November 2010, the euro-area finance ministers agreed to institute the ESM, a permanent crisis management tool, which is due to replace the EFSF, providing financial support to countries that request assistance subject to strict conditions. Assistance is also subject to a rigorous debt sustainability analysis. Member states considered insolvent would have to negotiate a restructuring plan with private creditors. On the same day, the finance ministers also decided to grant support to Ireland through the EFSF.
- On 21 July 2011, the Council agreed on a new Greek assistance programme, which included a sizable bail-in for private investors (with estimated losses amounting to €50 billion).

Table 4

Regression Results

(continuous crisis variable)

	(1)	(2)	(3)	(4)
spread(t–1)	0.947 ***			
	(0.040)			
general government debt	0.179	2.088 ***	0.625 ***	2.000 ***
	(0.112)	*(0.278)*	*(0.057)*	*(0.256)*
private debt	0.087 **	1.117 ***	0.388 ***	1.102 ***
	(0.043)	*(0.073)*	*(0.032)*	*(0.070)*
GDP growth	–1.172 **	–3.301 ***	–6.520 ***	–3.483 ***
	(0.516)	*(0.825)*	*(0.705)*	*(0.870)*
current account surplus	0.068	1.599 ***	–1.360 ***	1.494 ***
	(0.166)	*(0.354)*	*(0.217)*	*(0.361)*
liquidity (bid-ask)	1.413	6.517 ***	10.154 ***	7.141 ***
	(1.144)	*(1.816)*	*(1.015)*	*(1.604)*
VIX	0.101	0.604 ***	0.890 ***	0.597 ***
	(0.068)	*(0.124)*	*(0.121)*	*(0.141)*
Greek rating	–0.238	–4.747 *	–4.120 **	–5.920 **
	(1.626)	*(2.857)*	*(1.728)*	*(2.611)*
public debt x Greek rating	0.028 *	0.165 ***	0.176 ***	0.171 ***
	(0.016)	*(0.032)*	*(0.019)*	*(0.030)*
private debt x Greek rating	0.009	0.073 ***	0.105 ***	0.074 ***
	(0.011)	*(0.230)*	*(0.011)*	*(0.022)*
GDP growth x Greek rating	–0.743	–2.863 ***	–2.958 ***	–2.144 ***
	(0.484)	*(0.721)*	*(0.308)*	*(0.652)*
current account x Greek rating	–0.126 *	–0.898 ***	–0.920 ***	–0.881 ***
	(0.076)	*(0.128)*	*(0.084)*	*(0.132)*
liquidy x Greek rating	–0.132	–0.196	–0.403 ***	–0.236 *
	(0.097)	*(0.154)*	*(0.081)*	*(0.138)*
VIX*Greek rating	–0.010	0.055	–0.010	0.088
	(0.044)	*(0.079)*	*(0.043)*	*(0.074)*
R^2	0.98	0.91	0.87	0.93
Observations	1,269	1,269	1,269	1,242

Notes: Columns 1,2: LSDV; Column 3: DOLS (1 lead and 1 lag added for each variable; country dummies incl.); Column 4: FGLS. All estimations except column 4: Huber-white robust standard errors in parentheses. *: significant at the 10 per cent level; ** at the 5 per cent; *** at 1 per cent.

These policy actions may have influenced sovereign debt markets. To investigate this issue, we augment our empirical models with three event dummies, set equal to one in May 2010 (creation of the EFSF and launch of the SMP), December 2010 (creation of the ESM) and July 2011 (Greek private sector involvement), respectively. Introducing the event dummies does not change the economic and statistical significance of the other coefficients (Table 5, columns 1-4). However, non-conventional actions of EU policy-makers had an impact. In particular, as expected, the actions taken in May 2010 eased the tensions on the sovereign debt markets, and the involvement of the private sector in the Greek debt restructuring increased spreads. The results concerning the announcement of the ESM are somewhat less obvious, as that policy dummy is either insignificant (Table 5, columns 1 and 2) or significant with a positive sign (Table 5, columns 3 and 4). This indicates that the replacement of the temporary EFSF with the permanent ESM did not calm the markets, possibly owing to the news that Ireland as well as Greece had lost market access and had to be bailed-out, or to the official announcement that private sector involvement would be a permanent feature of the EU crisis resolution mechanism in the future.

5.5 A richer set of common factors

Ideally, one would like to control completely for unobserved time-varying common factors with a full set of time dummies. In practice, however, this would drastically reduce the degrees of freedom of our estimation. Moreover, the crisis dummy, which is the focus of our analysis, would be collinear with these dummies.[16] However, we can go some way in accounting for common time trends by enriching our vector of controls. In particular, we add to our F_t vector two further variables: (1) the monetary policy rate set by the ECB (*i.e.*, the interest rate on main refinancing operations); (2) an index of economic policy uncertainty for Europe computed recently by Baker *et al.* (2013). This second addition is quite interesting for its own sake. According to this index, economic policy uncertainty increased on average by 48 per cent in the crisis period. We show that this richer specification leaves our results unaffected (Table 6, columns 1-4). The two common factors appear significant in some but not all of the models that we estimate. They display the expected signs: both a tightening of monetary policy and an increase in policy uncertainty tend to increase sovereign spreads.

6 Computing the long-run level of sovereign spreads

Equation (3) can be rewritten applying the Oaxaca-Blinder decomposition to the crisis-induced change in spreads, as in Eichengreen and Mody (2000). That is, the difference between the pre-crisis and the crisis spread can be decomposed into two parts: one due to a change in the regressors, the other due to a change in the coefficients. The change in the constant term is what we identify as the "pure" contagion effect. Conditional on the occurrence of the crisis, one gets:

$$\begin{aligned} E(s_{it}^{LR}|D_{it} &= 0) = \alpha_{0i} + \beta_0 E(Z_{it}|D_{it}=0) + \beta_1 E(F_t|D_{it}=0) \ , \\ E(s_{it}^{LR}|D_{it} &= 1) = \alpha_{0i} + \gamma_0 + (\beta_0+\gamma_1)\, E(Z_{it}|D_{it}=1) + (\beta_1+\gamma_2)\, E(F_t|D_{it}=1), \end{aligned}$$

where the *LR* superscripts serve as a reminder that we are considering here the long-run equilibrium values of the spread. Therefore, the post-crisis long-run value of the spread is equal to:

---

[16] Incidentally, this is why Bernoth *et al.* (2012) cannot allow for pure contagion.

Table 5

Regression Results

(policy dummies)

	(1)	(2)	(3)	(4)
spread(t–1)	0.926 ***			
	(0.034)			
general government debt	0.007	1.299 ***	0.337 ***	1.222 ***
	(0.113)	*(0.288)*	*(0.065)*	*(0.249)*
private debt	0.047	0.900 ***	0.167 ***	0.894 ***
	(0.038)	*(0.073)*	*(0.037)*	*(0.075)*
GDP growth	–0.550 **	–0.107	–2.340 ***	–1.120
	(0.269)	*(0.637)*	*(0.795)*	*(0.743)*
current account surplus	0.102	2.338 ***	–0.351	2.263 ***
	(0.131)	*(0.346)*	*(0.237)*	*(0.352)*
liquidity (bid–ask)	0.430	7.758 ***	11.000 ***	7.636 ***
	(0.557)	*(1.312)*	*(1.758)*	*(1.424)*
VIX	0.151 ***	0.677 ***	0.960 ***	0.589 ***
	(0.027)	*(0.076)*	*(0.126)*	*(0.102)*
Dummy crisis	–20.962 **	–142.003 ***	–154.590 ***	–138.957 ***
	(10.37)	*(25.854)*	*(16.135)*	*(24.425)*
spread(*t*–1) x crisis	0.079			
	(0.052)			
Public debt x crisis	0.164 *	1.380 ***	1.387 ***	1.291 ***
	(0.092)	*(0.261)*	*(0.163)*	*(0.233)*
Private debt x crisis	0.053	0.376 ***	0.686 ***	0.330 ***
	(0.046)	*(0.131)*	*(0.078)*	*(0.114)*
GDP growth x crisis	–3.692 *	–27.587 ***	–30.780 ***	–22.798 ***
	(2.043)	*(3.607)*	*(1.904)*	*(3.207)*
Current account surplus x crisis	–0.986 *	–5.307 ***	–6.055 ***	–4.964 ***
	(0.536)	*(1.180)*	*(0.655)*	*(1.088)*
Liquidity x crisis	–0.689	–0.504	–3.001 ***	–0.448
	(0.743)	*(1.458)*	*(1.775)*	*(1.414)*
VIX x crisis	0.293	3.908 ***	3.770 ***	3.801 ***
	(0.349)	*(0.882)*	*(0.485)*	*(0.856)*
May 2010	8.488	–107.158 ***	–107.390 ***	–90.014 ***
	(7.750)	*(16.328)*	*(15.991)*	*(15.443)*
December 2010	–11.762	40.575	49.323 ***	66.071 **
	(11.366)	*(27.965)*	*(15.251)*	*(28.857)*
July 2011	54.110 ***	102.693 ***	106.139 ***	107.377 ***
	(16.942)	*(30.333)*	*(15.216)*	*(27.415)*
R^2	0.98	0.88	0.86	0.91
Observations	1,269	1,269	1,269	1,242

Notes: Columns 1,2: LSDV; Column 3: DOLS (1 lead and 1 lag added for each variable; country dummies incl.); Column 4: FGLS. All estimations except column 4: Huber-White robust standard errors in parentheses. *: significant at the 10 per cent level; ** at the 5 per cent; *** at 1 per cent.

Table 6

Regression Results

(more common factors)

	(1)	(2)	(3)	(4)
spread(*t*–1)	0.920 ***			
	(0.035)			
general government debt	0.012	1.381 ***	0.312 ***	1.333 ***
	(0.121)	*(0.303)*	*(0.065)*	*(0.258)*
private debt	0.059	0.873 ***	0.144 ***	0.901 ***
	(0.039)	*(0.072)*	*(0.038)*	*(0.074)*
GDP growth	–0.418	–0.725	–2.515 ***	–1.684 **
	(0.294)	*(0.684)*	*(0.819)*	*(0.776)*
current account surplus	0.118	2.501 ***	–0.299	2.411 ***
	(0.132)	*(0.357)*	*(0.241)*	*(0.347)*
liquidity (bid–ask)	0.167	6.702 ***	9.508 ***	6.657 ***
	(0.537)	*(1.304)*	*(1.820)*	*(1.399)*
VIX	0.076 ***	0.250 ***	0.252	–0.007
	(0.029)	*(0.093)*	*(0.225)*	*(0.139)*
policy uncertainty	0.037 ***	0.204 ***	0.349 ***	0.045
	(0.013)	*(0.038)*	*(0.090)*	*(0.062)*
monetary policy rate	0.910 ***	–1.048	–0.001	0.832
	(0.249)	*(0.738)*	*(1.503)*	*(0.775)*
dummy crisis	–84.379 ***	–244.561 ***	–231.860 ***	–262.364 ***
	(21.928)	*(55.081)*	*(28.368)*	*(50.019)*
spread(*t*–1) x crisis	0.082			
	(0.050)			
public debt x crisis	0.167 *	1.499 ***	1.511 ***	1.411 ***
	(0.091)	*(0.255)*	*(0.164)*	*(0.220)*
private debt x crisis	0.069	0.416 ***	0.751 ***	0.381 ***
	(0.047)	*(0.133)*	*(0.079)*	*(0.111)*
GDP growth x crisis	–3.053	–24.423 ***	–28.462 ***	–20.492 ***
	(1.947)	*(3.449)*	*(1.920)*	*(3.027)*
current account surplus x crisis	–1.067 **	–5.001 ***	–5.701 ***	–4.776 ***
	(0.544)	*(1.201)*	*(0.6576)*	*(1.108)*
liquidity x crisis	–0.455	0.314	–1.604	0.157
	(0.729)	*(1.484)*	*(1.837)*	*(1.424)*
VIX x crisis	–2.355 **	–1.025	–0.703	–0.855
	(1.005)	*(1.699)*	*(0.955)*	*(1.678)*
policy unceirtanty x crisis	0.669 **	0.168	0.049	0.170
	(0.282)	*(0.559)*	*(0.266)*	*(0.552)*
monetary policy rate x crisis	38.309 **	190.433	165.896 ***	212.190 ***
	(16.755)	*(39.688)*	*(21.661)*	*(29.616)*
R^2	0.98	0.88	0.85	0.92
Observations	1,269	1,269	1,269	1,242

Notes: Columns 1,2: LSDV; Column 3: DOLS (1 lead and 1 lag added for each variable; country dummies incl.); Column 4: FGLS. All estimations except column 4: Huber-White robust standard errors in parentheses. *: significant at the 10 per cent level; ** at the 5 per cent; *** at 1 per cent.

Table 7

Long-run Values of the Spread

(basis points)

	Fitted Values		
Coefficients	*pre-crisis*	*pre-crisis*	*post-crisis*
Fundamentals	*pre-crisis*	*post-crisis*	*post-crisis*
Italy	24	47	247
Austria	23	43	131
Belgium	21	45	210
Finland	0	16	81
France	7	32	175
Ireland	35	335	558
Portugal	46	257	507
Spain	28	97	269
Netherlands	10	35	134

Notes: Spreads computed with coeff. from Table 2, col. 4 (DOLS).

$$
\begin{aligned}
E(s_{it}^{LR}|D_{it} \;=\; & 1) = E(s_{it}^{LR}|D_{it}=0) + \\
& \beta_0\left[E(Z_{it}|D_{it}=1) - E(Z_{it}|D_{it}=0)\right] + \beta_1\left[E(F_t|D_{it}=1) - E(F_t|D_{it}=0)\right] + \\
& + \underbrace{\gamma_0}_{pure} + \underbrace{\gamma_2 E(Z_{it}|D_{it}=1)}_{wake-up\text{-}call} + \underbrace{\gamma_3 E(F_t|D_{it}=1)}_{shift}\,.
\end{aligned}
\tag{5}
$$

Terms in the second row capture the post-crisis change in fundamentals, while terms in the third row capture the different kinds of contagion: γ_0 is what we call pure contagion and is unrelated to country characteristics; $\gamma_2 E(Z_{it}|D_{it}=1)$ captures wake-up-call contagion, is country-specific and depends on fundamentals; $\gamma_3 E(F_t|D_{it}=1)$ is the shift-contagion component.

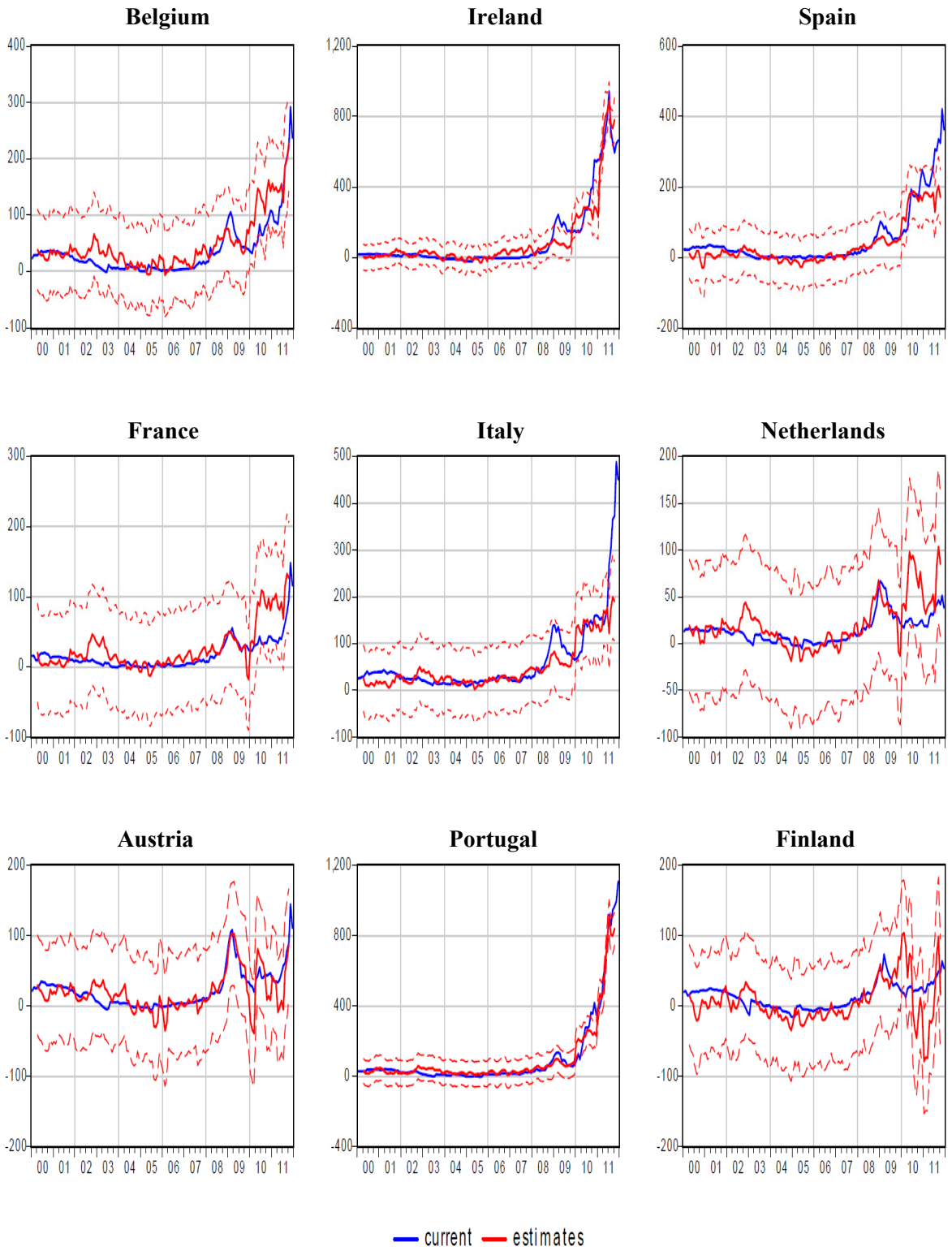
We use the estimates presented in Section 4.3 to compute the various pieces of equation (5). We first consider, for each country, the estimated value of $E[s_{it}^{LR}|D_t=0]$ (Table 7, column 1). We then add to this value the terms in the second line of equation (5) (Table 7, column 2). To compute those values it is necessary to assess the pre- and post-crisis values of the fundamentals and of the VIX. In the table, we put them equal to their respective sample counterparts. Finally, we add the contagion terms, and we get to $E[s_{it}^{LR}|D_t=1]$ (Table 7, column 3).

According to our calculations, for most countries the spreads observed at the end of the sample period (December 2011) are very close to their estimated long-run levels. However, for two countries, namely Spain and Italy, they are considerably above their equilibrium values (Figure 2).

Figure 2

Cointegrated Model: Predicted Values

(dashed lines: 95 per cent conf. bands)



7 Conclusions and policy implications

The analyses presented in this paper suggest that investors largely ignored macroeconomic indicators when pricing sovereign bonds before October 2009. At that date they started to discriminate among sovereigns based on the quality of their fundamentals. In particular, countries with worse fiscal conditions and external positions recorded higher spread levels. In the terminology adopted in this paper, the sharp increase in spreads observed for some countries after the start of the Greek crisis was the result of a wake-up-call rather than of a pure form of contagion: the Greek crisis increased investors' sensitivity to the fundamentals of the other euro-area countries.

Concerning the policy implications of our results, the fact that for some countries the current spread levels are above their long-run values argues for policy measures to speed up the convergence of spreads towards their long-run levels. It must be stressed that the absence of pure contagion, per se, does not settle the normative issue concerning the investors' ability to price sovereign bonds correctly.[17] We cannot say, for example, whether the increased post-crisis sensitivity to fundamentals is "appropriate": it could also be "too limited" or "excessive". Answering this question would be important in implementing the OMT. More broadly, it would help settle the debate about the relative merits of market-based as against rules-based fiscal and macroeconomic discipline, which is as old as the very idea of EMU. Indeed, already in 1989 the Delors report worried that market forces "might be either too slow and weak or too sudden and disruptive". Further research on this issue, both theoretical and empirical, is warranted.

Another related question is the possible reoccurence of a regime in which investors do not pay attention to fundamentals. To avoid disruptive cycles of excessive complacency and sudden wake-up calls, it seems advisable to push for market-friendly policies that highlight the fundamental imbalances of EMU countries even in good times. This is the rationale behind the decision to periodically publish scoreboards prepared by the European Commission and the results of the Macroeconomic Imbalance Procedure. Needless to say, the variables included and the methodology adopted in such exercises should be based on sound economic principles.[18]

---

[17] Symmetrically, the existence of contagion does not imply malfunctioning of the markets. This is particularly true in the case of wake-up-call and shift contagion. For example, rational inattention stories would imply that markets are constrained-efficient, once the limits in information processing are taken into account. It appears more difficult, but not impossible, to reconcile "pure" contagion with market efficiency and/or with full rationality (Kyle and Chiong, 2001, Kodres and Pritsker, 2002).

[18] Another avenue for further research would be to investigate whether the risk of the break-up of the euro area influences sovereign debt spreads. Di Cesare *et al.* (2012) point out that this risk began to be perceived by investors in 2012, therefore after the end of our sample.

REFERENCES

Acharya, V.V., I. Drechsler and P. Schnabl (2011), "A Phyrric Victory? Bank Bailouts and Sovereign Credit Risk", NBER, Working Paper, No. 17136.

Akitoby, B. and T. Stratmann (2008), "Fiscal Policy and Financial Markets", *Economic Journal*, Vol. 118, pp. 1971-85.

Alter, A. and Y.S. Schuler (2011), "Credit Spread Interdependencies of European States and Banks During the Financial Crisis", University of Konstanz, Department of Economics, Working Paper, No. 24.

Angeloni, C. and B. Wolff (2012), "Are Banks Affected by Their Holdings of Government Debt?", Bruegel Working Paper, No. 07/2012.

Arezeki, R., B. Candelona and N. Sy (2011), "Sovereign Rating News and Financial Markets Spillover: Evidence Form the European Debt Crisis", IMF, Working Paper, No. 11/68.

Attinasi, M.G., C. Checherita and C. Nickel (2009), "What Explains the Surge in Euro Area Sovereign Spreads During the Financial Crisis of 2007-09?", ECB, Working Paper, No. 1131.

Baltagi, B.H. (2008), *Econometric Analysis of Panel Data*, fourth edition, John Wiley and Sons, Chichester (UK).

Baltagi, B.H., C. Kao and L. Liu (2008), "Asymptotic Properties of Estimators for the Linear Panel Regression Model with Random Individual Effects and Serially Correlated Errors: The Case of Stationary and Non-stationary Regressors and Residuals", *Econometrics Journal*, Vol. 11, pp. 554-72.

Baltagi, B.H., C. Kao and S. Na (2011), "Test of Hypotheses in Panel Data Model when the Regressor and the Disturbances Are Possibly Non-stationary", *Advances in Statistical Analysis*, Vol. 95, No. 4, pp. 329-50.

Banerjee, A. (1999), "Panel Data Unit Roots and Cointegration: An Overview", *Oxford Bulletin of Economics and Statistics*, Vol. 61, pp. 607-29.

Beber, A., M.W. Brandt and K.A. Kavajecz (2009), "Flight-to-quality or Flight-to-liquidity? Evidence from the Euro-area Bond Market", *Review of Financial Studies*, Vol. 22, No. 3, pp. 925-57.

Bekaert, G., M. Ehrmann, M. Fratzscher and A.J. Mehl (2011), "Global Crises and Equity Market Contagion", NBER, Working Paper, No. 17121.

Baker, S.R., N. Bloom and S.J. Davis (2013), "Measuring Economic Policy Uncertainty", mimeo.

Bernoth, K., J. von Hagen and L. Schuknecht (2012), "Sovereign Risk Premiums in the European Government Bond Market", *Journal of International Money and Finance*, Vol. 31, pp. 975-95.

Cáceres, C., V. Guzzo and M. Segoviano (2010), "Sovereign Spreads: Global Risk Aversion, Contagion or Fundamentals?", IMF, Working Paper, No. 120/10.

Calvo, G.A. (1988), "Servicing the Public Debt: The Role of Expectations", *American Economic Review*, Vol. 78, pp. 647-61.

Calvo, G.A. and E.G. Mendoza (2000), "Rational Contagion and the Globalization of Securities Markets", *Journal of International Economics*, Vol. 51, No. 1, pp. 79-113.

Chari, V.V. and P.J. Kehoe (2003), "Hot Money", *Journal of Political Economy*, Vol. 111, No. 6, pp. 1262-92.

Choi, I. (2006), "Non-stationary Panels", in *Palgrave Handbooks of Econometrics*, Vol. 1, Palgrave Macmillan, London.

Chudik, A. and M. Fratzscher (2013), "Liquidity, Risk and the Global Transmission of the 2007-08 Financial Crisis and the 2010-2011 Sovereign Debt Crisis", *European Economic Review*, forthcoming.

Codogno, L., C.A. Favero and A. Missale (2003), "Yield Spreads on EMU Government Bonds", *Economic Policy*, pp. 503-32, October.

De Santis, R.A. (2012), "The Euro Area Sovereign Debt Crisis: Safe Haven, Credit Rating Agencies and the Spread of the Fever From Greece, Ireland and Portugal", ECB, Working Paper, No. 1419.

Di Cesare, A., G. Grande, M. Manna and M. Taboga (2012), "Recent Estimates of Sovereign Risk Premia for Euro-area Countries", Bank of Italy, Occasional Paper, No. 128.

Dungey, M., R. Fry, B. González-Hermosillo and V.L. Martin (2005), "Empirical Modelling of Contagion: A Review of Methodologies", *Quantitative Finance*, Vol. 5, No. 1, pp. 9-24.

Eichengreen, B., A. Rose and C. Wyplosz (1996), "Contagious Currency Crises: First Tests", *Scandinavian Journal of Economics*, Vol. 98, No. 4, pp. 463-84.

Eichengreen, B. and A. Mody (2000), "What Explains Changing Spreads on Emerging Market debt?", in S. Edwards (ed.), *Capital Flows and the Emerging Economies: Theory, Evidence and Controversies*, University of Chicago Press, Chicago (IL).

Eichengreen, B. and A.K. Rose (1999), "Contagious Currency Crises: Channels of Conveyance", in T. Ito and A.O. Krueger (eds.), *Exchange Rates in Rapidly Developing Countries: Theory, Practice, and Policy Issues*, University of Chicago Press, Chicago (IL).

Eichengreen, B. and R. Hausmann (2004), *Other People's Money: Debt Denomination and Financial Instability in Emerging Market Economics*, University of Chicago Press, Chicago (IL).

European Commission (2009), *EMU@1O: Successes and Challenges After 10 years of EMU*, Brussels.

——————(2012), "Scoreboard for the Surveillance of Macroeconomic Imbalances", European Economy, Occasional Paper, No. 92.

Favero, C.A., M. Pagano and E.L. von Thadden (2010), "How Does Liquidity Affect Government Bond Yields?", *Journal of Financial and Quantitative Analysis*, Vol. 45, No. 1, pp. 107-34.

Forbes, K.J. and R. Rigobon (2002), "No Contagion, Only Interdependence: Measuring Stock Market Comovements", *Journal of Finance*, Vol. 57, No. 5, pp. 2223-61.

Forbes, K.J. (2012), "The Big C: Identifying Contagion", NBER, Working Paper, No. 18465.

Gande, A. and D.C. Parsley (2005), "News Spillovers in the Sovereign Debt Market", *Journal of Financial Economics*, Vol. 75, No. 3, pp. 691-734.

Giavazzi F. and L. Spaventa (2011), "Why the Current Account May Matter in a Monetary Union: Lessons from the Financial Crisis in the Euro Area", in M. Beblavy, D. Cobham and L. Ódor (eds.), *The Euro Area and the Financial Crisis*, Cambridge University Press, Cambridge (UK).

Goldstein, M. (1998), *The Asian Financial Crises: Causes, Cures, and Systemic Implications*, Institute for International Economics, Washington (D.C.).

Goldstein, M., G.L. Kaminsky and C.M. Reinhart (2000), *Assessing Financial Vulnerability: An Early Warning System for Emerging Markets*, Peterson Institute of International Economics Press, Washington (D.C.).

Gourinchas, P.O. and M. Obstfeld (2012), "Stories of the Twentieth Century for the Twenty-First", *American Economic Journal: Macroeconomics*, Vol. 4, No. 1, pp. 226-65.

Hallerberg, M. and G. Wolff (2008), "Fiscal Institutions, Fiscal Policy and Sovereign Risk Premia", *Public Choice*, Vol. 136, pp. 379-96.

Hondroyiannis, G., H.H. Kelejian and G.S. Tavlas (2012), "Government Bond Spread and Contagion Among Euro Area Countries", Bank of Greece, mimeo.

Judson, R.A. and A.L. Owen (1999), "Estimating Dynamic Panel Data Models: A Guide for Macroeconomists", *Economics Letters*, Vol. 65, pp. 9-15.

Kao, C. and M.H. Chiang (2000), "On the Estimation and Inference of a Cointegrated Regression in Panel Data", *Advances in Econometrics*, Vol. 15, pp. 179-222.

Kiviet, J.F. (1995), "On Bias, Inconsistency and Efficiency of Various Estimators in Dynamic Panel Data Models", *Journal of Econometrics*, Vol. 68, pp. 53-78.

Kyle, A.S. and W. Xiong (2001), "Contagion as a Wealth Effect", *Journal of Finance*, Vol. 56, No. 4, pp. 1401-40.

Kodres, L.E. and M. Pritsker (2002), "A Rational Expectations Model of Financial Contagion", *Journal of Finance*, Vol. 57, No. 2, pp. 769-99.

Masson, P.R. (1998), "Contagion-monsoonal Effects, Spillovers, and Jumps Between Multiple Equilibria", IMF, Working Paper, No. 98/142.

——————(1999), "Multiple Equilibria, Contagion, and the Emerging Market Crises", IMF, Working Paper, No. 99/164.

Nickell, S.J. (1981), "Bias in Dynamic Models with Fixed Effects", *Econometrica*, Vol. 49, pp. 1417-26.

Pericoli, M. and M. Sbracia (2003), "A Primer on Financial Contagion", *Journal of Economic Surveys*, Vol. 17, No. 4, pp. 571-608.

Phillips, P.C.B. and H.R. Moon (1999), "Linear Regression Limit Theory for Non-stationary Panel Data", *Econometrica*, Vol. 67, pp. 1057-111.

—————— "Nonstationary Panel Data Analysis: An Overview of Some Recent Developments", *Econometric Reviews*, Vol. 19, No. 3, pp. 263-86.

Qian, R., C.M. Reinhart and K.S. Rogoff (2011), "On Graduation from Default, Inflation and Banking Crises: Elusive or Illusion?", in D. Acemoglu and M. Woodford (eds.), *NBER Macroeconomics Annual 2010*, MIT Press, Cambridge (MA).

Saikkonen, P. (1991), "Asymptotically Efficient Estimation of Cointegrating Regressions", *Econometric Theory*, Vol. 7, pp. 1-71.

Schinasi, G.J. and R.T. Smith (2000), "Portfolio Diversification Leverage and Financial Contagion", *IMF Staff Papers*, Vol. 47, No. 2, pp. 159-76.

Schuknecht, L., J. Von Hagen and G. Wolswijk (2009), "Government Risk Premiums in the Bond Market: EMU and Canada", *European Journal of Political Economy*, Vol. 25, pp. 371-84.

Schuknecht, L., J. Von Hagen and G. Wolswijk (2011), "Government Bond Risk Premiums in the EU Revisited: The Impact of the Financial Crisis", *European Journal of Political Economy*, Vol. 27, pp. 36-43.

Sgherri, S. and E. Zoli (2009), "Euro Area Sovereign Risk During the Crisis", IMF, Working Paper, No. 09/222.

Stock, J.H. and M.W. Watson (1993), "A Simple Estimator of Cointegrating Vectors in Higher Order Integrated Systems", *Econometrica*, Vol. 61, pp. 783-820.

Thornton, D.L. (2009), "What the Libor-OIS Spread Says", Federal Reserve Bank of St. Louis, *Economic Synopses*, No. 24.

Tutino, A. (2011), "Rational Inattention Guides Overloaded Brains, Helps Economists Understand Market Behaviour", *Federal Reserve Bank of Dallas Economic Letter*, Vol. 6, No. 3.

Wiederholt, M. (2010), "Rational Inattention", in *The New Palgrave Dictionary of Economics*, Palgrave Macmillan.

COMMENTS ON SESSION 1
THE INTERACTION OF FISCAL POLICY AND MACROECONOMIC IMBALANCES

Adi Brender[*]

In this note I discuss three of the papers that were presented in this session: "Indebtedness, Deleveraging Dynamics and Macroeconomic Adjustment" by Carlos Cuerpo, Inês Drumond, Julia Lendvai, Peter Pontuch and Rafal Raciborski; "Fiscal Policy Interactions and Imbalances in a Monetary Union" by Ida Hjortsø; and "Empirical Analysis of Current Account Adjustments at Fixed Exchange Rates" by Jean J. Le Pavec. All three papers share a common feature: they deal with countries that try to live beyond their means. Such policies may work for a while but eventually lead to a costly adjustment. In Cuerpo *et al.* the realization of these adjustments is in the form of deleveraging, Hjortsø's work focuses on welfare loss due to current account imbalances and inflation, and Le Pavec's on current account adjustments in countries that try to maintain an exchange rate peg. All three papers are pretty much in the building stage of their analysis and do not, therefore, suggest clear short-term policy implications or recommendations. In the discussion below I try to highlight the main contributions of these papers, and to suggest where the analysis can be expanded or modified to better answer the core questions.

1 Comments on "Indebtedness, Deleveraging Dynamics and Macroeconomic Adjustment" by Carlos Cuerpo, Inês Drumond, Julia Lendvai, Peter Pontuch and Rafal Raciborski

The paper provides intensive data work on households' and non-financial corporations' debt in the EU. They cluster countries according to various leverage criteria and then use the QUEST model to analyze potential macro effects of deleveraging and their sensitivity to various country and process characteristics. The paper does not relate debt data to macro variables.

Despite its broad data coverage the paper does miss on some potentially useful elements of the analysis. Key among those is that the cluster analysis would have been more insightful if clusters were mutually exclusive and based on more variables. The paper could also benefit from creating a direct link between its first and second parts. Additionally, the deleveraging simulations can be enriched by information from the cluster analysis, e.g. by comparing deleveraging of typical countries from Cluster A to typical ones from cluster B. If such clusters were both mutually exclusive and framed around meaningful economic concepts, the discussion of deleveraging would have become much more relevant to policy.

While the paper does not lend its analysis directly to policy, some policy implications do emerge from the analysis. Most importantly, it highlights the point that to be able to offset private deleveraging fiscal policy should be more counter-cyclical (including in financial cycles) during boom periods, particularly in small countries in a monetary union. This indicates a sort of Ricardian behavior by governments in the face of private leveraging that requires higher pubic savings when the private sector accumulates debt. If such a policy does not take place when balance sheets expand, tackling the consequences when things turn bad may be too late. This question may gain relevance as unified bank supervision is adopted in the Eurozone, because it implies that, in some countries, government bonds may not be accepted as a riskless asset even for

[*] Central Bank of Israel.

their domestic banks. This context of a unified risk assessment stresses the question whether government rating should also account for private debt in the country?

2 Comments on "Fiscal Policy Interactions and Imbalances in a Monetary Union" by Ida Hjortsø

Hjortsø's paper highlights potential benefits of fiscal coordination in a monetary union. While bringing out some interesting insights, the results depend to a large extent on the assumed parameters. In particular, they depend on whether imports complement or substitute local goods. In practice, the magnitude of the home bias in consumption is known to depend on the size of the economy, meaning that the results are limited to larger countries. Beyond that issue, the paper points out, as commonly found in the literature, that coordination in a benevolent policy setting environment is beneficial. However, the "real world" policy question is often how to create such cooperation and whether it is possible, rather than whether it may be beneficial.

To enhance the paper's contribution, the author may wish to focus on issues that are more at the core of current policy discussions. In particular, it may be useful to highlight questions related to the relative size of the discussed countries. Looking at small vs. large economies may be particularly important because the monetary authorities are likely to pay attention to the weighted average of the countries and in that case their contribution to mitigating shocks in small members of the union may not be significant. It is likely that a fiscal coordination authority would do the same thing and hence leave the smaller economies without macro stabilization instruments. In that sense the model seems to be more about Germany-France than Germany-Portugal/Greece, for example. Beyond that, it should be recognized that fiscal policy is not just about macro consequences and smoothing but also about preferences and national tastes. In terms of policy implications, the paper makes a case for coordination but ignores the trade-offs that are in the heart of the decision of small "different" countries whether to give up fiscal independence in favor of coordination. Indeed, more elaborate modeling may indicate that Pareto improving redistribution is a valid option but, even then, realizing it is not trivial. In this respect such an analysis may also have implications as to whether a full monetary union is sustainable.

To expand the current discussion the paper may take advantage of some elements included in the Cuerpo *et al.* paper. This may be done by picking up some of the insights regarding the role of fiscal policy in smaller countries in a monetary union and reflecting the policy trade-offs that arise from their model. Furthermore, utilizing estimated coefficients from the macro model would help in setting up a more empirically founded baseline case for the analysis.

3 Comments on "Empirical Analysis of Current Account Adjustments at Fixed Exchange Rates" by Jean J. Le Pavec

Le Pavec's paper's key policy question is what can Eurozone countries that face current account deficits learn from the experience of other countries? Specifically he examines how to adjust while maintaining a peg. Based on extensive data work he looks at current account adjustment episodes across the world and provides a detailed description of "success stories". He finds 38 successful episodes and studies them carefully in order to classify them based on their different characteristics. However, many of these episodes are not relevant to the question because they represent on/off issues such as wars, changes in global commodity prices, political crises and weather changes. All these may result in temporary current account deficits, but these fade away as the transitory shock dissipates. The analysis is more interesting with respect to other types of adjustments. Forced adjustments, dictated by the markets, are fast but may be socially costly. In

contrast, planned and paced reforms are effective and less costly, but found to be very rare in the data.

The main caveat in the paper is that it does not really answer the question it poses. To present the data in a way that is more relevant to the question the author should examine all the cases that required an adjustment, rather than only successful adjustments, and identify policies that sustained the peg. As is, the paper may be positively highlighting strategies that failed in most cases (ended in continuing deficits or abandoning the peg), simply because they are common and succeeded in some cases. Moreover, the main recommendation emerging from the analysis is to "allow more time" for adjustments when they have to be implemented. Unfortunately, such a recommendation is based on the assumption that the time inconsistency problem can be overcome. The author should bring more evidence that it is realistic in nowadays Eurozone. Other difficulties in the analysis stem from the comparison of the results of "autonomous adjustments" with other types. Such a comparison is not "fair" because, by definition, the initial conditions are different, so without an appropriate control for the initial conditions it is not legitimate. In addition, the discussion would benefit from an analysis of what differentiates countries that avoided a current account problem altogether from those that had to find a way to step out of one.

To help the paper provide a more direct contribution to the studied question and the relevant analytical and policy discussions, the most important change would be to compare countries that failed to sustain the peg with successful ones; this may identify what strategies are effective. To do that the author could look at strategies across all countries (not just successful ones) rather than at countries across strategies, as done in the current version. This analysis will be greatly enhanced by using multi-variate econometrics, preferably with methods that would handle selection endogeneity with respect to whether the exchange rate and the financial pressure are exogenous. Further contribution to the analysis, as well as to shortening the paper, may come from focusing on relevant cases. As noted above, many of the included episodes reflect temporary shocks in developing countries that seem less relevant to the main question. Finally, since the author identifies many potential benefits in "planned and paced" adjustments it may be worthwhile to discuss why they are so rare, and whether they are rarer in countries with a peg.

Session 2

MACROECONOMIC DEVELOPMENTS UNDERLYING THE CRISIS OF THE EURO AREA

OPTIMAL FISCAL POLICY MIX AND CURRENT ACCOUNT IMBALANCES: THE CASE OF GREEK ECONOMY

Panagiotis Chronis[*] *and George Palaiodimos*[*]

The paper investigates the twin-deficit hypothesis for Greece within a small-scale VECM with a non-trivial fiscal side over the period 2000q1-2011q4. Our approach enables us: firstly to formulate and explicitly put into hypothesis testing regarding the role of alternative fiscal policy instruments on the trajectory of the current account and secondly to evaluate the effectiveness of the current austerity mix in macroeconomic imbalances. Allowing for a number of factors that influence the long-run equilibrium of the current account adjustment we find no evidence against the twin-deficit hypothesis. Still the fiscal deficit pass through into current account imbalances is moderate. Additionally, even though government expenditure reductions are consistent with an improvement in current account position, total taxation increases appear to deteriorate external imbalances despite the positive contribution they have in fiscal deficit reduction. Effectively, this is attributed to the effect that taxation hikes have on price competitiveness. Lastly, when disaggregating the fiscal deficit to its components we find evidence that indirect taxation increases have adverse results compared to direct taxation increases when it comes to reducing existing current account imbalances. At the expenditure side, wages moderation and public investment increases reduce current account imbalances indicating, in the latter case, the existence of significant productivity and competitiveness externalities for the Greek economy.

1 Introduction

After nearly four years of fiscal consolidation and following a steady path of growing external imbalances during the period 2000-09, the Greek economy is seeking new ways of promoting and funding growth. This is especially important since a significant deleveraging is taking place at the same time. Turning from current account deficit to significant current account surpluses may exhibit a significant contribution in this purpose and contribute to the hugely needed capital accumulation. Following current economic adjustment programs, one needs to describe the implications of alternative fiscal policy instrument and carefully monitor their comparative contribution on current account dynamics.

In this context, we employ a small-scale VECM to address the basic relationship between the current account position, the associated fiscal policy and credit liquidity conditions in Greece. Our investigation stems from the current account inter-temporal approach, which was initially proposed by Sachs (1981) and Buiter (1981) and later extended by Obstfeld and Rogoff (1995). Despite our main interest which focuses on the nexus between current account balance and fiscal policy one cannot ignore the relationship between the current account position and the other factors referred in the relevant literature (*i.e.*, real effective exchange rate, private investments, demographic factors, and economic convergence indicator etc).

---

[*] Bank of Greece, Economic Research Department.

Corresponding author: Panagiotis Chronis, Fiscal Affairs Division, Economic Research Department, Bank of Greece – 21, E. Venizelos Avenue – Athens 102 50 – Greece. Tel. +30 210 3202368, E-mail: pchronis@bankofgreece.gr

We would like thank H. Gibson, G. Zombanakis, G. Hondrogiannis, E. Tzavalis and D. Papaoikonomou for their comments. We also like to acknowledge Angeliki Safari for excellent editing assistance. Moreover we would like to acknowledge the participants of the 15th Public Finance Workshop organized by Banca d'Italia and especially Fuad Hazanov for his suggestions.

The views expressed are those of the authors and should not be interpreted as necessarily those of Bank of Greece. All remaining errors are those of the authors.

Additionally, we contribute to the relationship between the current account balance and the fiscal policy mix by covering both spending and revenue side. Based on traditional textbook literature, an increase in government expenditures is consistent with disposable income increases (reductions) leading to current account deficit worsening (improvements). On the other hand, total revenue increases may reflect either a positive effect leading to disposable income decreases (again based on the disposable income approach) or a negative effect (the competitiveness effect) resulting to the widening of current account imbalances.

Our results indicate that the twin deficit hypothesis holds for Greece even after the recent years of crisis. According to our estimates the contribution of tax revenue is negative and greater than the relevant public expenditure effect. More specifically, even though taxation increases are consistent with fiscal deficit improvements they do not allow for improvements in the external sector (price competitiveness) since they mitigate the effects of reforms in labour and product market on unit labour cost. According to our estimates, it is proved that indirect taxation increases (*i.e.*, VAT taxation and other consumption taxations) lead to current account deteriorations as they put a burden on domestic production cost while direct taxation increases apart from deficit improvements lead also to current account improvements due to the income effect that they have. On the spending side, our estimates prove that wage moderation serves both the purposes of fiscal reduction and current account deficit reduction. Lastly, public investment reductions while serving fiscal consolidation have a negative on current account deficit by constraining the productivity and competitiveness of the economy. This differential pass through of disaggregate fiscal policy options to current account adjustment supports the existence of an optimal mixture of fiscal consolidation (expenditures vs. revenues) for a significant current account rebalancing.

The paper is organized as follows. In the next section, the current account and the respective balance of payments identity is analysed followed by the recent pattern of current account developments in Greece. In Section 3, the theoretical framework is presented along with the open form representation of our empirical model. The next section provides details over the employed data set and the methodology we follow. In Section 5, empirical results are presented and in the last section we conclude.

2 Conceptual framework

a) The accounting identity of current account balance

Current account is defined as the difference between the saving and investment of the private and public sector. In terms of national account balance representation, the current account balance incorporates the *trade balance* (the differences between exports and imports), the *service balance*, (which in the case of Greece, mainly reflects tourism, transportation, etc), the *income balance* (reflecting net payments for interest, dividends, profits on foreign investments) and the *current transfers* related to capital inflows and outflows like EU transfers to the Greek economy, structural funds related to the cofinancing of the public investment budget and the Greek contribution of the EU budget. In an open economy context, where savings are not necessarily equal to investment and under the assumption of mobile international capital, the current account deficit (*i.e.*, domestic investment exceeds saving) is financed from abroad.

Building on current account, another representation of a country's external position is also the balance of payments which is expressed as the outcome of current account position, capital transfers position (reflecting inflows and outflows with respect to: specific contributions to EU budget, inflows involving EU structural funds and Social cohesion funds) and lastly the *financial accounts* (*i.e.*, the difference between inflows and outflows of direct investments, portfolio investments and lastly the rate of change in foreign reserves).

b) Current account developments in Greece

Historically, Greece, and other economies in the euro area have been regarded as countries with significant current account imbalances. However, the magnitude and persistence of such imbalances in the period after the introduction of the euro in 1999 appears to be greater compared with the pre euro period (Barnes, Lawson and Radziwill 2010).

In the eve of the global financial crisis in 2008, dispersion in current account positions for the European Union – especially euro area countries – was greater than OECD average position (Blanchard and Giavazzi, 2002). Most euro area periphery countries did have larger current account deficits compared to core EMU member states, primarily reflecting differences in competitiveness, significant financial easing, consumption and import eruption, and the pursue of periphery counties to close infrastructure gap with other EMU countries with massive promotion of investments.

For Greece, the main drivers[1] behind the significant worsening of current account position refer to i) the constant and significant loss of competitiveness due to persistently high inflation *vis-à-vis* EMU partners, ii) the followed expansionary fiscal policy reflected in the widening of fiscal deficit and the accumulation of debt, iii) the significant leverage build up that contributed to the increase of domestic demand and real GDP growth. After-2008, and following the significant fiscal consolidation program, Greek external imbalances appear to adjust from 15 per cent of GDP in 2008 to below 10 per cent of GDP in 2011.

More specifically, the trade balance (Figure 1) in Greece shows a consistent trade deficit during the entire examined period. However, during the last three years (2009-11) a substantial improvement is recorded due to an import fall mainly reflecting current contraction of domestic demand. When excluding oil (refineries) and receipts from ships, the reduction of trade deficit becomes more pronounced. Exports are also slightly recovering as a result of lower unit labor costs (Figure 2) and the significant structural reforms that are related to the flexibility of the labor market.

The service balance (Figure 3) in Greece has had a positive contribution over the same period. The observed surplus has an upward trend over the last years reflecting positive contributions from the two main value added sectors of the Greek economy that is tourism and shipping. Still, in 2009 the net travel and transportation revenue reflected a huge drop depicting among other factors the significant contraction of the shipping industry following the reduction in global freight rates. Still, despite the observed post 2009 improvement in tourism and shipping balance, both levels remain below their pre 2009 values.

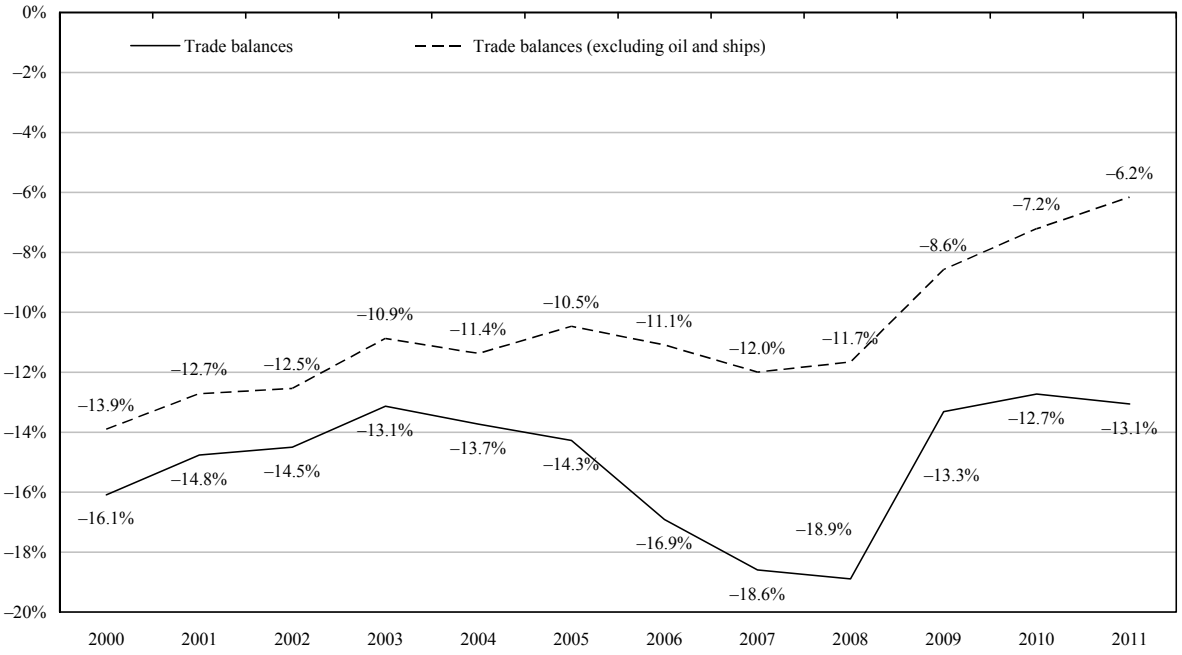
As far as income balance is concerned (Figure 4), one may observe a constant post-2000 deterioration reflecting mainly increased general government interest payments and profits earned from foreign investments in Greece. Starting from 0.7 per cent of GDP in 2000, income balance rises its negative contribution to 4.6 per cent of GDP in 2008. During the same period current transfers (Figure 4) appear to be constantly reduced (2000: 2.6 per cent of GDP, 2009: 0.6 per cent of GDP, 2011: 0.3 per cent of GDP) due to the significant reduction of inflows from EU structural and cohesion funds. The income balance for 2012 is expected to improve due to the recent developments regarding the completion of the PSI and the recent debt buy back operation as well as the lower interest payments of loans from the first and the second economic adjustment program (EU-IMF bailout programs) that reduce interest payments.

---

[1] See, for example, Monokroussos *et al.* (2012) and Brissimis *et al.* (2010).

Figure 1

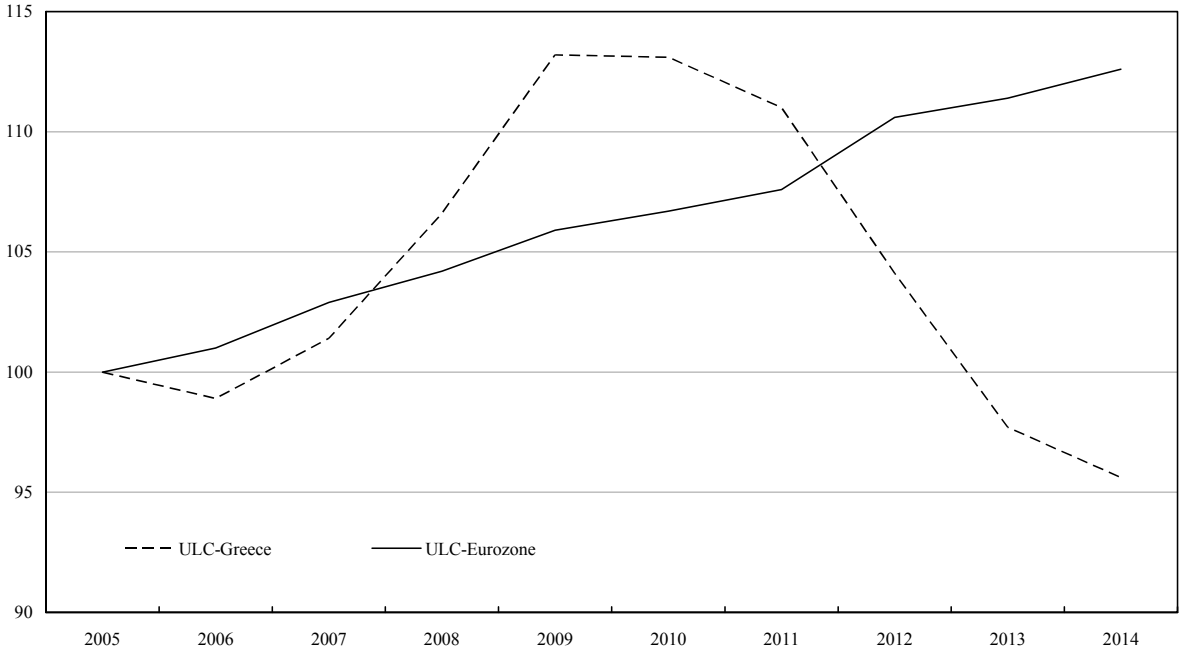
Trade Balance
(percent of GDP)



Source: Bank of Greece-Eurostat.

Figure 2

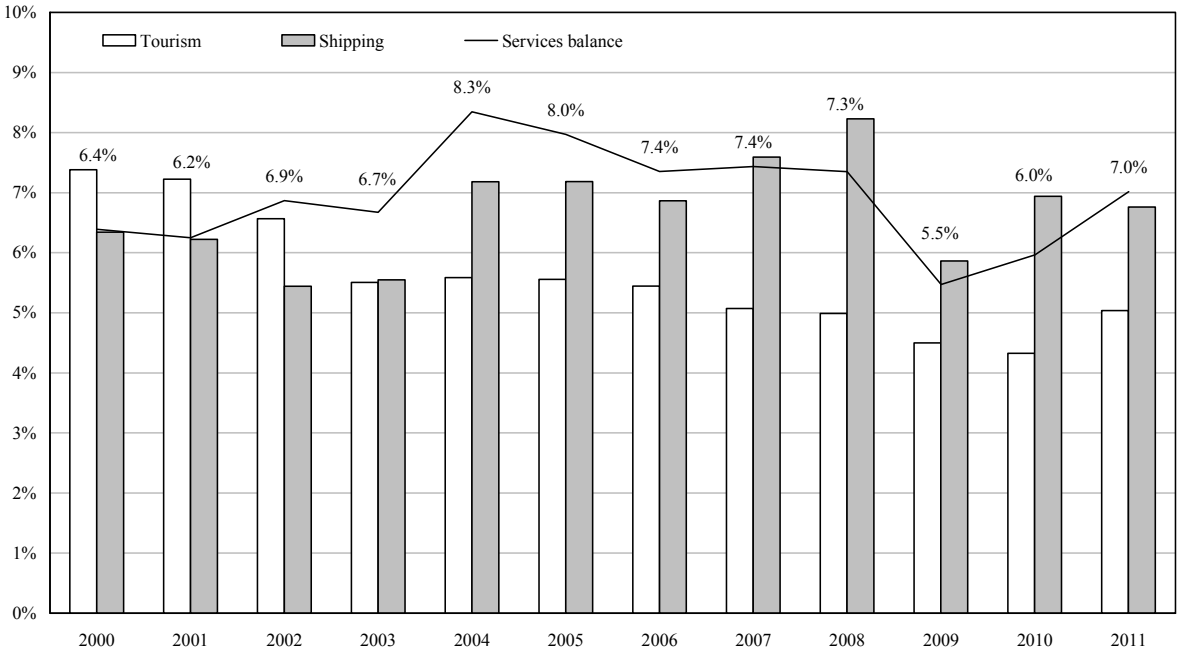
Unit Labour Cost (2005=100)



Source: Eurostat.

Figure 3

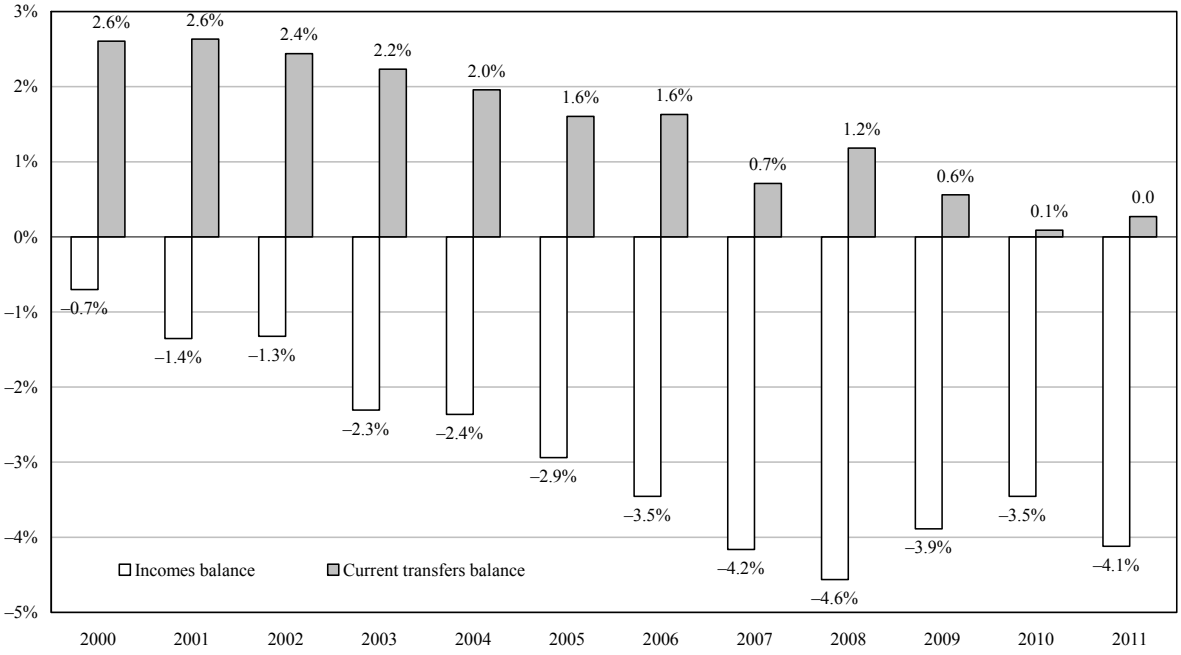
Services Balance
(percent of GDP)



Source: Bank of Greece-Eurostat.

Figure 4

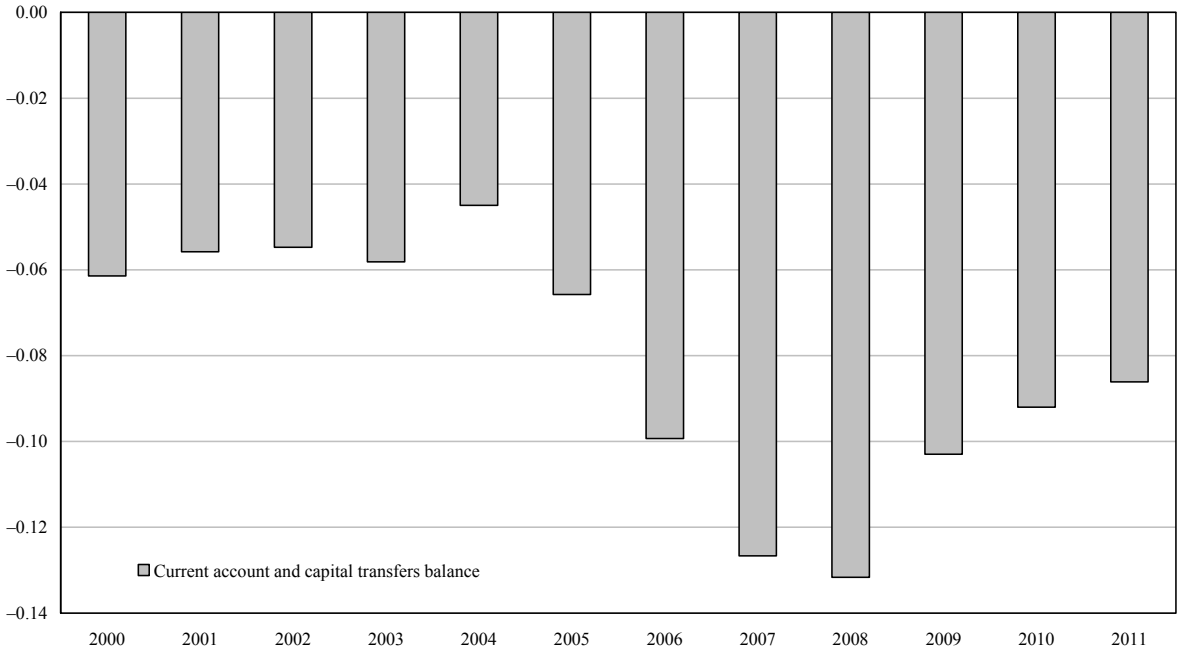
Income and Current Transfer Balances
(percent of GDP)



Source: Bank of Greece-Eurostat.

Figure 5

Current Account and Capital Transfers Balance
(percent of GDP)



Source: Bank of Greece-Eurostat.

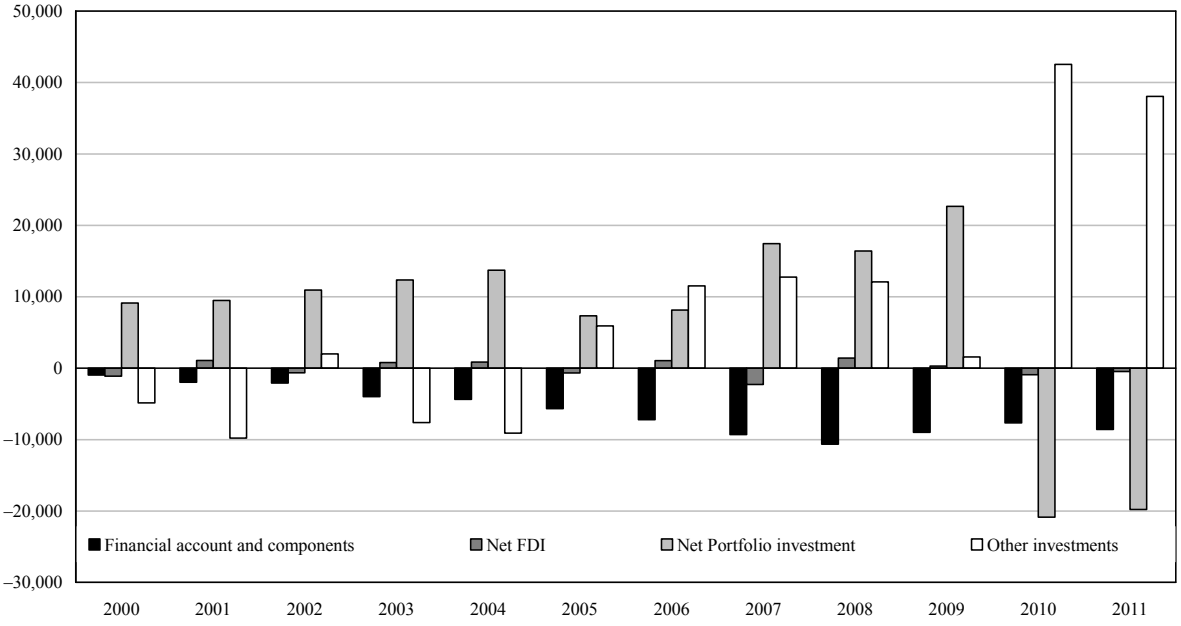
The current account and capital transfer balance (Figure 5) depict significant worsening during the entire period 2000-08 in the aftermath of EMU entrance. This negative contribution is culminated after 2009-with the entrance of Greek economy to recession. As presented previously, falling domestic demand for goods and services (reflected in to falling imports) coupled with limited absorption of the EU structural funds have been key drivers behind this adjustment.

Financial account deterioration is explained by the significant portfolio outflows. The significant recent funding to Greece under the EMU-IMF economic adjustment program influences considerably the country's financial account position. furthermore, the recent privatization program, the expected foreign direct investment flows as well as the return of bank deposits and net portfolio outflows is expected to stabilize the financial account and provide adequate financing to the country's balance-of-payment.

Lastly, turning to the savings – investment representation of current account balance, during the period 2000-11, total investments (financial and gross fixed capital formation investment) are constantly outperforming the savings rate of the economy (Figure 7). This gap is reduced only in the beginning of the decade 2000-02, *i.e.*, until the entrance of Greece into EMU and then follows an expanding path for the period 2002-08. During the same period current account builds up reaching its 2008 peak (15 per cent of GDP). As expected post crisis developments resulted into the huge rebalancing of investments (from 83 per cent of GDP in 2008 to 14 per cent in 2011) mostly reflected in financial investments and a lower level of total savings (from 13.6 per cent of GDP in 2000 to 6.3 per cent of GDP in 2011). This investment rebalancing of the total economy is the main driver behind the current account readjustment to surplus.

Figure 6

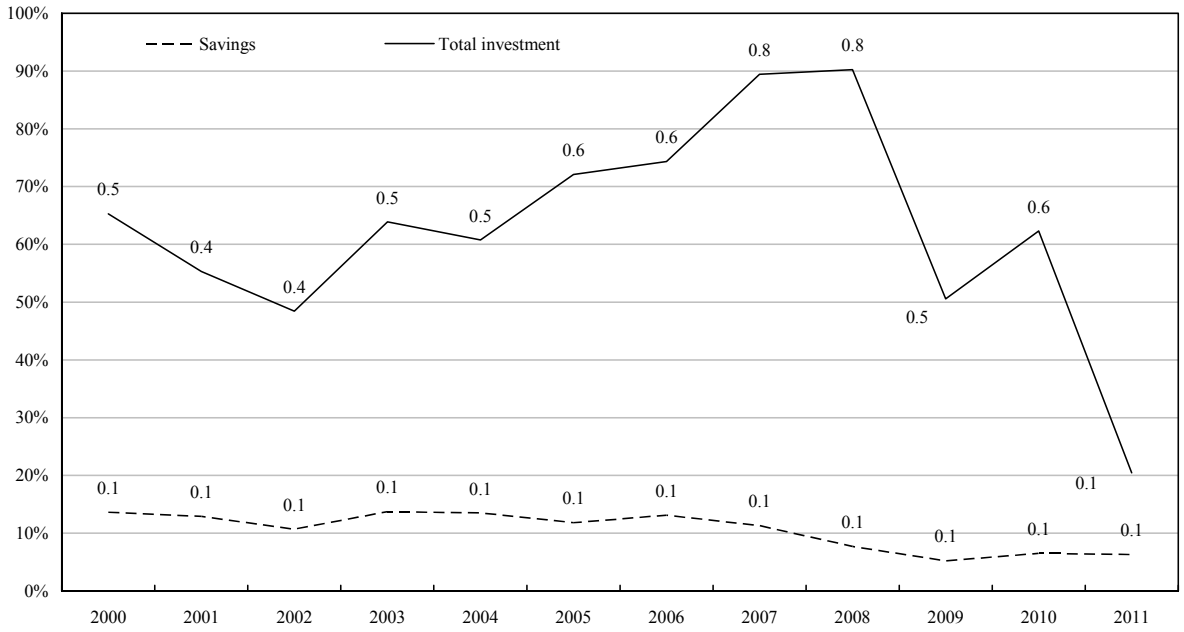
Financial Account and Components
(million euros)



Source: Bank of Greece-Eurostat.

Figure 7

Savings, Investment of Total Economy
(percent of GDP)



Source: ECB, Statistical Data Warehouse, Bank of Greece.

3 Theoretical framework

Our interest focuses on the way fiscal policy in Greece is related to the current account position. However we cannot ignore the relationship between the current account deficit and the other variables that are stipulated in the respective literature. Based on data availability our explanatory variables mainly include the fiscal deficit in an attempt to investigate, whether or not the twin deficit hypothesis holds, the real effective exchange rate (competitiveness indicator) since an appreciation of the real exchange rate affects the purchasing power and the relative values of assets held by domestic residents, the economic convergence indicator, which is related to the current account position through the capital moves, the dependency ratio[2] (demographic factor) and the private investment. Furthermore, since our interest is concentrated in making inferences about fiscal policy in Greece, we also investigate the way the composition of fiscal deficit is related with the current account position. Thus our estimation output is based on the elaboration of different models which based on the economic rationale could give us some insights about the fiscal policy choices.

Our investigation stems from the inter-temporal approach to the current account, which was initially proposed by Sachs (1981) and Buiter (1981) and later extended by Obstfeld and Rogoff (1995). The inter-temporal model of current account determination constitutes an extension of the rational expectations permanent income hypothesis model of private consumption to an open economy setting. The model treats the current account balance of a country as the outcome of forward-looking consumption and investment decisions (see Gandolfo, 2001), formed on the basis of expectations regarding future developments of macroeconomic variables. The standard inter-temporal model features a small open economy with an infinitely-lived representative agent, who optimally allocates consumption over time by freely lending or borrowing abroad in order to maximize his welfare (*i.e.*, aggregate utility function). The model assumes that the current account will absorb temporary or transitory shocks to net national cash flow (*i.e.*, output minus investment and government spending), primarily reflected in national saving, so that consumption is fully smoothed over time under the assumption of free capital movements. The economy will decrease (increase) national saving by running a current account deficit (surplus) whenever it expects a temporary decrease (increase) in net national cash flow in the future.[3]

Empirical applications of the model have followed two directions (see Bussière *et al*., 2004; Ca' Zorzi and Rubaszek, 2008). On the one hand, several studies have tried to establish evidence in favour of the baseline model using different testing strategies (e.g. see Bergin and Sheffrin, 2000; Nason and Rogers, 2006). On the other hand, a number of papers have examined the long-run relationship between the current account and its fundamental macroeconomic determinants by applying standard econometric techniques (e.g. see Debelle and Faruquee, 1996; Blanchard and Giavazzi, 2002; Chinn and Prasad, 2003; Bussière *et al*., 2004; Hermann and Jochem, 2005; Gruber and Kamin, 2007; Ca' Zorzi *et al*., 2009).

The present paper draws upon the second line of research and attempts to empirically test some of the implications for the current account as suggested by the inter-temporal model. Since the literature on current account modelling is vast and numerous specifications are available, we proceeded by selecting standard variables that are typically included in current account regressions, including credit to the private sector, but also take a step further by analysing the impact of certain fiscal variables that constitute the fiscal deficit on the current account deficit. This contribution is quite useful in the case of the Greek economy that currently follows an economic adjustment

---

[2] It is expected that changes in the ratio between the retired and the working age population are related to the consumption/saving behavior and hence to the current account position.

[3] On the other hand, an anticipated permanent change in national cash flow, say due to an increase in output, will cause a one-for-one change in consumption leaving the current account unaltered (Makrydakis, 1999).

program (EU-IMF bailout programs) and thus sets an ideal case study of the inter-linkages of fiscal policy with external sector.

We start from the accounting identity of the current account (*CA*) being equal to the difference between domestic saving (*S*) and investment (*I*), which is further decomposed into net private saving $(S_p–I_p)$ and general government fiscal balance $(S_g–I_g)$:

Dividing the previous accounting identity by GDP (*Y*) yields the following identity:

$$\frac{CA}{Y}=\frac{\left(S_p-I_p\right)}{Y}+\frac{\left(S_g-I_g\right)}{Y} \tag{1}$$

Following Brissimis *et al.* (2010), we employ an analytical representation of the current account position consisting formally of private saving to GDP ratio $\left(\frac{S_p}{Y}\right)$ which is again considered a function of the economic convergence indicator expressed as the ration of real GDP per capita of a reference country $\left(\frac{Y^*}{N^*}\right)$ relative to the domestic real GDP per capita $\left(\frac{Y}{N}\right)$, the real effective exchange rate *(REER)*, the ratio of the general government fiscal balance to GDP $\left(\frac{S_g-I_g}{Y}\right)$ and the ratio of private investment to GDP $\left(\frac{I_p}{Y}\right)$. This representation is further augmented by other financial and demographic factors that are considered explanatory variables of $\left(\frac{S_p}{Y}\right)$.

More specifically, the relative GDP per capita represents an important factor in explaining current account developments (e.g., see Freund, 2000), especially in the context of a monetary union. A small open economy at its early stages of economic development and convergence is mainly characterised by a comparatively lower level of savings. This implies increased external borrowing against future income, which, coupled with substantial initial investment needs, would translate into larger current account deficits at early stages of development (or economic convergence). *Thus, one should expect relative GDP per capita to be positively related to private saving and lead to a deterioration of current account.*

Moreover, an appreciation of the reer, increases the purchasing power in terms of imported goods of current and future income, as well as the value of the accumulated monetary and property assets of domestic agents. This effect tends to raise consumption and reduce propensity to save**.** *Thus, an increase in reer is expected to decrease private saving and lead to current account deterioration.*

A potentially important determinant of saving that appears in the empirical literature is financial liberalisation, hereby proxied by credit to the private sector as percent of GDP (denoted as *crp=credit/Y*). The process of deregulation in financial markets is usually associated with lower levels of private saving, as the borrowing constraint faced by households is relaxed (see Jappelli *et al.*, 1989; Bayoumi, 1993; Lehmussaari, 1990 and Ostry *et al.*, 1995).[4] Private credit variable as a percent of GDP is also capturing other effects, like credit conditions and private sector borrowing

[4] For further evidence showing that financial liberalization increases consumption, and significantly decreases saving, while it does not substantially increase investment, see Melitz (1990), Englund (1990) and Osugi (1990).

behaviour.[5] *In this respect, private credit is expected to influence negatively private saving and current account position.*

Last but not least, private investments may have a positive or negative effect on current account deficit depending on their interrelation with domestic or external economy of a country. For example in a small closed economy private investment may have a positive effect for export oriented sectors of the economy leading to substantial benefits for the current account position. The opposite may also hold in the context of an open economy in which most likely private investments pertain to external demand of investment goods and services.

To add up to the previous determinants of private savings, we employ a demographic variable in the context of Brissimis *et al.* (2010). We use the total dependency ratio to capture the demographic aspects of savings. Basic intuition implies that an increase in the dependency ratio would decrease the saving ratio because, according to the life-cycle hypothesis, the very young and the old are net consumers with comparatively lower levels of savings, while the remainder of the population is considered net savers intending to rest on their savings after retirement. However, other factors, like uncertainties about the lifespan after retirement and the financial support that will be required as well as the observed small differences between public wages and pensions (high replacement rate) that are more typical in the case of Greece, may urge the state (public agent) and the consumers to behave differently in their choice to save or spend. Consequently, the effect of the demographic variable on private saving should be considered ambiguous.

In total, the following analytical representation of $\left(\frac{S_p}{Y}\right)$ is followed:

$$\frac{S_p}{Y} = g\left(\frac{\left(\frac{Y^*}{N^*}\right)}{\left(\frac{Y}{N}\right)}, reer, crp, dr, \frac{\left(S_g - I_g\right)}{Y}, \frac{\left(I_p\right)}{Y}\right) \tag{2}$$

The relationship between fiscal policy on one hand and private saving and current account on the other hand, depends on the extent to which consumers react in a Keynesian or Ricardian way.[6] The Keynesian model assumes that a higher fiscal deficit (or to a lower fiscal surplus), as a result of lower taxes or higher government spending, increases disposable income and thereby consumption and decreases private saving, leading to a higher current account deficit (or lower current account surplus). The economic reaction of private agents under the Keynesian model supports the twin-deficit hypothesis, according to which wider fiscal deficits should usually be accompanied by wider current account deficits.

---

[5] These borrowing conditions have have drastically changed after the EMU entrance of Greece.

[6] For a literature review, see Debelle and Faruquee (1996), Bussière *et al.* (2005) and Briotti (2005). The empirical work by Nickel and Vansteenkiste (2008) shows that the government debt to GDP ratio can partly explain the Ricardian or Keynesian behaviour of private agents. In countries with debt to GDP ratios up to 90 per cent, the relationship between the government balance and the current account balance is positive, *i.e.*, an increase in the fiscal deficit leads to a higher current account deficit. In very high debt countries, however, this relationship turns negative but insignificant, implying that a rise in the fiscal deficit does not result in a rise in the current account deficit. Implicitly, this result suggests that households in very high debt countries tend to become Ricardian and thus sterilise fiscal policy from current account dynamics. The composition of government spending may also be important (see Bayoumi and Masson, 1998). For example, public investment, to the extent that it is viewed as productive, does not necessarily build on tax increases and should not generate a private saving response. By contrast, investment that does not generate revenues for the government (and is considered equivalent to government consumption) would involve future taxes and might induce a larger private saving offset.

However, the twin-deficit hypothesis does not necessarily hold when consumers are Ricardian. If the fiscal stance is perceived by agents as increasingly unsustainable, then tax increases or reduction in government spending (*i.e.*, fiscal consolidation) are expected in the future, which will affect agents future net wealth. In this case, a higher fiscal deficit (or lower fiscal surplus) decreases consumption and increases precautionary saving, so that agents maintain their long-run rate of consumption, in an environment of reduced future disposable income. This would lead to a lower current account deficit (or higher current account surplus). Thus, to the extent that private agents do not adjust their saving more than the change in the fiscal balance, we expect the current account to respond positively to the fiscal balance.

Substituting equation (2) into equation (1) yields our baseline (Model A) representation:

$$\frac{CA}{Y} = g\left(\frac{\left(\frac{Y^*}{N^*}\right)}{\left(\frac{Y}{N}\right)}, reer, crp, dr, \frac{\left(S_g - I_g\right)}{Y}, \frac{\left(I_p\right)}{Y}\right) - \frac{\left(I_p\right)}{Y} + \frac{\left(S_g - I_g\right)}{Y} \tag{3}$$

where private investment and fiscal deficit as a percent of GDP $\left(\frac{\left(I_p\right)}{Y}\right)$ and $\left(\frac{\left(S_p - I_p\right)}{Y}\right)$ enter the current account representation both directly and indirectly.

From the previous representation, we seek for a disaggregate view of fiscal deficit in order to make inferences regarding the effect of specific fiscal variables over the current account deficit. This investigation is particularly important for the assessment of the effect of current fiscal consolidation over current account deficit. In Model B, we decompose the fiscal deficit into expenditures (*exp*) and current revenues (*rev*) and acquire the following specification:

$$\frac{CA}{Y} = g\left(\frac{\left(\frac{Y^*}{N^*}\right)}{\left(\frac{Y}{N}\right)}, reer, crp, dr, \frac{\left(exp\right)}{Y}, \frac{\left(rev\right)}{Y}, \frac{\left(I_p\right)}{Y}\right) - \frac{\left(I_p\right)}{Y} + \frac{\left(exp\right)}{Y} + \frac{\left(rev\right)}{Y} \tag{4}$$

From a Keynesian standpoint, fiscal expansion (due to revenue reduction and/or public expenditure increases) is consistent with consumption increases and saving reduction deteriorating this way the current account balance. On the other hand, the Ricardian rationale, by contemplating the existence of a perfect world where no distortions exist, comes to the opposite conclusions since the rational economic agents anticipate a future tightness of fiscal policy following a fiscal expansion and hence increase their savings. As a result the two deficits follow different path.

In Model C, we further disaggregate fiscal deficit into public employee's compensation (*w*) and gross fixed capital formation (*gfcf*) in expenditure side and direct (*dirt*) and indirect taxation (*indirt*) in the case of revenues. This disaggregation will allow the quantification of the impact of the currently undergoing fiscal consolidation on current account deficit readjustment. Based on formula (4) we get the following:

$$\frac{CA}{Y} = g\left(\frac{\left(\frac{Y^*}{N^*}\right)}{\left(\frac{Y}{N}\right)}, reer, crp, dr, \frac{(w)}{Y}, \frac{(gfcf)}{Y}, \frac{(dirt)}{Y}, \frac{(indirt)}{Y}, \frac{(I_p)}{Y}\right) + \frac{(I_p)}{Y} + \frac{(w)}{Y} + \frac{(gfcf)}{Y} + \frac{(dirt)}{Y} + \frac{(indirt)}{Y} + \frac{(emp)}{Y} \quad (5)$$

Again, compensation of public employees, direct and also indirect taxation should be considered fiscal variables whose impact on current account deficit may have either a Keynesian or a Ricardian aspect. Depending on the effect of private $\left(\frac{(I_p)}{Y}\right)$ and public investments (*gfcf*) on domestic and external demand their effect may be also positive or negative.

A linear representation of the previous equations (3), (4), (5), including an intercept and a trend, can be the following:[7]

$$\frac{CA}{Y} = \alpha_0 \bullet \frac{\left(\frac{Y^*}{N^*}\right)}{\left(\frac{Y}{N}\right)} + \alpha_1 \bullet reer + \alpha_2 \bullet crp + \alpha_3 \bullet dr + \alpha_4 \bullet \frac{(I_p)}{Y} + \alpha_5 \bullet \frac{(S_g - I_g)}{Y} + \alpha_6 + \alpha_7 \bullet t \quad (6)$$

$$\frac{CA}{Y} = \alpha_0 \bullet \frac{\left(\frac{Y^*}{N^*}\right)}{\left(\frac{Y}{N}\right)} + \alpha_1 \bullet reer + \alpha_2 \bullet crp + \alpha_3 \bullet dr + \alpha_4 \bullet \frac{(I_p)}{Y} + \alpha_5 \bullet \frac{(exp)}{Y} + \alpha_6 \bullet \frac{rev}{Y} + \alpha_7 + \alpha_8 \bullet t \quad (7)$$

As disaggregation in a VECM context is at the cost of degrees of freedom, we estimate the previous VEC model of equation (8) trying though to preserve as much as possible degrees of freedom in our models. More specifically, we estimate the same model but instead of disaggregating both the expenditures and revenues in equation (7), we turn to disaggregate only expenditures and keep at aggregate level current revenues and vice versa (equations 8a and 8b).[8]

$$\frac{CA}{Y} = \alpha_0 \bullet \frac{\left(\frac{Y^*}{N^*}\right)}{\left(\frac{Y}{N}\right)} + \alpha_1 \bullet reer + \alpha_2 \bullet crp + \alpha_3 \bullet dr + \alpha_4 \bullet \frac{(I_p)}{Y} + \alpha_5 \bullet \frac{(w)}{Y} + \alpha_6 \bullet \frac{(gfcf)}{Y} + \alpha_7 \bullet \frac{(rev)}{Y} + \alpha_8 + \alpha_9 \bullet t \quad (8a)$$

$$\frac{CA}{Y} = \alpha_0 \bullet \frac{\left(\frac{Y^*}{N^*}\right)}{\left(\frac{Y}{N}\right)} + \alpha_1 \bullet reer + \alpha_2 \bullet crp + \alpha_3 \bullet dr + \alpha_4 \bullet \frac{(I_p)}{Y} + \alpha_5 \bullet \frac{(exp)}{Y} + \alpha_6 \bullet \frac{(dirt)}{Y} + \alpha_7 \bullet \frac{(indirt)}{Y} + \alpha_8 + \alpha_9 \bullet t \quad (8b)$$

---

[7] See also Herrmann *et al.* (2005).

[8] This approach of preserving degrees of freedom in a VAR context is acknowledged to be proposed to Thanasis Tangalakis.

Following the theoretical relationship between current account and its determinants, the expected signs of the employed variables are presented in the following summary table (Table 1).

4 Data and empirical methodology

Our data sample refers to 2000q1 to 2011q4 and captures the period in which Greece joined the EMU as well as the initial period of IMF/ECB/EC bail-in program. Quarterly data on current account balance, GDP, per capita real GDP, real exchange rate, fiscal deficit, total public spending, total revenues, public investment (gross fixed capital formation), compensation of employees, direct taxation, indirect taxation, dependency ratio and lastly total employment have been taken from Eurostat (National Accounts and Government Finance Statistics (GFS) and Labour force survey (LFS)). Bank of Greece quarterly data on credit have been used and lastly private investment data express the difference between total (economy wide) gross fixed capital formation and public gross fixed capital formation (again extracted from Eurostat). The current account deficit and all fiscal variables along with credit are relative to GDP.

The finding that many macro time series may contain a unit root has spurred the development of the theory of non-stationary time series analysis. Engle and Granger (1987) pointed out that a linear combination of two or more non-stationary series may be stationary. If such a stationary linear combination exists, the non-stationary time series are considered to be cointegrated. The stationary linear combination is called the cointegrating equation and may be interpreted as a long-run equilibrium relationship among the variables. We primarily focus on cointegration tests employing the Johansen (1991, 1988) system framework. The Johansen tests performed in this paper uses an estimated vector error correction (VEC) model which is a restricted VAR model that is designed for use with non-stationary series.

Typical VEC models have build-in cointegrating relations in their specification so that it restricts long-run behavior of the endogenous variables to converge to their cointegrating relationships while allowing for short-run adjustment dynamics. The cointegration term is known as the *error correction* term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments.

Let us assume, in its simplest form, a two variable system with one cointegrating relation and no lagged difference terms. Then, the cointegrating relation is:

$$y_{i,t} = \beta_j \bullet x_{i,t}$$

The corresponding VEC model of the *i*-th endogenous variable is:

$$\Delta y_{i,t} = \lambda_{i,1} \bullet \left(y_{i,t} - \beta_j \bullet x_{i,t} \right) + \varepsilon_{1t}$$

In this simple context, the only right-hand side variable is the error correction term. In long-run equilibrium, this term is zero. However, if we deviate from the long-run equilibrium, the error correction term will be nonzero and each variable adjusts to partially restore the equilibrium relation. Coefficient $\lambda_{i,1}$ measures the speed of adjustment of the i^{th} equation towards the long-run equilibrium. Lastly, in the above short-run representation, a dummy variable is exogenously imposed so as to capture potential changes in the short-run dynamics of our model. This dummy variable is a simple step dummy initiating a shift in 2008q2 representing the Lehman brother crisis.

Table 1

Current Account Theoretical Relationship (Model a, b, c)

Variable	Expected Sign
Differential GDP per capita $\left(\frac{\left(\frac{Y^*}{N^*}\right)}{\left(\frac{Y}{N}\right)}\right)$	+/–
Real effective exchange rate (*reer*)	-
Credit to the private sector (*crp*)	-
Demography (*dr*)	-
Fiscal deficit $\left(\frac{S_g - I_g}{Y}\right)$	+ (Keynesian view) / – (Ricardian view)
Total public spending $\left(\frac{(exp)}{Y}\right)$	+/–
Total revenues $\left(\frac{(rev)}{Y}\right)$	+/–
Private investment $\left(\frac{(I_p)}{Y}\right)$	+/–
Compensation of employees *(w)*	+/–
Public investment *(gfcf)*	+/–
Direct taxation *(dirt)*	+/–
Indirect taxation *(indirt)*	+/–
Total employment *(tot_emp)*	+/–

5 Empirical results

a) Baseline estimation

Our attempt focuses on investigating the channels through which fiscal policy could affect the current account position in Greece. In line with this, we use different models in which the fiscal policy is reflected by the fiscal balance and its components.

Starting from baseline Model a (Table 4 in the Appendix), the coefficients in the estimated long-run equilibrium relationship are significant and their sign is consistent with theory. Additionally, the short-run representation points to the consistency of our results since the error correction term is negative and significant (coef. λ_1: equals to –0.72) indicating a quick long-run equilibrium convergence.[9]

Turning to long-run equilibrium representation, the convergence indicator, has the expected sign (coef. α_0: –0.21) indicating that the larger gap of per capita GDP between a country of interest and one or more reference countries, is consistent with high capital and FDI inflows and thus larger current account imbalances. The competitiveness indicator (*reer*) is negatively related to current account balance (coef. α_1: –1.46) indicating that the appreciation of the real exchange rate ceteris paribus, increases the purchasing power of domestic income thus increasing the imports of goods, while on the other hand affects positively the relative value of assets (real estate, and other financial assets) held by domestic residents. As a result the propensity to consume increases and savings are reduced leading to current account deterioration. At the same time we should also consider a negative effect on export competitiveness leading to the deterioration of trade balance and thus current account position.

Credit variable (denoted *crp* in our model) has a negative sign which is consistent with theory (coef. α_2: –2.10) since credit expansion leads to the loosening of the households inter-temporal budget constraint that is also reflected into proportionally lower saving rates and higher propensity to consume. More specifically, credit expansion is related with income effects supporting domestic asset price pressures (real estate, housing, etc.) which together with the financial liberalization and higher levels of liquidity of the economy (as the case of Greek economy after entering EMU) contribute to higher import demand and lower savings.

The contribution of private investment is negative (coef. α_4: –0.22) and with smaller impact compared to previous variables, indicating this way the effects that this variable has on imports. Moreover, the negative sign of the dependency ratio variable (denoted dr in our theoretical model) provide evidence of the life cycle theory of consumption based on which a comparatively higher share of dependent and elderly people related to the working age population, contributes more to the deterioration of the current account balance. In other words, the higher the share of elderly peoples in an economy, the lower the tendency to save[10] is, leading to current account deterioration.

According to the same estimation output of Table 4 the positive relation between fiscal policy and current account is also confirmed (coef. α_5: 0.25) proving that for the case of Greece, twin deficit hypothesis also holds. This finding indicates that in the case of Greek economy, fiscal deficit improvements are related with improvements of external imbalances as reflected by current account position. Still this fiscal and current account deficit pass through is not perfect since our

---

[9] Based on Johansen trace test and maximum eigenvalue test in model a representation, the number of cointegrating relations is at most one. For more details please see Table 3 of the Appendix. Moreover, stability of the VECM (Model a) representation is also evident since the error correction is negative less than unity and significant (see Table 4 of the Appendix).

[10] According to Life cycle theory of consumption, elderly people tend to consume more and save proportionally less after their retirement.

estimates prove that only 25 per cent of fiscal deficit changes (levels) are transferred into current account.

Following these results, we focus our analysis on examining the ways in which available fiscal policy options (spending, revenue etc.) are contributing to the external imbalances of the Greek economy.

b) Disaggregate view of twin deficit hypothesis

Model b estimation output (Table 5 of the Appendix), confirms the model stability (representation 7) since the respective error correction term coefficient is significant and equals –0.31.[11] At the same time, the coefficients of non-fiscal variables are significant and have the expected signs.[12] In the case of fiscal variables employed in Model b, given that they are both statistically significant, it is clear that the effect of revenues (coef. α_6: –0.86) in the current account position is greater than the effect of the fiscal spending (coef. α_5: –0.004).

To our view these findings have a reasonable explanation in the case of the Greek economy. Starting from the spending side, an increase (reduction) in government spending is consistent with disposable income increases (reductions) that lead to the deterioration (improvement) of the current account position through demand increases of imported goods and services as well as subsequent savings reductions. The negative coefficient α_5 confirms this rationale.

On the other hand, negative revenue coefficient α_6, imply that even though revenue increases are consistent with fiscal deficit improvements, and current account improvements (if twin deficit hypothesis is valid), they may also have adverse effects as they do not allow for price competitiveness gains to be transformed into export competitiveness improvements as they mitigate the effect of unit labour cost improvements (currently observed in the Greek economy). Additionally, the reduction in disposable income due to increasing tax burden, results not only to consumption reduction but also to savings reduction contributing to additional deterioration of the current account position.

Following estimation results of the extended representation 8a (Model c, Table 6 of the Appendix), model stability is confirmed since the respective error correction term coefficient is significant and equals –0.24.[13] Real exchange rate (*reer*) and credit variable (*crp*) have the expected negative contributions on current account balance based on long-run equilibrium. On the other hand, economic distance indicator and private investment exhibit a negative contribution (coef α_0: –0.19, α_4: –1.39) and thus contribute negatively to current account imbalances build up.[14] More specifically, the following long-run equilibrium is estimated (*t*-statistic reported in parentheses below coefficients):

---

[11] Based on Johansen trace test (1988) and maximum eigenvalue test in the model b representation, the number of cointegrating relations is at most one. For more details see Table 3 of the Appendix.

[12] Dependency ratio is insignificant in the long-run equilibrium and thus we drop it from our analysis.

[13] Based on Johansen trace test (1988) and maximum eigenvalue test in the model c representation, the number of cointegrating relations is at most three (Table 3 of the Appendix). In the current context starting from three cointegrating relations, we apply a general to specific approach by eliminating correlations that have an insignificant contribution in the short-run representation. Doing so yields a short-run representation with only one error correction term (Table 6 of the Appendix). These representations have not been included for brevity reasons and may be given by authors upon request.

[14] In the same estimation output, dependency ratio and total employment are insignificant.

$$\frac{CA}{Y} = -\underset{(-6.56)}{1.48} * reer - \underset{(-7.17)}{1.40} * crp + \underset{(1.50)}{0.03} * dr - \underset{(-2.28)}{0.19} * \frac{\left(\frac{Y^*}{N^*}\right)}{\left(\frac{Y}{N}\right)} - \underset{(-3.98)}{1.39} * \frac{(I_p)}{Y} -$$

$$-\underset{(-1.66)}{0.01} * \frac{(w)}{Y} + \underset{(2.91)}{0.03} * \frac{(gfcf)}{Y} - \underset{(-6.33)}{1.47} * \frac{(tot\_rev)}{Y} + \underset{(0.30)}{0.0002} * \frac{(tot\_emp)}{Y} + \underset{(5.10)}{0.02} * t + 3 \quad (8a)$$

Turning to the employed fiscal variables, it is evident that all of them exhibit a statistically significant contribution and thus the employed variables should be seen as potential policy instrument to constrain current account imbalances. Public wage appears to marginally have a significant and negative contribution to current account balance, thus implying a feedback mechanism between wage increases (reductions) and current account deterioration (improvements), a result consistent with Keynesian view. Our results confirm that increases in this specific expenditure item feedback a current account deterioration. In the case of public gross fixed capital formation (*gfcf*), our results indicate a more Ricardian view since *gfcf* appears to result to the confinement of current account deficit (which is the case for Greece during the entire examined period). This is explained by the significant contribution that the public *gfcf* for controlling the Greek external balance (Public investment program (PIB)) through the financing of large investment and infrastructure projects that support productivity and competitiveness gains for the Greek economy.

In the case of Model 8a, the previous long-run representation and the effects of fiscal policy on external imbalances are confirmed also by short-run VECM representation and Impulse response (Cholesky decomposition) analysis provided in the Appendix. It is evident that current account responses are significant to wages, *gfcf* and revenue responses. Moreover, credit changes provide also significant current account responses.

Following previous finding of total taxation revenues impact on external imbalances we turn to the case of taxation disaggregation (*i.e.*, extended relation 8b, Model c, Table 7 in the Appendix) to examine the contribution of direct and indirect taxes to this effect. Model stability is confirmed since the respective error correction term coefficient is significant and equals –0.14.[15] Moreover, the following long-run equilibrium output estimation is derived (*t*-statistic reported in parentheses below coefficients):

$$\frac{CA}{Y} = -\underset{(-11.51)}{1.43} * reer - \underset{(-14.8)}{1.13} * crp + \underset{(-0.42)}{0.072} * \frac{(I_p)}{Y} + \underset{(-1.78)}{0.02} * dr - \underset{(4.32)}{0.16} * \frac{\left(\frac{Y^*}{N^*}\right)}{\left(\frac{Y}{N}\right)} - \quad (8b)$$

$$-\underset{(-6.58)}{0.28} * \frac{(tot\_exp)}{Y} + \underset{(7.34)}{0.02} * \frac{(dir\_tax)}{Y} - \underset{(16.21)}{0.07} * \frac{(indir\_tax)}{Y} + \underset{(6.01)}{0.0003} * \frac{(tot\_emp)}{Y} + \underset{(8.50)}{0.011} * t - 0.66$$

According to our estimation results the contribution of direct and indirect taxation on current account dynamics is significant though diversified. More specifically, direct taxation has a significant positive effect (coef. α_6: 0.02) on current account balance. This result is indicative of the effect of direct taxation increases on disposable income which is followed by a reduction of the

[15] Based on Johansen trace test (1988) and maximum eigenvalue test in the model c representation, the number of cointegrating relations is at most four (Table 3 of the Appendix). In the current context starting from three cointegrating relations, we apply a general to specific approach by eliminating correlations that have an insignificant contribution in the short-run representation. Doing so yields a short-run representation with only one error correction term (Table 7 of the Appendix). These representations have not been included for brevity reasons and may be given by authors upon request.

demand for imported goods and services. Indirect taxation exhibits a negative effect on current account balance (coef. $\alpha_{7:}$ 0.07). This different (compared to direct taxation) impact of indirect taxation reflects the impact of indirect taxation on relative prices between imported and exported goods through the inflationary effect of indirect taxation on domestic goods and services prices. Lastly, following the same estimation output, with the exception of economic distance, all other variables: real exchange rate (*reer*), private investment (I_p), credit (*crp*), dependency ratio (*dr*) and private investment $\frac{\left(I_p\right)}{Y}$ have the usual sign and magnitude.

Lastly, the effects of fiscal policy on external imbalances as depicted in long-run representation are broadly confirmed also by short-run VECM representation and Impulse response (Cholesky decomposition) analysis provided also in the Appendix. According to our simulation estimate current account responses are significant with respect to total spending, direct and indirect taxation responses. Same as Model 8a, credit changes provide also large and significant current account responses.

6 Conclusions

We used a small scale VECM in order to study the relationship between the current account position and the fiscal policy in the case of Greek economy during the recent decade. Our results indicate that the twin deficit hypothesis holds for Greece during the period of our sample though with a limited pass through from fiscal to current account deficit since only 25 per cent of fiscal deficit readjustment is being transferred to current account rebalancing.

According to our empirical evidence in the case of Greece, fiscal policy mix requires more attention in the revenue side since, when pursuing fiscal targets based on revenue increases, adverse effects on external imbalances are evident as tax increases put a burden on labour and production cost. These taxation increases are translated into export prices increases and thus current account deficit worsening. Contrary, pursuing fiscal targets by reducing spending has the usual income effects that lead to current account deficit reductions.

In the same context, empirical results using a disaggregated specification of our model with respect to fiscal variables, prove that, indirect taxation reduction and direct taxation increases reduce current account imbalances (even though with a different contribution). In the public spending case, public investment increases and wage reductions, serve the same purpose of limiting current account imbalances.

In light of these findings, an optimal way of performing fiscal policy to confront with current account imbalances in the case of Greek economy would be the increase of direct taxation accompanied by indirect taxation reductions while in the spending side case, the increase of public investment spending and the reduction of wage costs. These combined types of fiscal interventions offset each other out and provide neutral budgetary spending and revenue outcomes while achieving at the same time the supremum limitation of current account imbalances.

APPENDIX

Table 2

Variable Notation in Empirical Models (Model a, b, c) of the Appendix

Variable	Empirical Models Variable Notation
1. Differential GDP per capita $\left(\frac{\left(\frac{Y^*}{N^*}\right)}{\left(\frac{Y}{N}\right)}\right)$	$Diff_{real\ GDP}$
2. Real effective exchange rate (*reer*)	*reer*
3. Credit to the private sector (*crp*)	*credit*
4. Demography (*dr*)	dep_{ratio}
5. Fiscal deficit $\left(\frac{S_g - I_g}{Y}\right)$	$fisc_{def}$
6. Total public spending $\left(\frac{(exp)}{Y}\right)$	tot_{exp}
7. Total revenues $\left(\frac{(rev)}{Y}\right)$	tot_{rev}
8. Private investment $\left(\frac{(I_p)}{Y}\right)$	$priv_{invest}$
9. Compensation of employees *(w)*	*wages*
10. Public investment *(gfcf)*	pub_{inv}
11. Direct taxation *(dirt)*	dir_{tax}
12. Indirect taxation *(indirt)*	$indir_{tax}$
13. Total employment *(tot_emp)*	tot_{emp}

Table 3

Johansen Test Results

Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Prob.
Model A: Johansen test results {Sample (adjusted): 2000Q3 2011Q4, Included observations: 46 after adjustments, Trend assumption: Quadratic deterministic trend, Lags interval (in first differences): 1 to 3}.			
Unrestricted Cointegration Rank Test (Trace)			
None *	174.49	139.28	0
At most 1 *	116.36	107.35	0.01
At most 2	631.2	793.41	0.44
At most 3	261.41	552.46	0.98
At most 4	114.41	350.11	0.99
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)			
None *	581.3	495.86	0.01
At most 1 *	532.37	434.2	0
At most 2	369.79	371.64	0.05
At most 3	147	308.15	0.91
At most 4	732.5	242.52	0.99
Model B: Johansen test results {Sample (adjusted): 2000Q3 2011Q4, Included observations: 46 after adjustments, Trend assumption: Quadratic deterministic trend, Lags interval (in first differences): 1 to 3}			
Unrestricted Cointegration Rank Test (Trace)			
None *	183.21	139.87	0
At most 1 *	120.77	107.79	0.01
At most 2	643.9	793.67	0.39
At most 3	339.54	552.91	0.81
At most 4	131.23	350.21	0.98
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)			
None *	631.14	496.71	0
At most 1 *	555.12	434.14	0
At most 2	304.82	372.92	0.24
At most 3	208.99	308.78	0.48
At most 4	108.45	243.55	0.86

Table 3 ***(continued)***

Johansen Test Results

Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Prob.
Model C/8a: Johansen test results {Sample (adjusted): 2000Q3 2011Q4, Included observations: 46 after adjustments, Trend assumption: Quadratic deterministic trend, Lags interval (in first differences): 1 to 3}			
Unrestricted Cointegration Rank Test (Trace)			
None *	361.68	259.02	0.00
At most 1 *	269.86	215.12	0.00
At most 2 *	203.27	175.17	0.00
At most 3 *	143.70	139.27	0.03
At most 4	103.62	107.34	0.08
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)			
None *	631.14	496.71	0
At most 1 *	555.12	434.14	0
At most 2 *	304.82	372.92	0.24
At most 3	208.99	308.78	0.48
At most 4	108.45	243.55	0.86
Model C/8b: Johansen test results {Sample (adjusted): 2000Q3 2011Q4, Included observations: 46 after adjustments, Trend assumption: Quadratic deterministic trend, Lags interval (in first differences): 1 to 3}			
Unrestricted Cointegration Rank Test (Trace)			
None *	455.09	259.02	0.00
At most 1 *	338.97	215.12	0.00
At most 2 *	252.49	175.17	0.00
At most 3 *	176.88	139.27	0.00
At most 4 *	120.04	107.34	0.06
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)			
None *	116.11	67.91	0.00
At most 1 *	86.48	61.80	0.00
At most 2 *	75.61	55.72	0.00
At most 3 *	56.83	49.58	0.00
At most 4 *	44.12	43.41	0.04

Table 4

Vector Error Correction Estimates (Model a, Representation 6)

$$\frac{CA}{Y} = \alpha_0 \bullet \frac{\left(\frac{Y^*}{N^*}\right)}{\left(\frac{Y}{N}\right)} + \alpha_1 \bullet reer + \alpha_2 \bullet crp + \alpha_3 \bullet dr + \alpha_4 \bullet \frac{\left(I_p\right)}{Y} + \alpha_5 \bullet \frac{\left(S_g - I_g\right)}{Y} + \alpha_6 + \alpha_7 \bullet t$$

Cointegrating Eq.	**Long–run Relation**
CU_ACC_DEF(–1)	1.000000
DIFF_REAL_GDP_PC (–1)	0.209240
	(12.4635)
REER (–1)	1.460576
	(7.93460)
PRIV INVEST(–1)	0.222334
	(3.40844)
DEP RATIO(–1)	0.054850
	(7.28307)
CREDIT(–1)	2.103899
	(14.2808)
FISCAL DEF (–1)	–0.247148
	(–3.80688)
@TREND(00Q1)	–0.038040
	(–4.38507)
C	–3.418627

Short-run Representation	**D(CU_ACC_DEF)**	**D(PRIV_INVEST)**	**D(CREDIT)**	**D(REER)**	**D(FISCAL_DEF)**	**D(DIFF_REAL_GDP_PC)**	**D(DEP_RATIO)**
ECT	–0.719628	0.405912	0.394327	0.034186	–0.441449	–2.689734	–2.550572
	(–2.81557)	*(2.59465)*	*(1.31332)*	*(0.15266)*	*(–0.90726)*	*(–2.37961)*	*(–1.23151)*
D(CU ACC DEF(–1))	–0.531917	–0.167339	–0.384855	0.006363	0.411149	3.090238	0.660400
	(–2.00406)	*(–1.03003)*	*(–1.23430)*	*(0.02736)*	*(0.81368)*	*(2.63267)*	*(0.30705)*
D(CU ACC DEF(–2))	–0.827889	0.230440	–0.070328	–0.048114	0.469583	1.731874	–1.431198
	(–2.53332)	*(1.15203)*	*(–0.18319)*	*(–0.16804)*	*(0.75478)*	*(1.19832)*	*(–0.54046)*
D(CU ACC DEF(–3))	–0.409835	0.168825	0.035632	–0.038431	0.104605	0.735244	0.422214
	(–1.93154)	*(1.29992)*	*(0.14295)*	*(–0.20672)*	*(0.25896)*	*(0.78354)*	*(0.24557)*
D(PRIV INVEST(–1))	–0.080044	–0.459575	–0.857098	0.125696	–0.049448	0.062850	–1.376710
	(–0.23583)	*(–2.21210)*	*(–2.14955)*	*(0.42267)*	*(–0.07652)*	*(0.04187)*	*(–0.50055)*
D(PRIV INVEST(–2))	–0.807179	0.254875	0.030632	–0.222457	0.244252	0.362012	–1.182086
	(–1.81799)	*(0.93786)*	*(0.05873)*	*(–0.57186)*	*(0.28897)*	*(0.18437)*	*(–0.32856)*
D(PRIV INVEST(–3))	0.231334	–0.265456	0.418386	0.273044	0.014245	–2.496333	–0.855247
	(0.61846)	*(–1.15944)*	*(0.95214)*	*(0.83314)*	*(0.02000)*	*(–1.50907)*	*(–0.28216)*
D(CREDIT(–1))	1.228053	–0.645017	–0.621979	–0.201760	1.192397	3.008684	3.666657
	(2.81112)	*(–2.41224)*	*(–1.21198)*	*(–0.52713)*	*(1.43375)*	*(1.55732)*	*(1.03580)*
D(CREDIT(–2))	1.311640	–0.847867	–0.906112	0.167932	0.026694	0.217252	2.531000
	(2.49116)	*(–2.63089)*	*(–1.46496)*	*(0.36403)*	*(0.02663)*	*(0.09330)*	*(0.59323)*
D(CREDIT(–3))	0.869234	–0.487421	–0.518802	–0.010573	–0.124845	1.226808	2.300843
	(3.23721)	*(–2.96569)*	*(–1.64472)*	*(–0.04494)*	*(–0.24423)*	*(1.03311)*	*(1.05746)*

D(REER(–1))	1.078441	–0.570661	–0.872652	0.012032	–0.245185	3.365948	1.685045
	(2.39180)	*(–2.06773)*	*(–1.64750)*	*(0.03046)*	*(–0.28564)*	*(1.68801)*	*(0.46119)*
D(REER(–2))	–0.026658	–0.086419	–0.291524	–0.201432	0.036716	0.440497	1.750817
	(–0.08308)	*(–0.44003)*	*(–0.77343)*	*(–0.71653)*	*(0.06011)*	*(0.31044)*	*(0.67340)*
D(REER(–3))	0.430130	–0.048269	–0.242964	0.081350	–0.269099	–1.909129	–0.312095
	(1.55889)	*(–0.28581)*	*(–0.74957)*	*(0.33650)*	*(–0.51229)*	*(–1.56455)*	*(–0.13959)*
D(FISCAL_DEF(–1))	–0.428390	0.249684	0.320516	–0.021206	–0.608695	0.183179	–1.011315
	(–2.45852)	*(2.34106)*	*(1.56581)*	*(–0.13890)*	*(–1.83495)*	*(0.23771)*	*(–0.71625)*
D(FISCAL_DEF(–2))	–0.427916	0.220916	0.162440	0.113956	–0.775984	0.075920	–1.283595
	(–2.86781)	*(2.41884)*	*(0.92671)*	*(0.87166)*	*(–2.73172)*	*(0.11505)*	*(–1.06160)*
D(FISCAL_DEF (–3))	–0.421763	0.249640	0.433661	–0.084259	–0.153595	–0.017795	0.198443
	(–1.88444)	*(1.82229)*	*(1.64938)*	*(–0.42969)*	*(–0.36048)*	*(–0.01798)*	*(0.10942)*
D(DIFF_REAL_GDP_PC (–1))	0.115582	–0.077416	–0.075142	–0.017102	–0.012385	0.188995	0.488018
	(1.88668)	*(–2.06455)*	*(–1.04411)*	*(–0.31862)*	*(–0.10620)*	*(0.69758)*	*(0.98307)*
D(DIFF_REAL_GDP_PC (–2))	0.045169	–0.057517	–0.040882	0.041017	0.044369	0.170253	–0.139125
	(0.96174)	*(–2.00078)*	*(–0.74099)*	*(0.99678)*	*(0.49624)*	*(0.81969)*	*(–0.36557)*
D(DIFF_REAL_GDP_PC_ (–3))	–0.082768	0.022345	–0.026463	–0.024573	0.070371	–0.035099	0.462071
	(–1.78218)	*(0.78605)*	*(–0.48505)*	*(–0.60390)*	*(0.79593)*	*(–0.17089)*	*(1.22783)*
D(DEP_RATIO(–1))	–0.039383	0.037230	0.020648	0.003465	–0.008519	–0.092183	–0.087818
	(–1.10977)	*(1.71400)*	*(0.49528)*	*(0.11144)*	*(–0.12610)*	*(–0.58738)*	*(–0.30539)*
D(DEP_RATIO(–2))	0.033186	0.010300	0.021522	0.004580	0.007630	–0.133947	–0.090168
	(1.10886)	*(0.56228)*	*(0.61215)*	*(0.17468)*	*(0.13391)*	*(–1.01204)*	*(–0.37181)*
D(DEP_RATIO(–3))	0.066766	0.026649	–0.002272	0.002181	–0.028846	–0.062652	0.038177
	(2.09202)	*(1.36419)*	*(–0.06061)*	*(0.07799)*	*(–0.47477)*	*(–0.44390)*	*(0.14762)*
C	–0.024227	–0.020363	0.029322	0.046128	–0.028940	–0.332412	–0.050767
	(–0.56203)	*(–0.77179)*	*(0.57904)*	*(1.22136)*	*(–0.35266)*	*(–1.74373)*	*(–0.14534)*
@TREND(00Q1)	–0.001729	0.000851	0.000473	–0.000381	–0.000327	0.004381	–0.006818
	(–2.63241)	*(2.11763)*	*(0.61363)*	*(–0.66293)*	*(–0.26184)*	*(1.50811)*	*(–1.28108)*
@SEAS(1)	–0.034914	0.020180	0.044625	–0.050664	0.015572	0.363462	0.677432
	(–0.66693)	*(0.62978)*	*(0.72563)*	*(–1.10457)*	*(0.15625)*	*(1.56991)*	*(1.59693)*
@SEAS(2)	0.012678	0.020949	–0.052722	–0.000365	–0.001109	0.165899	–0.170449
	(1.49008)	*(0.20163)*	*(– 0.35025)*	*(–0.32641)*	*(–0.08516)*	*(0.69058)*	*(–0.31274)*
@SEAS(3)	–0.037278	0.073625	0.032063	–0.087118	0.084001	0.355136	0.189693
	(–0.49648)	*(1.60198)*	*(0.36350)*	*(–1.32424)*	*(0.58765)*	*(1.06948)*	*(0.31177)*
DUMMY	0.082654	–0.036139	–0.030464	0.004719	0.005240	–0.057613	0.147333
	(4.37171)	*(–3.12289)*	*(–1.37160)*	*(0.28488)*	*(0.14558)*	*(–0.68904)*	*(0.96168)*
R^2	0.973206	0.906288	0.872989	0.671554	0.836322	0.922603	0.858916
Adj. R^2	0.924977	0.737605	0.644368	0.080350	0.541703	0.783288	0.604965
Sum sq. resids	0.004607	0.001726	0.006358	0.003537	0.016697	0.090105	0.302510

Note: Error correction representation when using one Cointegrating relation representation based on Johansen (1988) rank test. *t*-statistics in parentheses, Sample (adjusted): 2000Q3 2011Q4. ECT: error correction term. Autocorrelation of short-run representation equals 3.

Table 5

Vector Error Correction Estimates (Model b, Representation 7)

$$\frac{CA}{Y} = \alpha_0 \bullet \frac{\left(\frac{Y^*}{N^*}\right)}{\left(\frac{Y}{N}\right)} + \alpha_1 \bullet reer + \alpha_2 \bullet crp + \alpha_3 \bullet dr + \alpha_4 \bullet \frac{\left(I_p\right)}{Y} + \alpha_5 \bullet \frac{\left(exp\right)}{Y} + \alpha_6 \bullet \frac{rev}{Y} + \alpha_7 + \alpha_8 \bullet t$$

Cointegrating Eq.	**Long-run Relation**	**Cointegrating Eq.**	**Long-run Relation**	**Cointegrating Eq.**	**Long-run Relation**		
CU_ACC_DEF(–1)	1.000000						
DIFF_REAL_GDP_PC	0.054738	TOT_EXP(–1)	0.003553	@TREND(00Q1)	–0.009526		
	(3.05004)		*(3.35229)*		*(–8.52806)*		
REER(–1)	0.657508	TOT_REV(–1)	0.864765	C	–1.394267		
	(3.93677)		*(3.54806)*				
PRIV_INVEST(–1)	0.608124	CREDIT(–1)	0.696951				
	(3.36306)		*(5.91286)*				
Short-run Representation	***D(CU_ACC_DEF)***	***D(DIFF_REAL_GDP_PC)***	***D(REER)***	***D(PRIV_INVEST)***	***D(CREDIT)***	***D(TOT_EXP)***	***D(TOT_REV)***
ECT	–0.311608	–2.738950	–0.075211	0.035567	–0.260267	–124.8428	–0.888190
	(–1.87947)	*(–3.99085)*	*(–0.69795)*	*(0.33765)*	*(–2.20531)*	*(–3.98727)*	*(–4.30547)*
D(CU_ACC_DEF(–1))	–0.286000	2.323744	0.057373	–0.073755	0.009468	29.58809	0.190162
	(–1.64988)	*(3.23839)*	*(0.50923)*	*(–0.66969)*	*(0.07673)*	*(0.90384)*	*(0.88166)*
D(DIFF_REAL_GDP	–0.049643	0.267438	–0.027185	–0.001069	0.023082	7.965150	0.096941
	(–1.53655)	*(1.99971)*	*(–1.29459)*	*(–0.05210)*	*(1.00365)*	*(1.30548)*	*(2.41148)*
D(REER(–1))	–0.051787	2.331405	0.033712	0.140550	0.043906	36.46150	0.125265
	(–0.19246)	*(2.09312)*	*(0.19276)*	*(0.82214)*	*(0.22923)*	*(0.71753)*	*(0.37414)*

D(PRIV_INVEST(–1))	0.261013	–0.231738	0.199711	–0.208733	–0.270007	25.92235	–0.558160
	(0.80870)	*(–0.17345)*	*(0.95200)*	*(–1.01791)*	*(–1.17523)*	*(0.42529)*	*(–1.38986)*
D(CREDIT(–1))	0.392474	1.131522	–0.025375	0.048024	0.213449	32.21147	0.175367
	(1.88370)	*(1.31196)*	*(–0.18738)*	*(0.36279)*	*(1.43920)*	*(0.81865)*	*(0.67645)*
D(TOT_EXP(–1))	0.001697	–0.001188	–9.47E–05	–0.001215	–0.000758	0.208716	0.004387
	(1.77290)	*(–0.29988)*	*(–0.15215)*	*(–1.99710)*	*(–1.11283)*	*(1.15445)*	*(3.68319)*
D(TOT_REV(–1))	–0.077246	2.508313	–0.008560	0.267218	0.610733	–1.445436	–0.526558
	(–0.46045)	*(3.61196)*	*(–0.07850)*	*(2.50707)*	*(5.11426)*	*(–0.04562)*	*(–2.52256)*
C	–0.055957	–0.096762	0.013269	0.025386	0.031802	7.451157	0.041660
	(–3.97220)	*(–1.65934)*	*(1.44915)*	*(2.83643)*	*(3.17140)*	*(2.80083)*	*(2.37678)*
@TREND(00Q1)	–0.000436	0.002551	6.73E–05	–0.000121	–0.000136	–0.020690	–0.000102
	(–1.09563)	*(1.54981)*	*(0.26046)*	*(–0.48082)*	*(–0.48145)*	*(–0.27552)*	*(–0.20547)*
@SEAS(1)	0.003398	0.275433	–0.015706	–0.032183	0.006944	–9.259868	–0.062271
	(0.13138)	*(2.57251)*	*(–0.93425)*	*(–1.95845)*	*(0.37713)*	*(–1.89573)*	*(–1.93492)*
@SEAS(2)	0.078365	–0.190491	0.004984	–0.021244	–0.056451	–8.099541	–0.076972
	(4.71422)	*(–2.76832)*	*(0.46125)*	*(–2.01152)*	*(–4.77069)*	*(–2.58008)*	*(–3.72142)*
@SEAS(3)	0.132149	0.004863	–0.031390	–0.039674	–0.022391	–12.85517	–0.041927
	(9.21448)	*(0.08191)*	*(–3.36756)*	*(–4.35419)*	*(–2.19336)*	*(–4.74649)*	*(–2.34960)*
DUMMY	0.030243	0.025523	–0.002347	–0.004429	–0.005890	0.884862	0.006666
	(2.59450)	*(0.52895)*	*(–0.30981)*	*(–0.59801)*	*(–0.70987)*	*(0.40197)*	*(0.45964)*
R^2	0.931549	0.827008	0.551629	0.746555	0.874911	0.783597	0.746150
Adj. R^2	0.903741	0.756730	0.369478	0.643593	0.824094	0.695683	0.643023
Sum sq. resids	0.012714	0.217857	0.005371	0.005132	0.006442	453.4286	0.019684

Note: Error correction representation when using one Cointegrating relation representation based on Johansen (1988) rank test. *t*-statistics in parentheses, Sample (adjusted): 2000Q3 2011Q4. ECT: error correction term. Autocorrelation of short-run representation equals to one.

Table 6

Vector Error Correction Estimates (Model c, Representation 8a)

$$\frac{CA}{Y} = \alpha_0 \bullet \frac{\left(\frac{Y^*}{N^*}\right)}{\left(\frac{Y}{N}\right)} + \alpha_1 \bullet reer + \alpha_2 \bullet crp + \alpha_3 \bullet dr + \alpha_4 \bullet \frac{\left(I_p\right)}{Y} + \alpha_5 \bullet \frac{\left(w\right)}{Y} + \alpha_6 \bullet \frac{\left(gfcf\right)}{Y} + \alpha_7 \bullet \frac{\left(rev\right)}{Y} + \alpha_8 + \alpha_9 \bullet t$$

Cointegrating Eq.	**Long-run Relation**	**Cointegrating Eq.**	**Long-run Relation**	**Cointegrating Eq.**	**Long-run Relation**					
CU_ACC_DEF(–1)	1.000000									
DIFF_REAL_GDP_PC(–1)	0.186325	WAGES(–1)	0.009821	TOT_EMP(–1)	–2.51E–05					
	(2.27542)		*(1.66403)*		*(–0.29811)*					
REER(–1)	1.483968	GFCF(–1)	–0.028449	@TREND(00Q1)	–0.018616					
	(6.56041)		*(–2.91611)*		*(–5.09186)*					
PRIV_INVEST(–1)	1.394579	CREDIT(–1)	1.401600	C	–3.009059					
	(3.98262)		*(7.17153)*							
DEP_RATIO(–1)	–0.027778	TOT_REV(–1)	1.476216							
	(–1.50796)		*(6.33989)*							
Short-run Representation	***D(CU_ACC_DEF)***	***D(DIFF_REAL_GDP_PC)***	***D(REER)***	***D(PRIV_INVEST)***	***D(DEP_RATIO)***	***D(WAGES)***	***D(GFCF)***	***D(CREDIT)***	***D(TOT_REV)***	***D(TOT_EMP)***
ECT	–0.235793	–0.440337	–0.120302	0.015001	0.418674	–1.027198	–7.963370	–0.166789	–0.696326	208.7194
	(–1.9779)	*(–2.03507)*	*(–1.68759)*	*(0.18103)*	*(0.51449)*	*(–2.15134)*	*(–3.59408)*	*(–1.95745)*	*(–4.52381)*	*(1.69568)*
D(CU_ACC_DEF(–1))	–0.179314	0.501047	0.068016	–0.051159	0.288768	–3798380	–3774757	–0.058243	0.019676	181.4828
	(–0.90889)	*(1.47621)*	*(0.60824)*	*(–0.39358)*	*(0.22622)*	*(–0.50714)*	*(–1.08606)*	*(–0.43576)*	*(0.08149)*	*(0.93992)*
D(DIFF_REAL_GDP_PC(–1))	–0.164806	0.267742	–0.085814	–0.004387	0.449844	–1.154446	0.125508	0.060603	0.169845	–1.051.133
	(–1.77130)	*(1.67266)*	*(–1.62724)*	*(–0.07156)*	*(0.74724)*	*(–0.32683)*	*(0.07657)*	*(0.96143)*	*(1.49156)*	*(–1.15435)*
D(REER_CORRECT(–1))	0.040681	0.408244	0.042013	0.058441	0.029204	10.00917	1.809373	–0.075290	0.359044	–3.431.156
	(0.14513)	*(0.84654)*	*(0.26443)*	*(0.31644)*	*(0.01610)*	*(0.94056)*	*(0.36640)*	*(–0.39646)*	*(1.04658)*	*(–1.25071)*
D(PRIV_INVEST(–1))	0.628671	–0.417971	0.185291	–0.320214	–0.096997	–8.044173	–8.097835	–0.420508	–0.094232	–2.800.511
	(1.83440)	*(–0.70891)*	*(0.95388)*	*(–1.41815)*	*(–0.04374)*	*(–0.61828)*	*(–1.34124)*	*(–1.81111)*	*(–0.22467)*	*(–0.83496)*

D(DEP_RATIO(–1))	–0.004694	–0.068546	0.005984	0.016567	0.029558	–2.254081	–1.377292	0.005978	–0.105194	–2.121.409
	(–0.14070)	*(–1.19418)*	*(0.31642)*	*(0.75367)*	*(0.13692)*	*(–1.77959)*	*(–2.34322)*	*(0.26446)*	*(–2.57618)*	*(–0.64968)*
D(WAGES(–1))	–0.000959	–0.012822	0.000959	–0.000486	0.001714	–0.291260	–0.057075	–0.001387	0.011187	0.009777
	(–0.19514)	*(–1.51602)*	*(0.34408)*	*(–0.15010)*	*(0.05389)*	*(–1.56065)*	*(–0.65903)*	*(–0.41638)*	*(1.85943)*	*(0.00203)*
D(GFCF(–1))	–0.013908	–0.004207	0.003694	0.002262	0.020274	–0.284717	–0.203658	0.009238	–0.020685	7.274330
	(–1.15692)	*(–0.20340)*	*(0.54213)*	*(0.28560)*	*(0.26065)*	*(–0.62384)*	*(–0.96161)*	*(1.13419)*	*(–1.40590)*	*(0.61827)*
D(CREDIT(–1))	0.376790	0.027700	0.084121	0.086007	–1.193.290	11.62695	5.793045	0.256434	0.314009	–2.652.682
	(1.58047)	*(0.06754)*	*(0.62254)*	*(0.54756)*	*(–0.77359)*	*(1.28465)*	*(1.37931)*	*(1.58768)*	*(1.07621)*	*(–1.13692)*
D(TOT_REV(–1))	0.214740	0.603888	–0.076465	0.126710	–0.496351	–3.528767	–4.998728	0.345458	–0.165619	–3.649.963
	(1.08372)	*(1.77147)*	*(–0.68083)*	*(0.97057)*	*(–0.38714)*	*(–0.46910)*	*(–1.43197)*	*(2.57336)*	*(–0.68294)*	*(–1.88214)*
D(TOT_EMP(–1))	0.000137	–2.92E–05	0.000177	6.98E–05	–0.000503	0.004221	0.003798	0.000184	0.000179	0.579867
	(0.95933)	*(–0.11853)*	*(2.17718)*	*(0.73964)*	*(–0.54271)*	*(0.77643)*	*(1.50520)*	*(1.89985)*	*(1.02364)*	*(4.13722)*
C	–0.081645	–0.027707	0.006861	0.024036	0.008895	0.546328	0.140707	0.023085	0.015963	–6.077.524
	(–5.35748)	*(–1.05680)*	*(0.79426)*	*(2.39391)*	*(0.09021)*	*(0.94431)*	*(0.52410)*	*(2.23592)*	*(0.85587)*	*(–4.07489)*
@SEAS(1)	0.038210	0.138490	–0.005496	–0.030911	0.480414	–0.233493	–0.692138	0.019638	–0.039659	110.3125
	(1.11660)	*(2.35242)*	*(–0.28336)*	*(–1.37106)*	*(2.16979)*	*(–0.17973)*	*(–1.14811)*	*(0.84706)*	*(–0.94697)*	*(3.29388)*
@SEAS(2)	0.109989	–0.000256	0.009980	–0.033635	0.004401	–0.502265	0.460181	–0.048317	0.011579	151.3616
	(3.97115)	*(–0.00538)*	*(0.63575)*	*(–1.84321)*	*(0.02456)*	*(–0.47767)*	*(0.94311)*	*(–2.57496)*	*(0.34158)*	*(5.58393)*
@SEAS(3)	0.140496	0.010571	–0.035265	–0.046837	0.018487	–1.076.621	–0.204087	–0.029166	–0.016214	33.70582
	(9.18764)	*(0.40182)*	*(–4.06873)*	*(–4.64878)*	*(0.18684)*	*(–1.85454)*	*(–0.75757)*	*(–2.81527)*	*(–0.86636)*	*(2.25218)*
DUMMY	0.020351	0.004509	0.008461	–0.002129	–0.053648	0.163770	7.40E–05	–0.001668	0.003294	–2.967.942
	(2.12882)	*(0.27416)*	*(1.56143)*	*(–0.33803)*	*(–0.86732)*	*(0.45125)*	*(0.00044)*	*(–0.25759)*	*(0.28156)*	*(–3.17221)*
R^2	0.929663	0.767893	0.649629	0.719941	0.749017	0.679087	0.803501	0.883569	0.747640	0.894371
Adj. R^2	0.894495	0.651839	0.474444	0.579911	0.623526	0.518631	0.705251	0.825353	0.621460	0.841557
Sum sq. resids	0.013064	0.038667	0.004197	0.005671	0.546924	18.82862	4.054593	0.005996	0.019568	12513.17

Note: Error correction representation when using one Cointegrating relation representation based on Johansen (1988) rank test. *t*–statistics in parentheses, Sample (adjusted): 2000Q3 2011Q4. ECT: error correction term. Autocorrelation of short-run representation equals to one.

Table 7

Vector Error Correction Estimates (Model c, Representation 8b)

$$\frac{CA}{Y} = \alpha_0 \bullet \frac{\left(\frac{Y^*}{N^*}\right)}{\left(\frac{Y}{N}\right)} + \alpha_1 \bullet reer + \alpha_2 \bullet crp + \alpha_3 \bullet dr + \alpha_4 \bullet \frac{\left(I_p\right)}{Y} + \alpha_5 \bullet \frac{\left(exp\right)}{Y} + \alpha_6 \bullet \frac{\left(dirt\right)}{Y} + \alpha_7 \bullet \frac{\left(indirt\right)}{Y} + \alpha_8 + \alpha_9 \bullet t$$

Cointegrating Eq.	**Long-run Relation**	**Cointegrating Eq.**	**Long-run Relation**	**Cointegrating Eq.**	**Long-run Relation**					
CU_ACC_DEF(–1)	1.000000									
DIFF_REAL_GDP_PC(–1)	–0.159135	TOT_EXP(–1)	0.289313	TOT_EMP(–1)	–0.000267					
	(–4.32378)		*(6.58641)*		*(–6.00980)*					
REER(–1)	1.434645	CREDIT(–1)	1.139986	@TREND(00Q1)	–0.011626					
	(11.5117)		*(14.8097)*		*(–8.49465)*					
PRIV_INVEST(–1)	0.072691	DIR_TAX(–1)	–0.018428	C	0.656334					
	(0.41415)		*(–7.34634)*							
DEP_RATIO(–1)	–0.023342	INDIR_TAX(–1)	0.068407							
	(–1.77504)		*(16.2115)*							
Short-run Representation	**D(CU_ACC_ DEF)**	**D(DIFF_REAL_G DP_PC)**	**D(REER)**	**D(PRIV_ INVEST)**	**D(DEP_ RATIO)**	**D(TOT_EXP)**	**D(CREDIT)**	**D(DIR_TAX)**	**D(INDIR_ TAX)**	**D(TOT_EMP)**
ECT	–0.135241	–0.981080	0.127032	–0.183436	0.233107	0.132547	–0.051962	3.292836	–8.323583	2474540
	(–1.62180)	*(–2.59368)*	*(1.02891)*	*(–1.54320)*	*(0.17029)*	*(0.27321)*	*(–0.42332)*	*(3.62203)*	*(–1.37414)*	*(1.25046)*
D(CU_ACC_DEF(–1))	–0.458724	0.624990	–0.050819	0.187710	0.004773	–0.464602	0.054664	–1.696974	–0.450986	2.042.079
	(–2.19472)	*(1.71937)*	*(–0.42832)*	*(1.64326)*	*(0.00363)*	*(–0.99653)*	*(0.46342)*	*(–1.94241)*	*(–0.07748)*	*(1.07382)*
D(DIFF_REAL_GDP_PC(–1))	–0.151874	0.268273	–0.068885	–0.020250	0.658250	0.318722	–0.044390	8.080551	5.670491	–7.520.919
	(–1.48344)	*(1.50671)*	*(–1.18530)*	*(–0.36191)*	*(1.02155)*	*(1.39566)*	*(–0.76827)*	*(1.88827)*	*(1.98876)*	*(–0.80740)*
D(REER(–1))	0.151294	1394640	–0.010713	0.214703	–0.620985	–0.008739	0.124874	–1.339350	–2.291900	–5.827.964
	(0.42181)	*(2.23574)*	*(–0.05262)*	*(1.09527)*	*(–0.27508)*	*(–0.01092)*	*(0.61689)*	*(–0.89335)*	*(–0.22944)*	*(–1.78582)*
D(PRIV_INVEST(–1))	0.078493	–1006649	0.131835	–0.059131	–1610974	0.027414	–0.116531	–2.775787	–2.689809	–1.249.933
	(0.19928)	*(–1.46955)*	*(0.58964)*	*(–0.27469)*	*(–0.64984)*	*(0.03120)*	*(–0.52423)*	*(–1.68601)*	*(–2.45207)*	*(–0.03488)*

D(DEP_RATIO(–1))	0.034758	–0.065274	0.028402	–0.007934	0.051138	–0.058875	0.013580	1.867778	–0.242851	–4131710
	(1.01902)	*(–1.10038)*	*(1.46690)*	*(–0.42562)*	*(0.23821)*	*(–0.77383)*	*(0.70546)*	*(1.31008)*	*(–0.25565)*	*(–1.33136)*
D(TOT_EXP(–1))	0.086833	–0.096190	–0.025723	–0.039651	0.447621	–0.279850	0.015962	–2.876641	0.255915	–9292231
	(1.04108)	*(–0.66313)*	*(–0.54331)*	*(–0.86986)*	*(0.85270)*	*(–1.50421)*	*(0.33911)*	*(–0.82513)*	*(0.11017)*	*(–1.22448)*
D(CREDIT(–1))	0.676098	–0.637538	0.209906	–0.213202	–0.841955	–0.494062	0.360224	–7.864752	–6.828910	–5.552.966
	(2.08777)	*(–1.13200)*	*(1.14187)*	*(–1.20464)*	*(–0.41309)*	*(–0.68397)*	*(1.97102)*	*(–0.58103)*	*(–0.75718)*	*(–1.88464)*
D(DIR_TAX(–1))	–0.007706	0.014001	–0.005414	0.010411	–0.028782	–0.005102	0.006160	–0.407993	–0.406020	–0.126663
	(–1.64712)	*(1.72075)*	*(–2.03845)*	*(4.07137)*	*(–0.97743)*	*(–0.48888)*	*(2.33311)*	*(–2.08625)*	*(–3.11601)*	*(–0.02975)*
D(INDIR_TAX(–1))	0.006980	0.023528	–0.000456	0.006114	–0.038116	–0.013666	0.019780	–0.856235	–0.661074	–1824779
	(0.77457)	*(1.50134)*	*(–0.08922)*	*(1.24151)*	*(–0.67209)*	*(–0.67990)*	*(3.88949)*	*(–2.27332)*	*(–2.63425)*	*(–2.22572)*
D(TOT_EMP(–1))	1.13E–05	–0.000352	0.000162	5.04E–05	–0.000237	0.000419	9.42E–05	0.014486	–0.002510	0.667364
	(0.06856)	*(–1.22960)*	*(1.73488)*	*(0.56063)*	*(–0.22864)*	*(1.14111)*	*(1.01485)*	*(2.10598)*	*(–0.54772)*	*(4.45727)*
C	–0.072915	–0.044473	0.011135	0.015716	0.010897	0.063471	0.017552	0.529376	0.462736	–5505175
	(–4.10889)	*(–1.44103)*	*(1.10538)*	*(1.62042)*	*(0.09756)*	*(1.60348)*	*(1.75260)*	*(0.71369)*	*(0.93630)*	*(–3.40964)*
@SEAS(1)	–0.005500	0.180367	–0.023345	0.001412	0.505879	–0.056360	0.009873	–2.185034	0.691568	1258726
	(–0.14391)	*(2.71359)*	*(–1.07603)*	*(0.06762)*	*(2.10305)*	*(–0.66111)*	*(0.45771)*	*(–1.36778)*	*(0.64973)*	*(3.61977)*
@SEAS(2)	0.055963	0.095448	–0.030527	0.029575	–0.120437	–0.025909	–0.035722	–1647828	–2351306	1568810
	(1.33043)	*(1.30474)*	*(–1.27848)*	*(1.28647)*	*(–0.45492)*	*(–0.27613)*	*(–1.50476)*	*(–0.93721)*	*(–2.00712)*	*(4.09911)*
@SEAS(3)	0.165821	–0.045459	–0.009663	–0.082673	0.077618	–0.133588	–0.018552	0.851666	0.067357	2.010.558
	(6.02646)	*(–0.94997)*	*(–0.61868)*	*(–5.49768)*	*(0.44820)*	*(–2.17656)*	*(–1.19472)*	*(0.74051)*	*(0.08790)*	*(0.80310)*
DUMMY	0.021419	0.009381	0.006120	–0.000941	–0.058034	–0.001413	–0.001214	–0.502088	–0.257298	–3347433
	(2.09468)	*(0.52753)*	*(1.05433)*	*(–0.16839)*	*(–0.90175)*	*(–0.06194)*	*(–0.21034)*	*(–1.17473)*	*(–0.90351)*	*(–3.59803)*
R^2	0.926273	0.755565	0.646547	0.805953	0.763503	0.680055	0.915962	0.858352	0.843965	0.883636
Adj. R^2	0.886776	0.624618	0.457197	0.702000	0.636808	0.508656	0.870942	0.782469	0.760375	0.821298
Sum sq. resids	0.012874	0.038938	0.004148	0.003845	0.509973	0.064055	0.004100	2.249.260	9.985.359	10657.47

Note: Error correction representation when using one Cointegrating relation representation based on Johansen (1988) rank test. *t*–statistics in parentheses, Sample (adjusted): 2000Q3 2011Q4. ECT: error correction term. Autocorrelation of short-run representation equals to one.

Figure 8

Response to Cholesky One S.D. Innovations (Model 8a)

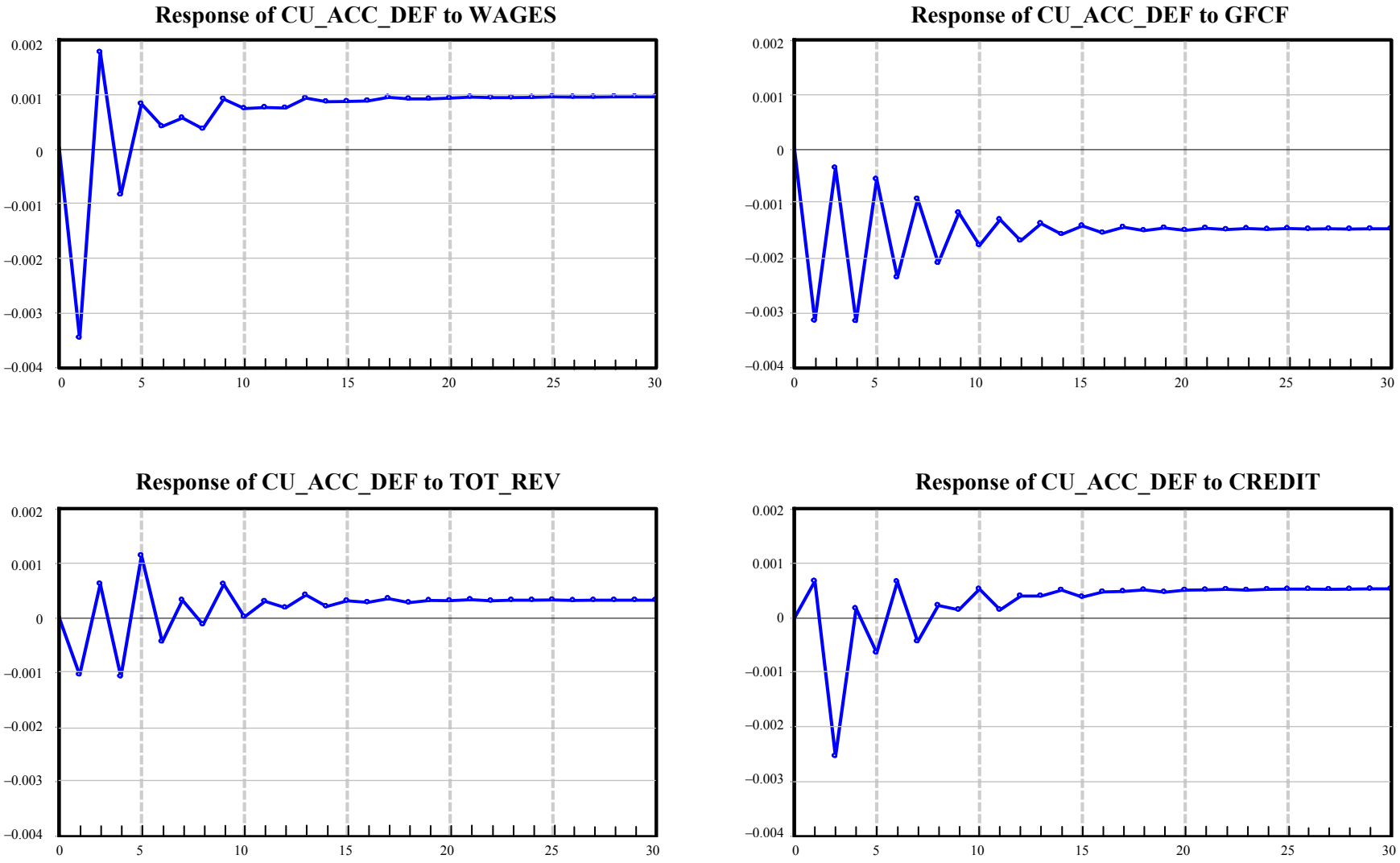
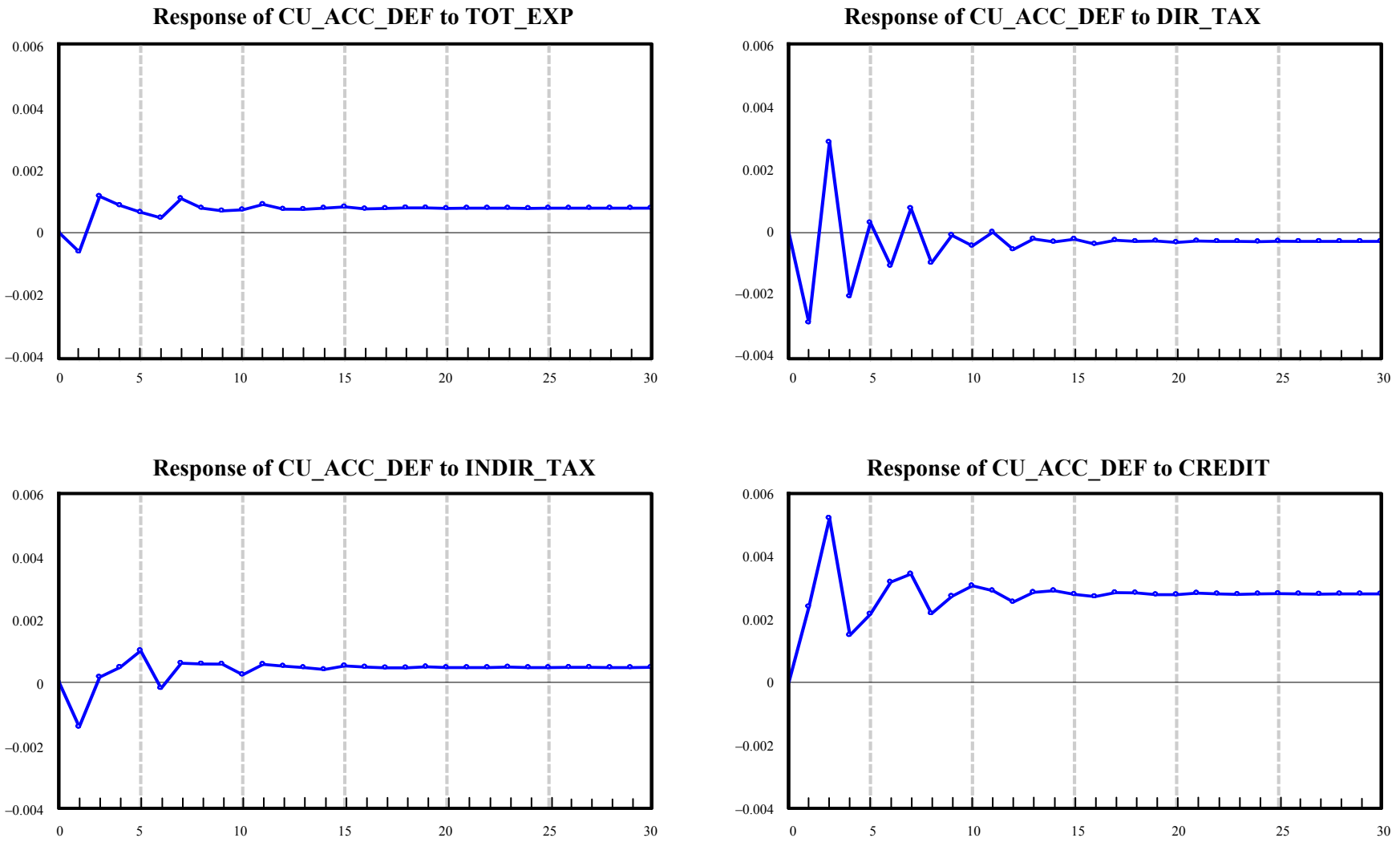


Figure 9

Response to Cholesky One S.D. Innovations (Model 8b)



REFERENCES

Barnes, S., J. Lawson and A. Radziwill (2010), "Current Account Imbalances in the Euro Area – A Comparative Perspective", OECD, Economics Department, Working Paper, No. 826.

Bayoumi, T.A. (1993), "Financial Deregulation and Consumption in the United Kingdom", *Review of Economic and Statistics*, No. 75, pp. 536-39.

Bayoumi, T.A. and P.R. Masson (1998), "Liability-creating Versus Non-liability-creating Fiscal Stabilisation Policies: Ricardian Equivalence, Fiscal Stabilisation and EMU", *Economic Journal*, No. 108, pp. 1026-45.

Bergin, P.R. and S.M. Sheffrin (2000), "Interest Rates, Exchange Rates and Present Value Models of the Current Account", *Economic Journal*, No. 110, pp. 535-58.

Blanchard, O. and F. Giavazzi (2002), "Current Account Deficits in the Euro Area: The End of the Feldstein-Horioka Puzzle?", *Brookings Papers on Economic Activity*, No. 2, pp. 147-86.

Briotti, M.G. (2005), "Economic Reactions to Public Finance Consolidation: A Survey of the Literature", European Central Bank, Occasional Paper, No. 38.

Brissimis, S.N, G. Hondroyiannis, C. Papazoglou, N.T. Tsaveas and M.A. Vasardani (2010), "Current Account Determinants and Fiscal Sustainability in Periods of Structural Change", ECB, Working Paper, No. 1243 and *Economic Change and Restructuring*, No. 45, pp. 77-95.

Buiter, W.H. (1981), "Time Preference and International Lending and Borrowing in an Overlapping-generations Model", *Journal of Political Economy*, No. 89, pp. 769-97.

Bussière, M., M. Fratzscher and G.J. Müller (2004), "Current Account Dynamics in OECD and EU Acceding Countries – An Intertemporal Approach", European Central Bank, Working Paper, No. 311.

——————(2005), "Productivity Shocks, Budget Deficits and the Current Account", European Central Bank, Working Paper, No. 509.

Ca' Zorzi, M., A. Chudik and A. Dieppe (2009), "Current Account Benchmarks for Central and Eastern Europe: A Desperate Search?", European Central Bank, Working Paper, No. 995.

Ca' Zorzi, M. and M. Rubaszek (2008), "On the Empirical Evidence of the Intertemporal Current Account Model for the Euro Area Countries", European Central Bank, Working Paper, No. 895.

Chinn, M.D. and E.S. Prasad (2003), "Medium-term Determinants of Current Accounts in Industrial and Developing Countries: An Empirical Exploration", *Journal of International Economics*, No. 59, pp. 47-76.

Debelle, G. and H. Faruqee (1996), "What Determines the Current Account? A Cross-sectional and Panel Approach", IMF, Working Paper, No. 58.

Engle R.F. and C.W.J. Granger (1987), "Co-integration and Error Correction: Representation, Estimation, and Testing", *Econometrica*, No. 55, pp. 251-76.

Englund, P. (1990), "Financial Deregulation in Sweden", *European Economic Review*, No. 34, pp. 385-93.

Freund, C.L. (2000), "Current Account Adjustment in Industrialized Countries", Board of Governors of the Federal Reserve System, International Finance, Discussion Paper, No. 692.

Gandolfo, G. (2001), *International Finance and Open-economy Macroeconomics*, Springer-Verlag, New York.

Gruber, J.W. and S.B. Kamin (2007), "Explaining the Global Pattern of Current Account Imbalances", Journal of International Money and Finance, No. 26, pp. 500-22.

Herrmann, S. and A. Jochem (2005), "Determinants of Current Account Developments in the Central and East European EU Member States – Consequences for the Enlargement of the Euro Area", Deutsche Bundesbank, Discussion Paper Series 1, Economic Study, No. 32.

Jappelli, T. and M. Pagano (1989), "Consumption and Capital Market Imperfection: An International Comparison", *American Economic Review*, No. 79, pp. 1088-105.

Johansen, S. (1991), "Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models", *Econometrica*, Vol. 59, No. 6, pp. 1551-80, November.

Lehmussaari, O.P. (1990), "Deregulation and Consumption: Saving Dynamics in the Nordic Countries", IMF, Staff Paper, No. 37, pp. 71-93.

Makrydakis, S. (1999), "Consumption-smoothing and the Excessiveness of Greece's Current Account Deficits", *Empirical Economics*, No. 24, pp. 183-209.

Melitz, J. (1990), "Financial Deregulation in France", *European Economic Review*, No. 34, pp. 394-402.

Monokrousos, P. and D. Thomakos (2012), "A Technical Study on the Determinants of Greece's Current Account Position", Eurobank Research, *Economy & Markets*, Vol. VII, No. 2.

Nason, J.M. and J.H. Rogers (2006), "The Present-value Model of the Current Account Has Been Rejected: Round Up the Usual Suspects", *Journal of International Economics*, No. 68, pp. 159-87.

Nickell, C. and I. Vansteenkiste (2008), "Fiscal Policies, the Current Account and Ricardian Equivalence", European Central Bank, Working Paper, No. 935.

Obstfeld, M. and K. Rogoff (1995), "The Intertemporal Approach to the Current Account", in G.M. Grossman and K. Rogoff (eds.), *Handbook of International Economics*, Vol. 3, North-Holland, pp. 1731-99.

Ostry, J.D. and J. Levy (1995), "Household Saving in France: Stochastic Income and Financial Deregulation", IMF, Staff Paper, No. 42, pp. 375-97.

Osugi, K. (1990), "Japan's Experience of Financial Deregulation Since 1984 in an International Perspective", BIS, Economic Paper, No. 26.

Sachs, T.D. (1981), The Current Account and Macroeconomic Adjustment in the 1970s", *Brookings Papers on Economic Activity*, No. 1, pp. 201-68.

BALANCING IMBALANCES: INTEGRATED SURVEILLANCE AND THE ROLE OF THE MIP

Jonas Fischer[*] *and Alexandr Hobza*[*]

The new EU governance arrangements introduced as part of the so-called "six-pack" legislation aim at deepening of the EU fiscal surveillance frameworks as well as broadening surveillance to cover the issue of macroeconomic imbalances. The new elements are applied in a setting of integrated surveillance under the European Semester. The integrated approach reflects one of the key lessons of the recent crises, namely the strong interlinkages across sectors within an economy and the importance of the fiscal and external constraints.

Against this broader context, the paper focuses on the new process to prevent and correct macroeconomic imbalances – the Macroeconomic Imbalance Procedure (MIP). It explains the rationale of the MIP, its place in EU multilateral surveillance and discusses its potential role in facilitating the adjustment of the accumulated macroeconomic imbalances. It takes a sectorial perspective and underlines the strong interlinkages across sectors within an economy. It also discusses the nature and importance of the external constraint within the euro area in the context of rebalancing and fiscal consolidation and implications for the adjustment.

It argues that the MIP can contribute to better economic outcomes through promoting adjustment and stability-oriented policies, reinstating external sustainability and avoiding asset booms. The overall governance framework of the EU is under rapid development, in particular as regards the financial sector and banking union, which also will change the conditions under which future imbalances may develop in the economy. Therefore, looking forward, the MIP will crucially need to stay flexible to react to changing circumstances.

1 Introduction

It is now evident that the build-up of external and internal macroeconomic imbalances in the pre-crisis years contributed to the depth of the crisis. Their unwinding has proven very costly, contributing to a sovereign debt crisis and deleveraging pressures in the private sector. As a side product, the unravelling of the economic and financial crisis has exposed weaknesses in the surveillance arrangements within EMU. Therefore, alongside to policy responses to limit the impact of the crisis and to put in place an exit strategy, important progress is being made in developing the institutional building blocks of EU and euro area economic surveillance.

In particular, these developments pointed to the need to broaden the economic governance framework underpinning EMU so as to better address the issue of unsustainable macroeconomic trends in all sectors of the economy. The potential implications of the accumulation of macroeconomic imbalances were not fully reflected in the existing governance arrangements in EMU. In particular, the necessary toolbox and the analytical basis for efficient surveillance on imbalances were missing at that time.

The new procedure for the prevention and correction of macroeconomic imbalances – the Macroeconomic Imbalance Procedure (MIP) – responds to this need and was one of the key building blocks of the legislative package (the "six-pack") to enhance the governance structures in EMU adopted in late 2011. The MIP should not be seen in isolation from other surveillance tools,

---

[*] The authors work at DG ECFIN at the European Commission.

The views expressed in this article are those of the authors and do not necessarily represent those of the European Commission.

such as the EDP and the European semester, but as part of the broader efforts to move towards more integrated and encompassing surveillance.

Against this background, Section 2 first provides a rationale for the MIP by looking at the economic developments in the run-up to the crisis; and discusses also the adjustment to external, fiscal and private sector macroeconomic imbalances. There is a particular focus on the sectorial interlinkages and the role of external and internal constraints for the adjustment. Section 3 then briefly presents the MIP and how it fits in the overall EU surveillance framework. Against the backdrop of accumulation of macroeconomic imbalances in 2000s, Section 4 examines the past country-specific policy advice given in the context of the economic surveillance, also before the crisis, and contrasts it with that given in the first years of application of the MIP. Section 5 concludes.

2 The macroeconomic imbalances and the need for an integrated surveillance approach

This section discusses the developments that preceded the onset of the economic and financial crisis and which were marked by the accumulation of significant macroeconomic imbalances. In particular, it focuses on the strong interlinkages across different sectors within economies as well as across different euro area members. It aims to demonstrate the need for a multifaceted approach to monitoring and tackling macroeconomic imbalances, which is reflected in the design of the MIP. Drawing on the adjustment experience of recent years, the section also outlines the economic challenges on the way forward that will have to be addressed in the context of the application of the integrated macroeconomic surveillance in the EU.

2.1 The emergence of imbalances in the run-up to the crisis: the loosening of constraints

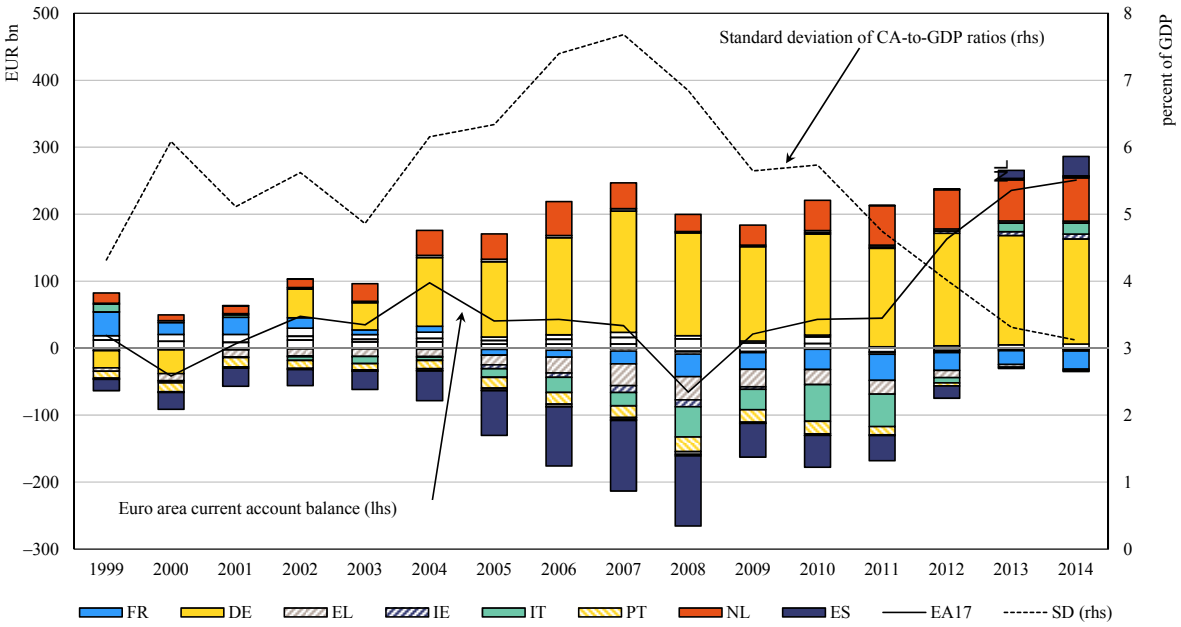
2.1.2 The relevance of current accounts in a monetary union: the link to internal imbalances

Perhaps the most visible manifestation of macroeconomic imbalances was the increasing divergence in external positions. Some Member States saw their current account deficits rise to staggering levels while others accumulated substantial current account surpluses (Figure 1). In 2008, current account deficits of the euro area deficit countries reached their peak and stood at almost 4.7 per cent of the group's GDP, with deficits of Greece, Spain or Portugal being around or above 10 per cent of their respective GDP. Current account positions of surplus countries accounted for 5.5 per cent of their GDP in this year, with the highest one recorded in Germany and exceeding 6 per cent of GDP. These persistent external imbalances resulted in the rising stocks of net external liabilities in the deficit countries and improving net asset positions in the surplus countries (Figure 2). In particular, the negative net international positions of countries such as Greece, Spain and Portugal grew to levels exceeding their annual output, much of this consisting of debt liabilities.

These developments bear witness to the importance of current account balances even in a monetary union and underline the need to undertake surveillance on external imbalances. Clearly, the nature of the external constraint is different in a country participating in a monetary union compared to economies that have their own currency. A number of the concerns and risks that large current account imbalances generate do not apply in a monetary union: current account imbalances carry lesser immediate risks as there is no (or less of a) threat of a sudden stop, *i.e.*, interruption of capital inflows. Also, creditors are protected from risks of large depreciations in the value of their assets abroad and in sudden losses of competitiveness through large exchange rate swings.

Figure 1

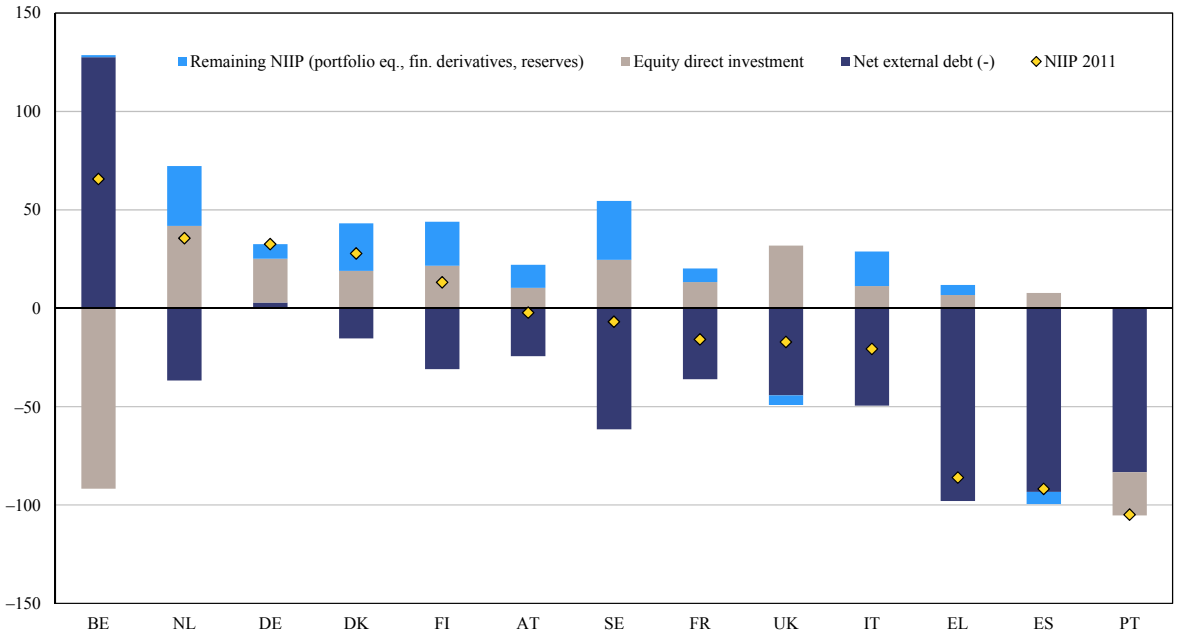
Current Account Balances in the Euro Area



Source: AMECO.

Figure 2

Net International Investment Positions
(percent of 2011 GDP)



Source: Eurostat.

Current account deficits and surpluses are also part of the adjustment process in a monetary union. They absorb asymmetric shocks in the absence of independent monetary policy and nominal exchange rate adjustment. Market-driven changes in cost and price competitiveness facilitate adjustment, with competitiveness losses taking place in overheating economies and gains in countries in cyclical downturn and with high unemployment.

However, current account balances provide useful information on potentially destabilising internal developments, particularly in a monetary union that consists of independent national states and lacks well-functioning cross-border adjustment mechanisms. Current account deficits are indicative of the extent to which the economic agents in a country rely on capital from abroad to fill in their saving-investment gaps. Concerns about the external debt sustainability still exist, in so far as they reflect the solvency of the government, firms and households, the financial responsibilities of which are usually intermediated by the respective banking systems. If deficits are excessive and the representative economic agent of a country lives beyond her means, her solvency will at some time be disputed and creditors will refuse increasing or rolling over credit. In these cases, there is a need to address the underlying distortions – this applies to both countries with their own currencies and those in a monetary union.

2.1.2 External imbalances and their drivers

The build-up of the large current account imbalances in the EU and the euro area coincided with several major developments on both European and global levels. These primarily included financial factors such as the introduction of the euro which reduced sovereign risk premiums across the euro area and promoted financial market integration in the EU as well as the global reduction in interest rates, which increased risk appetite among financial investors, led to severe underpricing of credit risks and initiated a global credit boom.

The financial factors played a particularly important role and contributed to the accumulation of external imbalances through two channels:

- They increased the cross-border supply of capital: the elimination of currency risk coupled with institutional reforms to harmonise financial sector policies have stimulated capital flows from the core to the periphery. The expansion of cross-border financial flows was a global phenomenon during the period up to the crisis, but was particularly strong in the euro area.
- They boosted demand for capital in the periphery: the softening of credit constraints as well as the sharp reduction of real interest rates have led to the fuelling of domestic demand in the south, which in turn caused prices and labour costs to increase. The ensuing real exchange rate appreciation implied a relative loss in competitiveness while at the same time there was a deterioration in the current account positions.

The mounting current account deficits and surpluses were thus a counterpart to strong capital flows across the euro-area. An important part of the widening in surpluses and deficits was driven by the convergence in interest rates after the introduction of the euro. A global decline in interest rates and ample supply of liquidity were accentuated by the financial euro-bias and progress in establishing a single financial market.

Capital inflows benefited mostly those countries which in the run-up to EMU experienced the largest reductions in nominal interest rates and where the real returns on investment appeared the highest. While the observed developments partially reflected sound catching-up processes, particularly in the initial period, they also had much less benign repercussions and became a significant ingredient of unsustainable macroeconomic trends in some countries. Part of the capital flows was channelled into unproductive uses and fuelled domestic demand booms, which were

associated with excessive credit expansions in the private and/or public sectors and housing bubbles in some euro-area members.

The expansion of domestic demand generated upward pressure on prices, which was particularly strong in non-tradable sectors. The resulting changes in relative prices induced a reallocation of resources in the economy towards the non-tradable sectors and, on the whole, resulted in substantial losses in price and cost competitiveness. This can be clearly seen from the developments in competitiveness indicators, such as real effective exchange rates or unit labour costs, which document the increasing divergences in the euro area (Figure 3). Faced with strong demand pressures, some countries were also unable to react appropriately to negative productivity shocks.

Inside the euro area, the external deficits were largely financed by the excess savings of the surplus countries, both directly and indirectly.[1] Moreover, the core economies (in particular Germany and France) intermediated large financial flows from non-EU investors to deficit countries (Figure 4). Most of this financing took the form of debt and was channelled through the bond and inter-bank markets. In the absence of appropriate macro-financial supervision, all this resulted in credit-driven booms, reductions in savings and excessive investment in non-productive activities in the periphery, and excessive risk concentration in the financial systems of the core countries.

In addition, external shocks compounded the effects of intra-euro area factors in the emergence of large deficits and surpluses in the EU. During the first decade of its existence, the euro area was exposed to a number of external shocks such as the rapidly evolving competition from emerging countries, enlargement of the EU, increases in commodity prices, recycling of oil-producers' income and changes in the pattern of global demand. These external shocks had different impacts on individual Member States. They were, on the whole, more favourable for the exports and terms of trade of the core EU economies, partially due to the product and geographic composition of their exports and stronger non-price competitiveness, while they put pressure on the export potential, and promoted imports of the periphery.[2] In addition, the strengthening in the nominal exchange rate of the euro put further pressure on price competitiveness. Exports of the deficit countries have been more price sensitive and the composition of their exports has made them more vulnerable to shifts in the nominal exchange rates.

Therefore, the current account divergence in the euro area was a reflection of the ongoing adjustment to a number of endogenous and exogenous shocks. They were manifestations of increasing domestic disequilibria in the euro area countries and not necessarily a cause of the subsequent crisis.[3]

2.1.3 A sectorial perspective: linking external and internal imbalances

These trends point to the close interlinkages between cross-border financial flows, external positions of countries and developments in sectorial balance sheets. A sectorial perspective is thus essential to understand the interplay between domestic and external imbalances. It is relevant to detect a possible concentration of risks in specific parts of the economy and its institutional sectors. From an accounting perspective, current account balance corresponds to the saving-investment balance of the total economy, which, in turn, is the aggregate of saving-investment balances of domestic sectors:

---

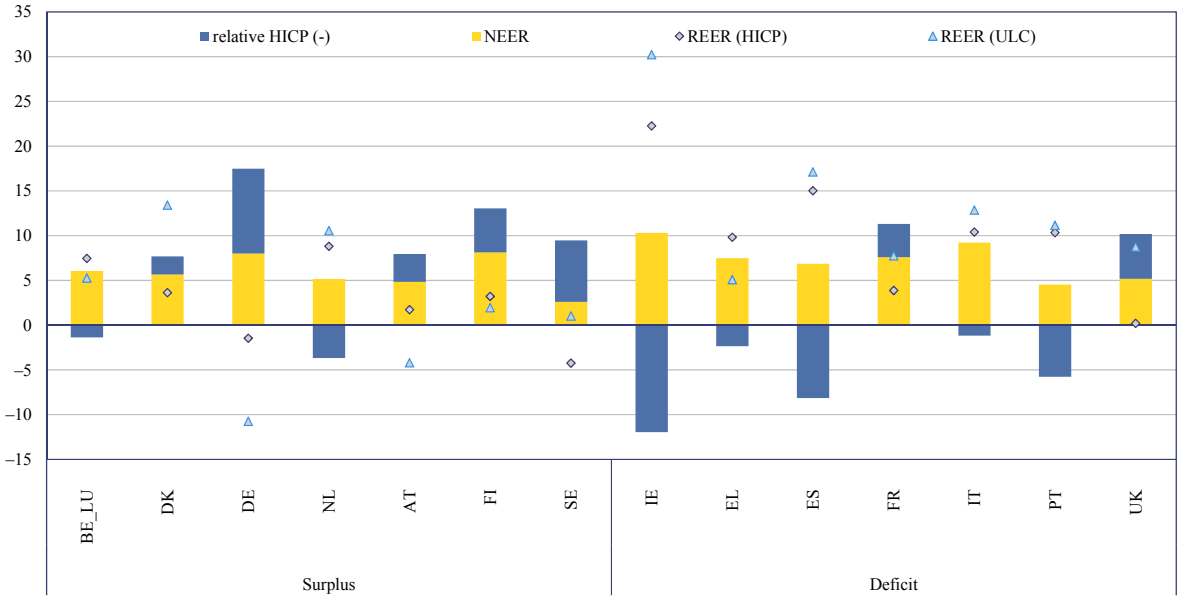
1 European Commission (2012c).

2 Chen *et al.*, 2012.

3 Buti and Turrini, 2012.

Figure 3

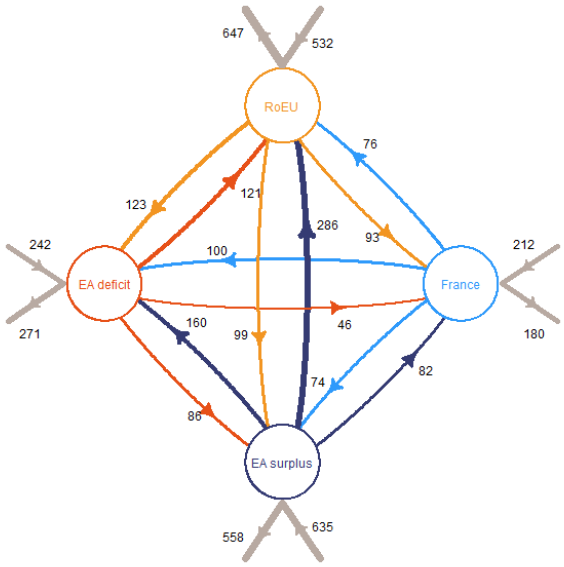
Real Effective Exchange Rates
(change between 1999 and 2007)



Source: AMECO.

Figure 4

Total Financial Flows Among Groups of Countries
*(average 2004-06)**



Source: European Commission (2012).
* Note: The direction of arrows shows the direction of the gross flows. The regions include the euro area surplus countries discussed in European Commission (2012c) (EA surplus), the euro area peripheral countries including Greece, Italy, Ireland, Portugal and Spain (EA deficit), the remaining EU countries, including new Member States which joined the EU since 2004 (RoEU), and France, which is considered separately because it is an important intermediator of financial flows to the periphery and has been both a surplus and deficit country during the last decade.

$$CA = (S–I)_{private} + (S–I)_{GG}$$

The aggregate saving and investment can be decomposed into contributions from different institutional sectors, *i.e.*, the government, households, businesses and financial corporations (the latter three sometimes aggregated in the private sector). This allows analysing contributions of these sectors to the overall external balance of the economy.

A look at the sectorial net lending/borrowing in the groups of surplus and deficit countries in the euro area shows that the key driver of the growing divergences in external positions prior to the on-set of the crisis was the non-financial private sector: while in surplus countries the financial balance of the private sector on average improved, in deficit countries it progressively deteriorated up to 2007 (Figures 5 and 6). The household sectors in both surplus and deficit countries were on average net lenders over the whole period, while the net lending position was much weaker in the latter and, moreover, deteriorating in the run-up to the crisis. The non-financial corporations were net borrowers in deficit countries while they turned into net lenders in surplus countries. This is quite striking given the fact that companies typically are net borrowers as they use credit to finance their investment plans.[4]

The government sector balances in the deficit countries were on average negative and contributed significantly to the external deficits. Their size did not change significantly over time though and thus they were not behind the expansion in deficits before the crisis. On the other hand, surplus countries tightened their fiscal policies considerably and their government sectors turned into net lenders, adding thus to the contributions of the private sectors to external surpluses. The net lending/borrowing positions of the financial sector were relatively small and broadly similar, reflecting the intermediation role of financial institutions.

A closer examination of the sectorial saving-investment balances in individual euro area countries unveils important differences in their contributions to the external position of the economy (Table 1). Overall, the size of saving-investment gaps tended to increase in many sectors in the run-up to the crisis. The highly negative net lending/borrowing positions of households in Ireland and Greece are remarkable and reflect the extent of the housing boom in Ireland and (probably) the consumption boom in Greece. In other high-deficit countries such as Spain or Portugal, it was the corporate sector, which was an important net borrower. Government balances were highly negative in Greece and Portugal but actually positive in Spain and Ireland.

2.1.4 Private sector imbalances and current accounts

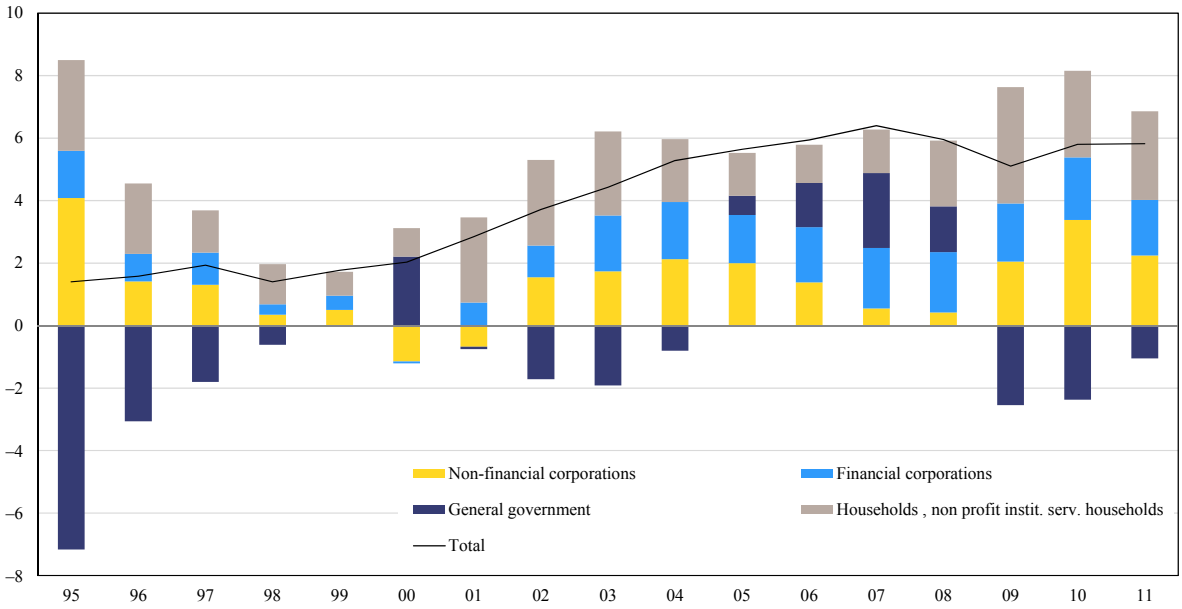
As mentioned above, the loosening of the external constraint coincided with the accumulation of private sector imbalances in the current account deficit countries. The increased ability of countries' banking systems to tap international sources of capital allowed the credit growth significantly exceed the growth in domestic deposits. The ample supply of cheap capital benefited both households as well as companies. Figures 7 and 8 indicate that the association with current account positions was stronger in the corporate sector than in the household sector.

In this respect, the composition of capital inflows played an important role. Domestic credit expansions were fuelled by the fact that the capital inflows in the periphery took form of mostly (inter-bank) debt. Figure 9 shows the close association between cross-border debt flows and domestic credit growth. Debt flows, however, carry more risks than equity-based financing (e.g., the FDI), which allows more cross-border diversification of risk. At the same time, the expansion phase of imbalances may induce important relocation of resources in the economy: capital inflows

[4] For an analysis of developments in corporate balance sheets, see for example Ruscher and Wolff (2012).

Figure 5

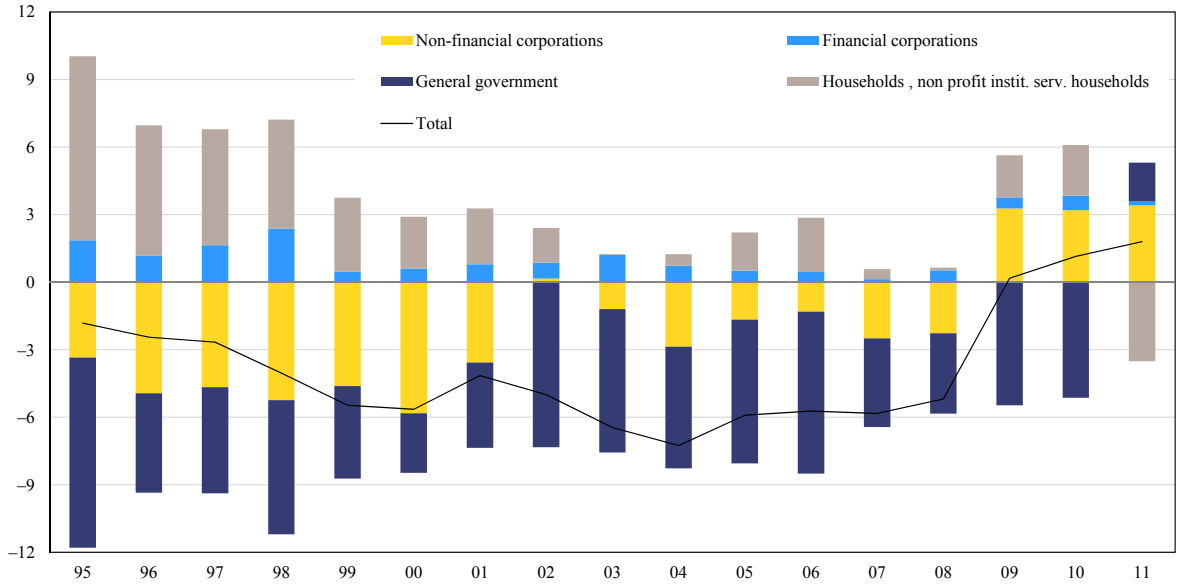
Net Lending/Borrowing by Sector – Surplus Countries
(percent of GDP)



Source: Eurostat.
Note: Surplus countries include: AT, BE, DE, FI, LU and NL.

Figure 6

Net Lending/Borrowing by Sector – Deficit Countries
(percent of GDP)



Source: Eurostat.
Note: Deficit countries include other euro area countries but the surplus ones.

Table 1

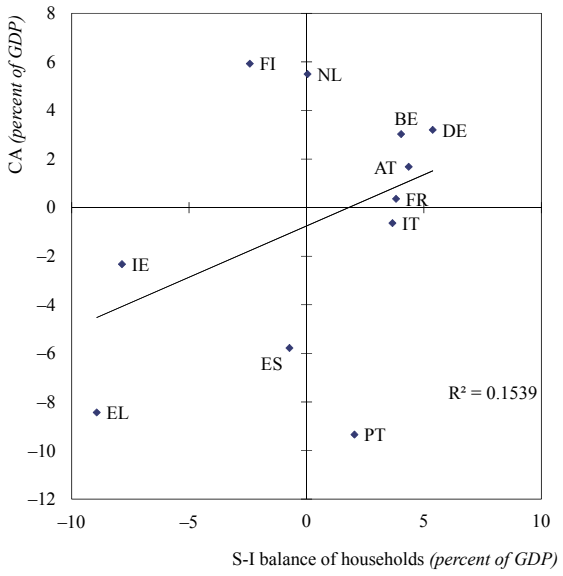
Average Saving-investment Balances of Different Sectors
(percent of GDP)

Country	00-04					05-07					08-11				
	HH	NFC	FC	GG	Total	HH	NFC	FC	GG	Total	HH	NFC	FC	GG	Total
BE	4.9	–0.5	0.4	–0.1	4.8	2.5	0.3	1.3	–0.8	3.4	3.3	0.3	1.2	–3.6	1.2
DE	5.0	–1.4	0.6	–2.7	1.4	6.0	0.8	1.2	–1.6	6.4	5.8	1.3	0.8	–2.0	6.0
EE	–3.3	–7.0	1.4	0.7	–8.2	–9.1	–6.3	0.8	2.0	–12.6	–0.7	4.8	–0.3	–0.9	3.0
IE	–6.6	–0.1	3.6	0.4	0.3	–9.1	–1.0	4.2	1.6	–4.0	1.8	1.5	10.9	–16.2	–1.8
EL	–9.0	3.5	0.6	–5.3	–10.2	–8.8	1.0	1.9	–6.3	–12.1	–8.5	4.6	2.7	–11.4	–12.6
ES	0.2	–4.1	0.9	–0.4	–3.4	–2.3	–8.8	1.2	1.9	–8.2	3.5	–1.5	1.5	–8.7	–5.1
FR	4.2	–0.9	0.3	–2.8	0.8	3.2	–2.0	0.6	–2.7	–0.9	4.3	–2.0	1.4	–5.8	–2.0
IT	3.7	–1.7	0.7	–2.9	–0.1	3.5	–2.2	0.7	–3.2	–1.1	2.1	–2.0	1.0	–4.0	–2.9
CY	1.0	0.6	–1.2	–3.9	–3.4	–1.8	–6.2	–0.0	–0.0	–8.1	–0.5	–7.9	3.6	–4.2	–9.0
NL	0.6	5.3	1.4	–1.1	6.2	–1.0	7.3	1.6	0.1	8.0	–0.2	7.9	0.8	–3.6	4.9
AT	3.9	–1.8	0.6	–1.8	0.9	5.1	–2.0	1.4	–1.5	3.0	4.3	–0.2	2.0	–3.0	3.0
PT	2.2	–5.5	–0.0	–3.9	–7.2	1.8	–6.8	0.7	–4.8	–9.1	3.9	–7.5	1.8	–7.0	–8.9
SI	4.9	–4.3	0.9	–3.0	–1.5	5.6	–7.8	–0.1	–1.0	–3.2	4.6	–2.7	1.4	–5.0	–1.7
SK	–0.6	–0.5	1.0	–6.4	–6.5	–1.5	–3.8	0.6	–2.6	–7.3	0.7	1.7	1.1	–5.7	–2.2
FI	–1.8	4.6	0.3	4.2	7.3	–3.5	3.1	0.6	4.0	4.2	–1.4	2.7	0.7	–0.5	1.5

Source: Eurostat.
Note: The data for EL are provisional.

Figure 7

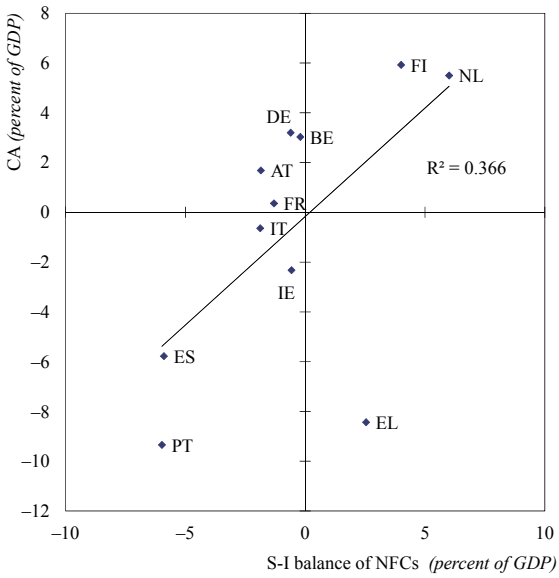
CAs and Household S-I Balances
(percent of 2000-07 GDP)



Source: Eurostat.

Figure 8

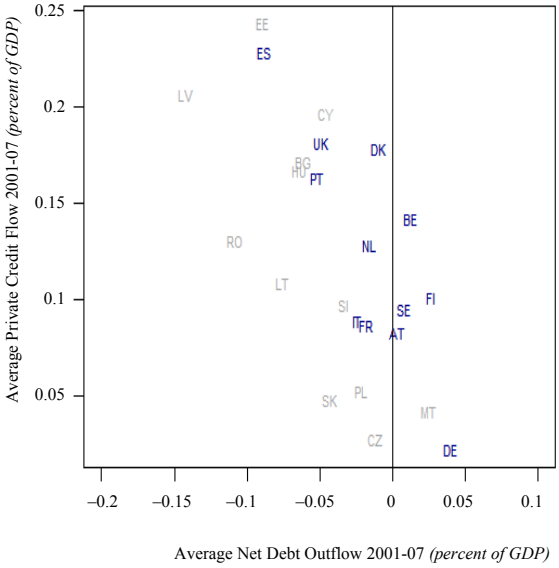
CAs and NFCs S-I Balances
(percent of 2000-07 GDP)



Source: Eurostat.

Figure 9

Credit vs. External Debt Flows, 2001-07[5]

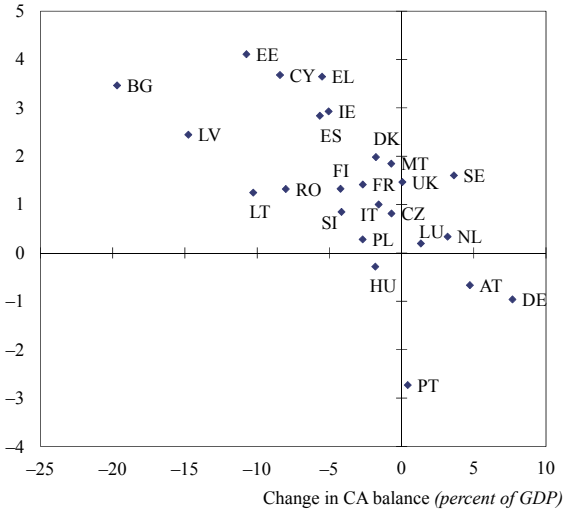


Source: Eurostat, IMF.

Figure 10

Current Accounts and Residential Investment, 2001-07

Change in Residential Investment
(percent of GDP) 01 to 07



Source: Eurostat.

[5] Note: Net debt outflow refers to the share of net financial transactions in portfolio debt and other investment (percent of GDP).

accompanying current account deficits are associated with relative growth of the non-traded sectors at the cost of the traded ones (Blanchard, 2007). Indeed, widening current account deficits in the pre-crisis period were closely related to the increases in residential investment and the expansions in the construction sectors (Figure 10). Reversal of such trends in the real economy in the adjustment phase can then become very costly in the presence of rigidities (Lane, 2013).

2.1.5 Fiscal policy and current accounts

As discussed above, the fiscal stance proved to be an important determinant of current accounts in the euro area. This is in line with theoretical findings and empirical regularities. Unless offset by dissaving of the private sector (the Ricardian effect), a reduction in the government deficit contributes to higher current account surpluses or smaller deficits. The idea that external deficits are driven by government deficits is known as the "twin deficit" hypothesis. Figure 11 shows that average fiscal positions in surplus countries over the period 2000-7 were generally better than those in deficit countries and this relationship continues to hold. Empirical analyses confirm this positive relationship. For example, Abbas *et al.* (2011) find that an improvement in fiscal balance of 1 percentage point of GDP leads to an increase in current account balance in the range of 0.3-0.5 per cent of GDP. European Commission (2012c) finds a similar effect of around 0.2 per cent of GDP. This effect is generally lower during periods when fiscal policy or current accounts are subject to big changes, and this is especially the case in advanced economies. On the other hand, current account changes appear to be stronger during fiscal contractions. In the EU, the association between changes in fiscal positions and changes in current accounts in the pre-crisis period appears relatively weak (Figure 12). In particular, the increasing current account deficits in the euro area periphery were generally driven by the worsening financial position of the private sectors, with the public sectors' saving-investment balances being negative, but roughly stable.

With fiscal policy being a key macro policy instrument to address country-specific developments in a monetary union, it appears that fiscal policies of the deficit countries were not leaning enough against the wind to contain the expanding imbalances in other sectors.

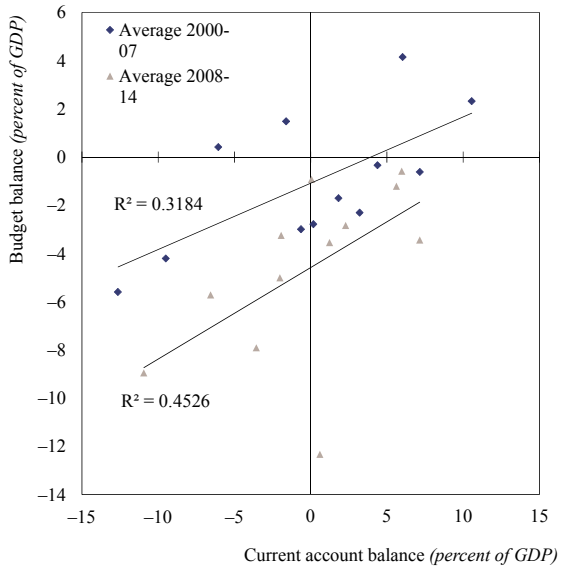
One aspect in this context could relate to how the fiscal stance and underlying fiscal positions are measured. Indeed, large current account imbalances may lead to a mis-measurement of the structural fiscal deficit and complicate setting appropriate fiscal stance. Unsustainable current account deficits may result from domestic absorption booms, the expansion of the construction sector, and the related windfall revenues. The standard approaches to adjusting budget balances, by applying constant revenue and expenditure elasticities for the cycle, fail to account for the temporary accelerations of revenues during absorption booms, which lead to an underestimation of structural deficits. Moreover, the abundance of credit may boost economic activity for several years, which may be misunderstood as an improvement in potential output.[6] In the case of surpluses, the true underlying cyclically-corrected balance can actually be better than what the estimates of structural balance indicate. Targeting macroeconomic policies to such estimated structural balances means that the fiscal policy becomes overly restrictive and a more expansionary fiscal stance will lead to smaller than expected deteriorations in the budget balance. In addition, the effectiveness of fiscal policy to act against external imbalances might be limited by political economy constraints (Lane, 2010). Indeed, it appears that many euro area members failed to neutralise the windfall revenues in the pre-crisis period.

---

[6] European Commission, 2006; and Lendvai *et al.*, 2011

Figure 11

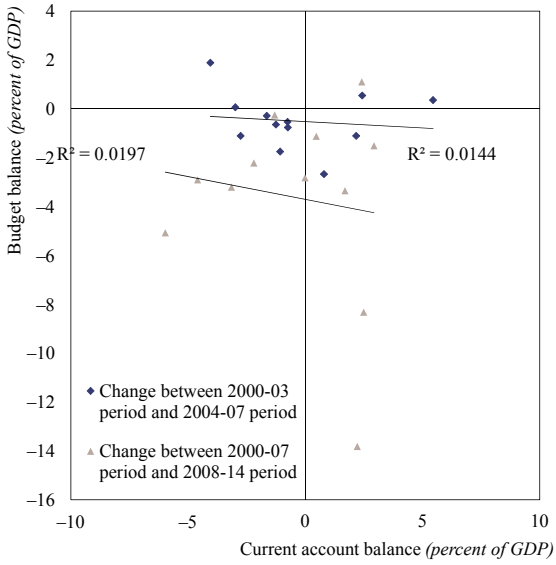
Budget Balance and Current Account



Source: AMECO.

Figure 12

Changes in Budget Balance and Current Account



Source: AMECO.

While probably helpful, more restrictive fiscal stance would most likely not be sufficient to prevent the accumulation macroeconomic imbalances though. This would require addressing the more fundamental reasons behind their accumulation, which were linked to incorrect assessment of country-specific prospects and risks combined with the lack of appropriate euro area-wide macro-prudential supervision of financial markets as well as the failure to tackle structural weaknesses that prevented appropriate allocation of resources.

On the way forward, fiscal policy stance can contribute to the necessary rebalancing. In particular, in countries featuring consolidation needs in combination with external imbalances, progress in reducing fiscal deficits will help achieve the needed real exchange rate devaluation and promote reallocation of resources towards tradable sectors. On the other hand, the short-run growth effects of fiscal consolidations can be substantial, in particular in conjunction with deleveraging pressures in the private sector.

2.2 The imbalances in the post-crisis adjustment period: the biting constraints

When the crisis struck, the existence of large imbalances proved highly damaging: their unwinding contributed, particularly in the euro area, to the gravity and propagation of the crisis by deepening the contraction as well as aggravating the situation of public finances. While the public accounts appeared in a seemingly good shape at the outset of the crisis, they took a major hit as the crisis started unfolding. Implicit or explicit government guarantees for the troubled banking sector resulted in the transfer of risk from private to public sector. Additionally, sharp contractions in the overblown sectors, e.g., construction, and the related increases in unemployment contributed to the deterioration of public finances through falling tax revenues and increased unemployment support. Moreover, the sovereign debt crisis that hit Greece, Ireland and Portugal generated strong

cross-border spillover effects through the loss of confidence by financial markets. These developments clearly document the sectorial links within economies as well as cross-border linkages and further underline the need for an EU/euro area-wide approach to the surveillance of imbalances.

Figure 13 shows the changes in saving-investment balances of the private and public sectors and implicitly the economy as a whole (the downward-sloping line shows the locus of points where the country has a balanced current account) in the periods before (2000-7) and after (2008-11) the start of the crisis. It shows that the crisis has induced sharp corrections in private saving-investment balances in countries where private sectors were the largest net borrowers in the crisis such as Ireland, Greece or Spain. It was also these countries which experienced the most significant deteriorations in government balances. Interestingly, the external constraint started to bite only more recently in the euro area countries as the official financing (e.g., the ECB liquidity support, TARGET 2 balances, or direct programme assistance) replaced the private flows which suffered a "sudden stop" (Merler and Pisani-Ferry, 2012). This helped to cushion the impact of the necessary external adjustment, and current account deficits started to shrink only gradually. As a result, the euro area vulnerable countries moved broadly in parallel with the balanced-CA locus in Figure 13, with Portugal even recording, on average, a worsening in its external balance. In contrast, Estonia, which for most of the post-crisis period was still outside of the euro area,[7] experienced a sharp correction in private balances, accompanied by only a mild deterioration in public net borrowing. This translated in a significal improvement in its external balance.

The adjustment in macroeconomic imbalances in the vulnerable countries significantly accelerated recently and should progress in the coming years. However, despite the adjustment in current accounts and corrections in housing markets, the outstanding stocks of debt remain high (Figure 14 shows the developments in Spain).

2.3 The prospects for adjustment to imbalances[8]

While the adjustment of macroeconomic imbalances is ongoing, it is far from complete. The growth performance in countries facing the biggest adjustment challenges will be substantially affected in the years to come. In particular, the large accumulated stocks of debt will require prolonged repair of balance sheets in private and public sectors, constraining both private consumption and investment. Similarly, some of the most affected countries still run non-negligible current account deficits that point to the need for external financing, which is difficult to secure given the distress in financial markets.

The challenge of the adjustment is arguably the largest when different constraints combine and a country faces imminent deleveraging pressures in the private sector, unsustainable external positions and is lacking fiscal space at the same time. To illustrate this, Figure 15 shows the constraints in different sectors in individual euro area countries. It classifies countries according to the three constraints:

- *External constraint:* the net international investment position shows the external constraint of the economy as a whole and links the internal position with the economies' external needs/capacities;
- *Fiscal constraint:* the gross general government debt embodies the fiscal constraint and indicates the extent of the consolidation needs on the one hand and the ability of a government to compensate for a potential saving-investment gap in the private sector;

---

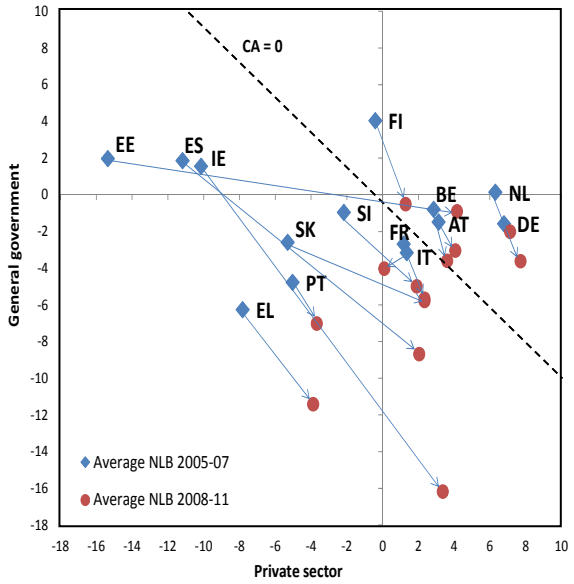
7 Estonia joined euro area on 1st January 2011.

8 This section draws on the analysis in Curpo and Hobza (2013).

Figure 13

Saving-investment Balances in Private and Public Sector

(percent of GDP, 2005-07 vs. 2008-11)

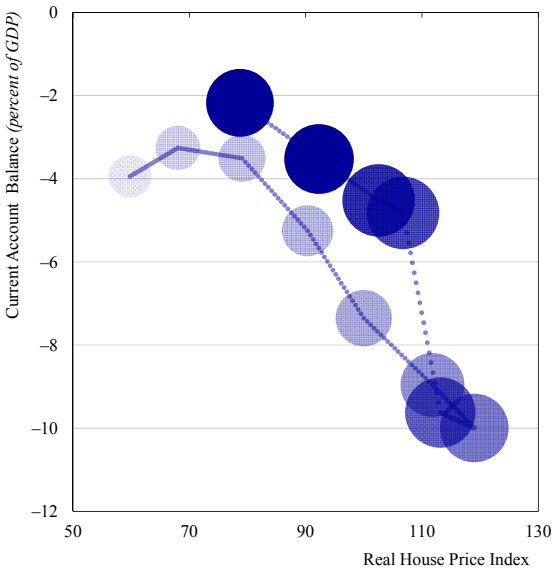


Source: Eurostat.

Figure 14

Interlinkages Among Imbalances in Spain

(current account, house prices and private sector debt)



Source: Eurostat.

- *Private sector constraint:* shown by the size of the private sector debt (shown as a relative size of the bubbles in the figure). In order to qualify the extent of deleveraging pressures in the private sector, the figure also indicates whether the domestic private savings are sufficient to finance the needs of firms. The light colour of a bubble thus shows that the "coverage ratio", *i.e.*, the ratio between the NFA position of households to that of firms, is higher than one in absolute terms while the dark colour points to less than full coverage.[9]

The results are also summarised in Figure 16, which applies the indicative benchmarks used in the EU surveillance processes to classify countries according to the constraints they are facing.[10]

This rather simple look at the interactions among different macroeconomic constraints leads to some broad observations:

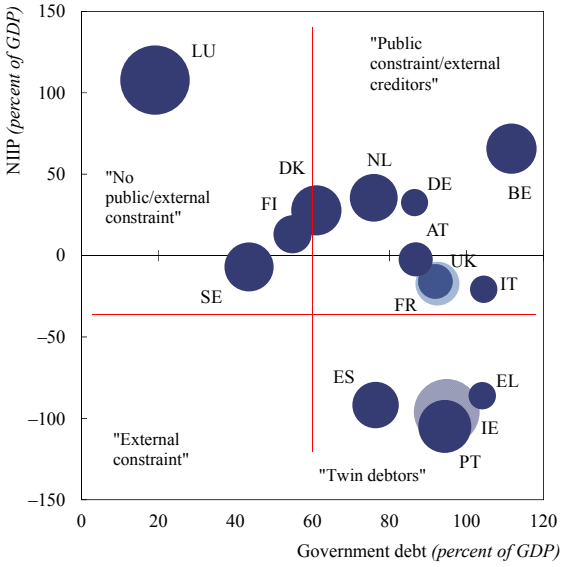
- The highest deleveraging pressures are felt in countries which are facing a combination of all three constraints: external, private and public. If, alongside private deleveraging pressures, a country also faces constrained public finances it has very limited means to cushion the short-run negative impact on demand and growth. In particular, financial strain in sovereign debt markets exerts upward pressure on financing costs as well as ability to raise credit in the private sector. The signs of financial fragmentation currently experienced in the euro area are case in point. Moreover, the need to reduce the excessive levels of net foreign liabilities will require outflows

[9] NFA of households is typically positive as they are on average net savers, while NFA of companies are on average negative as they tend to be net investors.

[10] It needs to be stressed that this approach is adopted for the sake of simplicity. The size and severity of imbalances a country is facing needs to be assessed on a bases of a considerably deeper analysis, which takes into account all relevant quantitative and qualitative information.

Figure 15

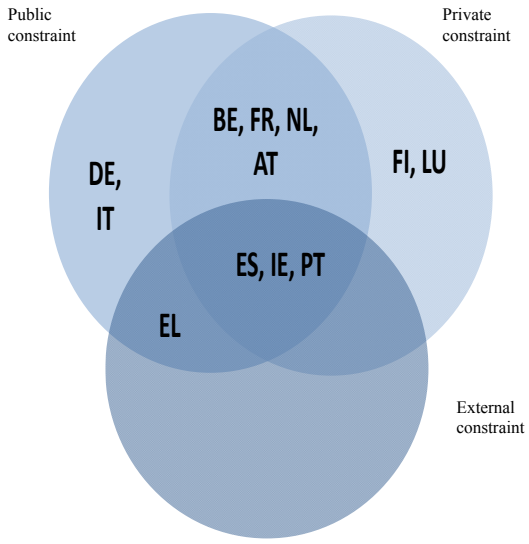
External, Public and Private Imbalances in Euro-area Countries[11]



Source: Eurostat.

Figure 16

Macroeconomic Constraints Facing Euro-area Countries[12]



Source: Own calculations.

of foreign capital, which will further strain the balance sheets of residents. This is the case of Spain, Ireland, Portugal and also partially of Greece (the level of private debt in Greece is comparatively lower but the savings of the households fail to cater for investment needs of companies).

- Several countries might be facing deleveraging pressures both in private and public sectors. Among the countries with rather high private and public debts are Belgium, France, Austria and the Netherlands. The extent of the deleveraging challenge differs among these countries and the specificities of their situations need to be take into account (e.g., the size of the private debt in Belgium might be biased upwards due to the high share of intra-company loans). In all of them, however, the external pressures are currently limited and net domestic savings exceed the investment needs of companies. Some of them though, are likely to witness complementary deleveraging forces to those of the public sector, reinforcing their effects on growth and upward pressure on the external position.
- While facing important consolidation challenges in the public sector and an overall negative net external asset position, Italy's private sector features an excess of household savings over business investment, which might limit the pressure to deleverage. Germany, with its modest level of private (both households and firms) indebtedness may have room for targeted increases

---

[11] The size of the bubbles show the relative size of private sector debt (households and NFCs) as percent of GDP. The shade of the bubble show the ratio between the NFA position of households to that of firms ("coverage ratio"), which gives an indication to what extent domestic private savings are sufficient to finance the needs of firms: the light colour of the points in indicates full coverage and the dark colour reflects less than full coverage

[12] The classification of the constraints is based on benchmarks used in the EU surveillance processes. External constraint: NIIP is below –35 per cent of GDP. Private constraint: private debt is above 160 per cent of GDP. Public constraint: public debt is above 60 per cent of GDP.

in private sector leverage, compensating the public consolidation effects.

- Finally, Luxembourg and Finland show relatively high levels of private debt and comparatively low net savings. However, more detailed analyses conclude that the deleveraging pressures appear overall limited.[13]

These observations also document the more benign nature of the external constraint in a monetary union, which, in the absence of the sudden stop risk in the general sense, is essentially a reflection of internal imbalances. Thus, the external constraint always appears in a combination with either strained private or public balance sheets.

To further demonstrate the extent of the deleveraging challenge in the private sector in the group of most vulnerable countries, but also more generally, Figure 17 presents results of two stylised scenarios, which derive the level of credit that would bring the private debt-to-GDP ratio to a certain benchmark.[14] The first one shows the average annual levels of credit-to-GDP that would keep the private sector debt-to-GDP ratio constant at the 2011 level and the second one shows the levels of credit that would reduce it by 2020 a threshold of 160 per cent (the indicative benchmark embedded in the MIP scoreboard).

This shows that households and firms in a number of euro area countries will have to go through an austerity period and face considerably lower levels of credit than in the past. Just to keep the private sector debt ratios at the 2011 level and prevent further increases, the inflows of new credit should on average be around half of what euro area countries were experiencing in the last decade. To bring the debt ratios down to the indicative threshold of 160 per cent of GDP, average private sector credit growth would have to be negative over the next decade in overly-indebted countries. This simple exercise cannot be seen as an assessment of deleveraging pressures but it clearly shows the sheer extent of the challenge.[15] Such a contraction in credit supply would also have large implications for output growth and would generate further feedback loops on indebtedness and ability to service debt.

Moreover, some of the most affected countries still run non-negligible current account deficits that point to the need for external financing, which is difficult to secure given the distress in financial markets. Figure 18 shows that further improvements in the current accounts are needed in countries such as Greece, Spain or Portugal to bring the external debt on a downward path (in Ireland the actual current account balances of IE and SI are consistent with declining external indebtedness). Achieving external sustainability will require current account surpluses (or at least trade surpluses) for a prolonged period of time. To achieve this, more pronounced relative cost/price adjustment than experienced so far is likely necessary to ensure that the corrections in external imbalances prove to be lasting and not associated with the build-up of persistent internal imbalances such as a high rate of structural unemployment.

---

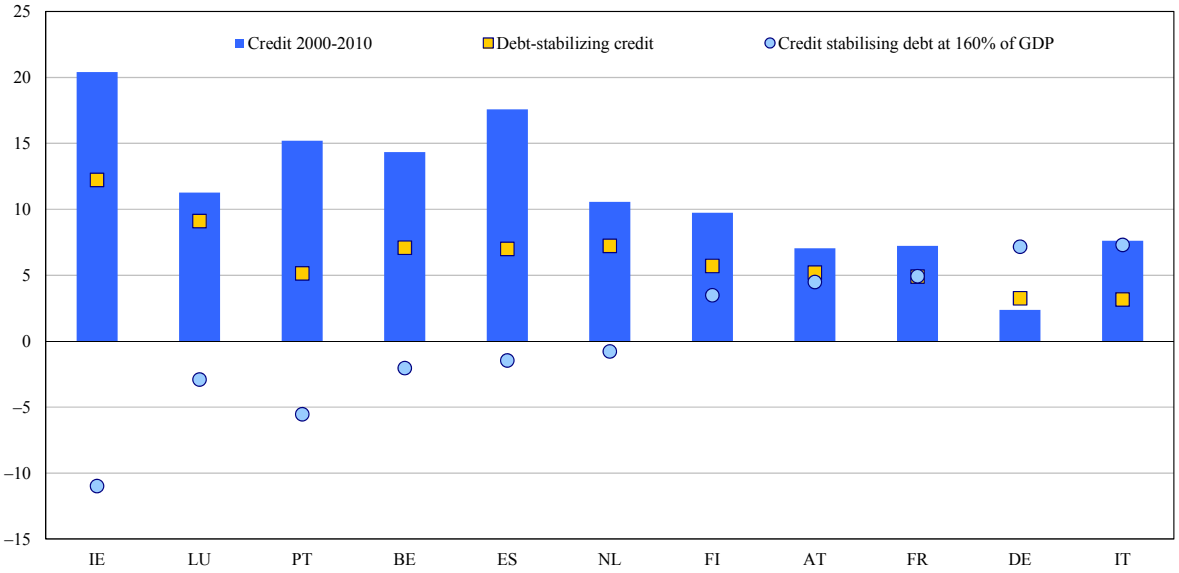
[13] Cuerpo *et al.*, 2013

[14] Such an approach is akin to sustainability assessments of external positions (see, for example, Lee *et al.*, 2008) or public finances (see European Commission, 2009). The underlying growth and inflation projections are based on the forecasts and long-run ageing projections in European Commission, 2011b and 2011c.

[15] Obviously, this analysis is based on a number of simplifying assumptions. The selected benchmarks most likely do not correspond to "equilibrium" levels of indebtedness. Some economies might be capable of sustaining for an extended period of time higher levels of private sector debt than the 160 per cent of GDP benchmark. Moreover, this exercise only considers that deleveraging can take place through nominal growth or repayment of the debt. It does not take into account possible valuation changes, e.g., through price changes of corporate bonds, or outright write-offs. These factors can play a rather significant role, particularly in times of economic distress. In addition, these computations focus on gross debt and indebtedness, including the interest on outstanding debt. Given the high debt levels, servicing costs of debt can be high in many cases, effectively reducing the amount of "fresh" credit flows to the economy. Adverse shocks to financing costs can thus amplify the credit shortages further.

Figure 17

Private Sector Credit Flows of Euro-area Countries Under Different Deleveraging Scenarios*



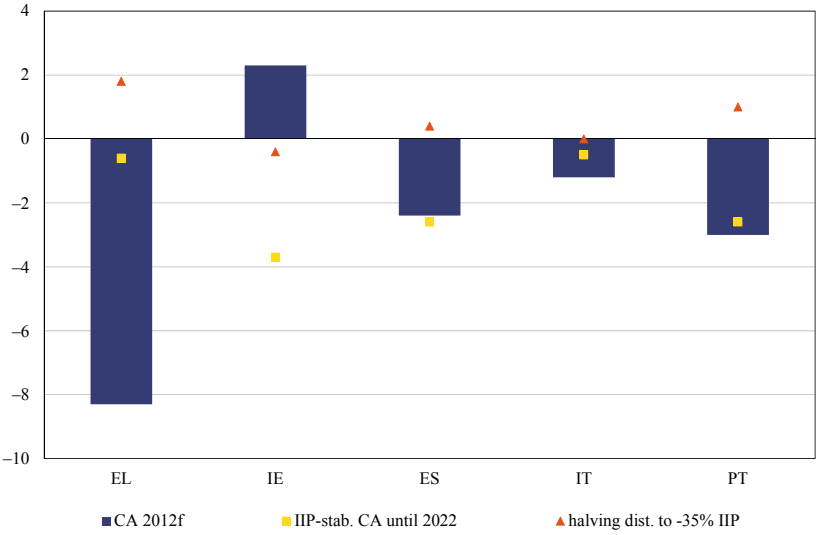
Source: Eurostat and own calculations.
* The countries are sorted in a decreasing order according to the level of private sector debt. The figure shows the average annual levels of private credit-to-GDP ratios in two deleveraging scenarios: (i) keeping private sector debt-to-GDP constant at 2011 levels until 2020 and (ii) bringing the level of debt-to-GDP to 160 per cent by 2020. The computations are based on a simple accumulation equation for private debt, taking into account projections of future real growth and inflation. For some countries, the past average credit flows are computed for a shorter period than 2000-2010 due to data limitations.

2.4 Summary

This section has shown how numerous macroeconomic imbalances accumulated in many euro area countries in the run-up to the Great Recession. Alongside to country-specific shocks and different policy paths, they were partially a result of differentiated reactions of individual economies to euro area-wide shocks (both related to the euro introduction and external ones) and inappropriate policy responses, including the lack of macro-prudential supervision in financial markets.

Figure 18

IIP Stabilizing Current Account Balances Based on Long-term Projections Until 2022
(percent of GDP)



Source: European Commission.

When looking at developments of imbalances within the euro area before the onset of the financial crisis, it is important to distinguish between two periods.[16] The initial period, following the establishment of the monetary union, was characterised by probably relatively sound financial flows spurred by the introduction of the euro which supported the catching up dynamics in the peripheral economies.[17] However, the later period, starting sometimes in the second half of 2000s, witnessed extraordinary financial flows that helped fuel credit booms and assets bubbles in some euro area countries. It is in this period that current account positions of euro area countries began to diverge at a fast pace. The cross-border debt-financed credit expansions led to significant shifts in sectorial structures of the peripheral economies favouring non-tradable sectors, most notably construction, which are now costly to revert.

Despite important progress, many euro area countries are facing a formidable adjustment challenge. It is the largest in countries which are facing the tightening in all three constraints: the external, the private and the public. Countries with such "triple" debts are, in particular, Portugal, Ireland, Greece and Spain. Other countries are facing the "double" constrains stemming from the strained public finances and deleveraging pressures in the private sector. These countries such as the Netherlands are likely to witness complementary deleveraging forces to those of the public sector, reinforcing their effects on growth and upward pressure on the external position. Finally, countries like Germany, with a modest level of private (both households and firms) indebtedness may have room for targeted increases in private sector leverage, compensating the public consolidation effects.

3 The Macroeconomic Imbalances Procedure: context and set-up

The crises has been met by various policy responses both at EU and national level. As regards the policy responses coordinated at EU level, in the early stages of the crises, the focus invariably was more of a crisis management nature. Action started to be taken to stabilize the financial system and its institutions. Policy reactions included an expansionary monetary stance and initially also a coordinated expansionary fiscal policy response in the context of the European Economic Recovery Plan (EERP) that was running between 2009-10.[18] Over time, the focus of policy action shifted towards measures to address the long-run consequences of the crisis on growth and fiscal sustainability and also policies to prevent future reoccurrences. The rationale behind the overall approach was the need to address a triplet of mutually intertwined objectives, namely: (i) to successfully accomplish the financial repair and fix the regulatory weaknesses in the financial system; (ii) to proceed with fiscal consolidation and put the strained public finances back on sustainable paths; and (iii) to boost growth and competitiveness in the EU in order to alleviate the necessary adjustment and limit the long-run costs of the recession.

The crises also pointed to the need for improved economic surveillance structures of Member States economies as well as for improved EU economic governance structures as indispensable for addressing the root problems at the origins of the crisis. The "six-pack" was a key response in this context. To this can be added the recent "two-pack" which aim to further strengthen surveillance mechanisms for euro area Member States, including budgetary surveillance and stronger monitoring of countries with financial stability issues or countries requiring financial assistance.[19] As regards the rationale for having a new and separate procedure for the surveillance

---

16 Lane and Pels (2012).

17 Blanchard and Giavazzi (2002).

18 See Fischer and Justo (2011) for an overview of the EERP.

19 On 23 November 2011 the Commission presented proposals for two new regulations adding to the "six-pack". Political agreement has been achieved and they should enter into force before the summer of 2013. The first regulation proposes new monitoring

(continues)

of imbalances, it had become evident from the economic developments described in Section 2 that the economic surveillance at the EU level needed to be further extended as regards macroeconomic imbalances, indebtedness and competitiveness issues, in particular within the euro area. It also became clear that fiscal surveillance had to be deepened, mainly by strengthening domestic fiscal frameworks and ensuring increased focus on public debt.

Finally, a better integration of surveillance across different policy areas also appeared warranted together with better integration into the national policy planning cycle. Previously, discussions between the EU and Member States on economic priorities and structural reforms were taking place through different processes. Reports were issued separately and decisions were spread across the year with less positive synergies and interlinkages than would be ideal. This is why also an "European Semester"[20] was set up in 2011 to integrate and coordinate ex-ante budgetary and economic policies, in line with the Stability and Growth Pact and the Europe 2020 strategy as well as the MIP in 2012.

3.1 The MIP: the procedure step by step

The overall design of the Macroeconomic Imbalance Procedure follows the implicit logic of the Stability and Growth Pact, with a "preventive" arm and a stronger "corrective" arm for more serious cases. For euro-area countries, the corrective arm is supplemented by an enforcement mechanism including the possibility of financial sanctions.[21] To detect macroeconomic imbalances, the procedure relies on a two-step approach (see Figure 19). The first step consists of an alert mechanism aiming to identify Member States where there are signs of a potentially building up boom-bust cycle or in which the adjustment to busts require more in-depth examination. In the second step, for the identified Member States, the in-depth reviews assess whether there are imbalances and, if so, their nature and extent.

3.1.1 Step 1: the Alert Mechanism

As said above, the aim of the alert mechanism is to identify countries and issues for which more in-depth analysis is required. The conclusions of the AMR are discussed in the Council and the Eurogroup to enable the Commission to obtain feedback from Member States. The Commission then decides on the final list of countries for which it will prepare country-specific in-depth reviews.

More specifically, the alert mechanism consists of an indicator-based scoreboard complemented by an economic reading thereof presented in an annual Alert Mechanism Report (AMR). It should be stressed that the scoreboard is just one component of the alert mechanism, and additional relevant indicators, economic circumstances and country-specific situations are taken into account. The economic reading of the scoreboard indicators implies that there is no automaticity involved (*i.e.*, a "flash" for an indicator does not lead to an automatic conclusion that there is an imbalance) and that any other relevant information can also be taken into account (which is explicitly said in the regulation).

---

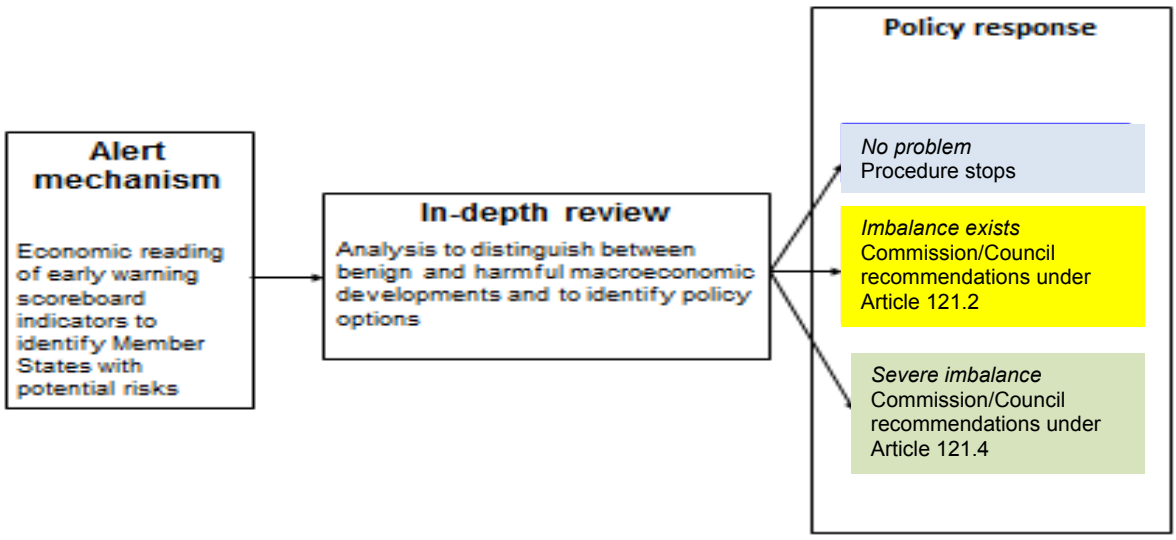
requirements include the introduction of a common budgetary timeline and common budgetary rules. The second Regulation propose stronger monitoring and surveillance procedures for Member States experiencing severe difficulties with regard to their financial stability or for those in receipt of financial assistance.

[20] The annual economic policy surveillance cycle, based on the European Semester under the Europe 2020 strategy, contains the following central elements: (i) a comprehensive Commission report (Annual Growth Survey); (ii) the alignment of SCPs and NRPs; (iii) the possibility of country-surveillance missions; and (iv) the issuance of recommendations and early warnings.

[21] The Macroeconomic Imbalance Procedure rests on two pieces of legislation. The first Regulation (EU 1176/2011) sets out the details of the new surveillance procedure and covers all the Member States. The second Regulation (EU 1174/2011) establishes the enforcement mechanism, including the potential use of sanctions, and only applies to the euro-area Member States.

Figure 19

The Steps of the Preventive Arm of the MIP



The choice of indicators in the scoreboard focuses on the most relevant dimensions of macroeconomic imbalances and competitiveness losses, with a particular focus on the smooth functioning of the euro area. For this reason, the scoreboard consists of indicators which can monitor external balances, competitiveness positions and internal imbalances, and encompass variables where both the economic literature and recent experiences suggest associations with economic crises. The scoreboard also has an important communication role, which is why the scoreboard consists only of a limited number of indicators. Moreover, the choice of indicators and transformations has been kept as simple and straightforward as possible. Given that the scoreboard (indicators and thresholds) need to provide signal of potentially harmful imbalances and competitiveness losses at an early stage, a combination of stock and flow indicators which can capture both shorter-term rapid deteriorations as well as the longer term gradual accumulation of imbalances have been chosen. Moreover, indicative thresholds have been at a level which aim to on the one hand avoid excessive numbers of "false alarms" but which on the other hand are not set so stringently that they only identify problems once they are entrenched. Further information on the scoreboard and the indicators are presented in Box 1.

BOX 1
THE DESIGN OF THE MIP SCOREBOARD

The indicators included in the scoreboard cover the most relevant areas of imbalances that are under the scope of the MIP. In line with the different challenges faced by the EU/euro-area countries, it comprises indicators of external positions and indicators of internal imbalances (see below). The scoreboard thus encompasses variables that both the economic literature and recent experience establish as being linked to economic crises. For the sake of transparency and easy communication, the scoreboard contains a limited number of simple indicators of high statistical quality. It combines stock and flow indicators that can

capture both shorter-term rapid deteriorations and the longer-term gradual accumulation of imbalances.

To facilitate the use of the scoreboard, indicative thresholds have been set for each indicator. These thresholds are mostly based on a simple statistical approach and are set at lower and/or upper quartiles of the historical distributions of the indicator values. These statistically determined thresholds are broadly in line with the findings of economic literature on the early-warning properties of different indicators in terms of predicting economic and financial crises. The breach of the indicative thresholds does not automatically trigger an 'alarm' in the form of a requirement for an in-depth review, though. Only the comprehensive economic reading of the result of the scoreboard, which takes into account additional information, indicates a need for further analysis. The scoreboard takes into account the euro-area dimension and differentiates between euro-area and non-euro area Member States where appropriate (REER and ULC).

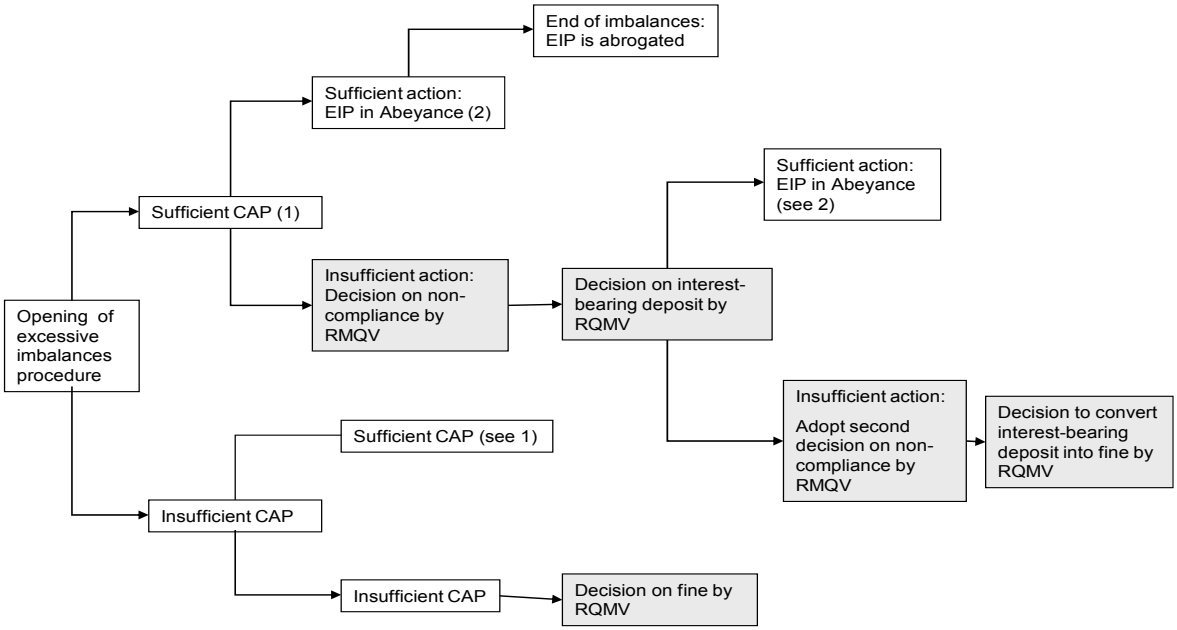
In view of the need to adjust to evolving macroeconomic conditions, the composition of the scoreboard is flexible. The design of the scoreboard could change over time to take into account improvements in data availability or enhancements in the underlying analysis and, even more importantly, new sources of potentially harmful macroeconomic imbalances that might develop in the future. Recognising the critical importance of taking due account of country-specific circumstances and institutions, the economic reading of the scoreboard is complemented by additional information and indicators.

The eleven indicators of the alert mechanism scoreboard are:[22]

1) three-year backward moving average of the **current account balance** in per cent of GDP, with a threshold of +6 per cent and –4 per cent;
2) **net international investment position** in per cent of GDP, with a threshold of -35 per cent;
3) five-year percentage change of **export market shares** measured in values, with a threshold of –6 per cent;
4) three-year percentage change in **nominal unit labour cost** (ULC), with thresholds of +9 per cent for euro-area countries and +12 per cent for non-euro area countries respectively;
5) three-year percentage change of the **real effective exchange rates** (REERs) based on HICP/CPI deflators, relative to 35 other industrial countries, with thresholds of –/+5 per cent for euro-area countries and –/+11 per cent for non-euro area countries respectively;
6) **private sector debt** in per cent of GDP, with a threshold of 160 per cent;
7) **private sector credit flow** in per cent of GDP, with a threshold of 15 per cent;
8) year-on-year **changes in the house price index** relative to a Eurostat consumption deflator, with a threshold of 6 per cent;
9) **general government sector debt** in per cent of GDP, with a threshold of 60 per cent;
10) three-year backward moving average of the **unemployment rate**, with a threshold of 10 per cent;
11) annual growth rate of total **financial sector liabilities**, with a threshold of 16.5 per cent.

Figure 20

Synthetic Overview of the Corrective Arm



3.1.2 Step 2: In-depth reviews and follow up

It is only on the basis of the in-depth reviews that an imbalance is identified and policy guidance may be issued to Member States. The reviews imply a thorough analysis of the macroeconomic imbalances, in particularly as regards their nature and extent, taking into account the economic and structural specificities of the Member State considered. If, on the basis of this analysis, the Commission considers the situation unproblematic it will conclude that no further steps are needed. If, however, the Commission considers that macroeconomic imbalances exist, it may come forward with proposals for policy recommendations for the Member State(s) concerned. In the preventive arm, these will be part of the integrated package of recommendations under the European Semester. This is particularly important since policy remedies to address imbalances cover to a very large extent policies (e.g., labour market, product market and fiscal policies) that may also be subject to other surveillance processes. If the Commission instead considers that there are severe imbalances, it may recommend that the Council open an excessive imbalance procedure, which constitutes the corrective arm of the new procedure.

3.2 The corrective arm and effective enforcement

Figure 20 provides a synthetic overview of the corrective arm including the enforcement dimension which applies only for euro area Member States. While in principle decisions are taken in the Council by qualified majority voting, the shaded boxes in the figure indicate Council decisions that are taken by reverse qualified majority voting (RQMV). In case of RQMV, a novelty for many of the key enforcement decisions across the six-pack, a Council decision on a

[22] For a detailed discussion per indicator, see European Commission (2012), 'Scoreboard for the surveillance of macroeconomic imbalances', European Economy, Occasional Paper No 92 (February).

Commission recommendation is deemed to be adopted by the Council unless it decides, by qualified majority, to reject the recommendation within then days of the Commission adopting it. The aim of this voting rule is to increase the automaticity of the decision-making process.

In case the in-depth review points to severe imbalances in a Member State, the Council declare the existence of an excessive imbalance and adopts a recommendation asking the Member State to present corrective actions within a specified deadline. Then, and this is a key feature, the Member State is obliged to present a corrective action plan (CAP) setting up a roadmap to implement corrective policy actions. The CAP should be detailed plan for corrective actions with specific policy actions and implementation timetable.

As regards the content of the CAP the policy response to the macroeconomic imbalances has to be tailored to the circumstances of the Member State concerned and where needed will cover the main policy areas, including fiscal and wage policies, labour markets, product and services markets and the financial sector. Moreover, efficiency and credibility derive from consistent approaches across policy strands. After submission of the CAP by the Member State, the Council assess the CAP with two possible outcomes: 1) If the Council considers the CAP to be **insufficient**, the Council adopts a recommendation to the Member State to submit a new CAP. If the new CAP is still considered to be insufficient, a fine can be imposed (with RQMV, see below) for having failed twice in a row to submit a sufficient CAP (0.1 per cent of GDP). Thus the Member State cannot stall the procedure by not presenting a good CAP, or; 2) If the Council considers the CAP to be **sufficient**, it will endorse the CAP through a recommendation that lists the corrective actions and their implementation deadlines.

Then, given that a sufficient CAP is in place, the Council will assess whether or not the Member State concerned has taken the recommended actions according to the set deadlines. Two outcomes are possible:

- If the Council considers that the Member State concerned has **not taken recommended corrective action**, it will adopt first decision establishing non-compliance together with a recommendation setting new deadlines for taking corrective action. In this case, the enforcement regime established by the regulation comes into play. It consists of a two-step approach. The first decision declaring non-compliance with the issued recommendation allows the Council to impose an interesting-bearing deposit (0.1 per cent of GDP). After a second decision by the Council declaring non-compliance, the Council can take the decision to convert the deposit into an annual fine. These decisions are taken with so called "reversed qualified majority voting", RQMV which implies that there needs to be a majority against taking the step (as opposed to the normal approach where a decision needs the backing of a qualified majority). When the second Council decision confirms compliance, the Council can put the procedure in abeyance.
- If the Council considers that the Member State concerned has **taken the recommended correction action**, but imbalances are not yet corrected, the procedure will be placed in abeyance. The Member State continues to be subject to periodic reporting. If the Council considers that the Member State concerned has taken the appropriate action and the Member State is no longer experiencing excessive imbalances, the EIP will finally be closed.

Overall, the corrective arm has a potential to be a rather strong instrument. In essence, it is similar to the "programme" approach used for countries receiving financial assistance, however, with the difference that there is no money involved. For euro area countries, a financial sanctions can be imposed, either because of the failure to repeatedly present a sufficient corrective action plan or for any failure to take the agreed corrective actions. Finally, all the key decisions leading to sanctions are taken by RQMV, making it more difficult to form blocking majorities.

4 External and internal constraints: their reflection in EU policy recommendations

The overarching objective of the MIP is to broaden the economic surveillance to cover also external and internal imbalances and complement thus the process of fiscal surveillance. This section, therefore, focuses on the policy advice in response to the emergence of macroeconomic imbalances. To this end, it starts by giving an overview of the first year of application of the MIP in 2012. It contrasts this with policy recommendations addressed to Member States in the context of the economic policy coordination processes since 2000, which were relevant from the point of view of macroeconomic imbalances. In particular, it analyses what different issues and when were *de facto* captured and how this corresponds to the trends in the build-up of imbalances discussed in Section 2. Finally, this discussion is completed by a simple backward-looking exercise, which examines the performance of the MIP scoreboard in identifying the build-up of imbalances in the course of 2000s in different areas and countries. Overall this allows to make some broad observations on how the EU policy advice has matched the constraints described in Section 2 and how the application of MIP can enhance this.

4.1 The application of the MIP: the outcome of the first and second rounds

The first Alert Mechanism Report was published in February 2012. It identified 12 Member States as warranting in-depth reviews on different aspects related to risks of imbalances.[23] Seven of them were euro-area members: Belgium, Spain, France, Italy, Cyprus, Slovenia and Finland. The remaining five were Bulgaria, Hungary, Denmark, Sweden and the UK. This was a rather large number of countries, which reflected the fact that this was the first application of the MIP. Given the economic circumstance in which the MIP was launched, it had to cater also for the adjustment to previously accumulated imbalances and not only the prevention of newly emerging imbalances.

The issues for which these countries were selected mirrored the broad scope of the procedure as reflected in the scoreboard:

- **External sustainability.** In a few of the countries, the external position remained vulnerable due to large negative net international investment positions (NIIP) despite rapid adjustments in the current account (Hungary, Bulgaria, Spain). A key mitigating factor in this reading was the role of Foreign Direct Investment (FDI) in catching up economies.
- **Export performance and competitiveness.** For several countries, the focus was on a weak export performance (Italy, Belgium, France, Finland) visible both in large losses of global export market shares as well as a trend wise deteriorating current account positions (even though external sustainability as such was not an immediate issue). Clearly, several euro-area countries lost export market shares well beyond what would be explained by the rapidly increasing competition from emerging economies. The drivers behind this were in some cases the losses in cost competitiveness (for example Belgium), both due to high wage increases but even more low productivity growth, while in other cases issues linked to non-cost competitiveness issues dominated (for example France).
- **Private sector indebtedness.** Potential risk from high levels of overall indebtedness was pointed to for a number countries (for example Belgium, Denmark, Spain, Cyprus, Sweden, UK). While excessive credit flows were rapidly adjusting, many Member States were left with high levels of private sector indebtedness and are in a likely prolonged process of deleveraging and adjustment of sectorial balance sheets. In a number of cases, the deleveraging challenge for households and/or businesses is compounded by the high levels of public debt. It was

[23] The four programme countries (Greece, Portugal, Ireland and Romania) were not covered in the assessment as they are already under an enhanced programme-based surveillance regime.

highlighted that the impact of deleveraging in the private sector could be magnified by the fiscal pressures. It was also pointed out that elevated amounts of debt in the hands of non-residents can prove to be an additional concern in a context of high uncertainty in international financial markets.

- **Housing and asset markets.** Linked to the continuous build-up of indebtedness in the private sector, several countries displayed developments in asset markets, in particular housing, that warranted further analysis (for example Spain, Cyprus, Finland, Denmark, Sweden, UK). It is clear that countries were in different position in the adjustment phase. For example, while in Sweden and Finland house prices were still moving upwards in other cases the question was whether the adjustments that had already taken place was sufficient or if more was to come (Spain). Nevertheless, the combination of very high increases in house prices together with a rapid build-up of household debt was a specific concern.

Clearly, there were large differences across these countries, both in terms of scope of the problems and the severity of the risks involved. Some countries were seen to be in needed of correcting internal and external imbalances accumulated in the past (e.g., Spain, Cyprus, Hungary, Italy, Belgium, UK), while others showed an overall good performance but still had to deal with issues concentrated in specific parts of the economy (for example Sweden and Denmark).

Against this background, the first generation of In-depth Reviews were published on 29 May 2012, together with the rest of the 2012 European semester package. The analysis in the IDRs broadly confirmed and nuanced the risks for the twelve selected countries. In all 12 cases an imbalance under the preventive arm of the MIP was established. Table 2 gives a summary of what were the key features of the identified imbalances, corresponding very much to what were the main reasons for their selection for an IDR. There was some differentiation made in terms of the urgency/severity of the imbalance. For Spain and Cyprus the imbalance was seen as "very serious", for Hungary, Slovenia, France and Italy as "serious" and for the others no qualification was made. However, it should be emphasised that from a legal perspective these distinctions play no role: they are all imbalances under the preventive arm.

Overall, this outcome corresponds well with the constraints for euro area countries as described in Section 2.3. For example, Spain and Cyprus face constraints simultaneously from the external, private and public side. In France, Italy and Belgium, the high public debt adds to restrictions from private sector indebtedness in a context of weakening external performance. Arguably, Finland faces the "softest" constraints where the issue of the weak export performance is closely related to a broad growth challenge, even though the current account position has deteriorated remarkably in recent years.

Because these imbalances fall under the preventive arm, the follow-up in terms of policy recommendations was integrated in the package of country-specific recommendations issued under the European semester, covering also the BEPGs, the employment guidelines as well as the Stability and Growth Pact. There were thus no individual "MIP" recommendations. Policies that were considered as valid policy responses to imbalances were earmarked as such but with no further distinction or consequence. While some of the issues covered by the MIP were relatively new to be in focus, the valid responses, as noted above, coincide with what is required for sustainable growth and jobs as well as sustainable public finances. For example, to address a weak export performance, higher productivity growth and wage growth in line with productivity are both relevant. However, these are the same policies that are necessary to support potential growth and stable inflation. Having said this, some more focus on policies to address cost and non-cost competitiveness issues as well as housing/indebtedness can arguably be a direct result from the introduction of the MIP.

Table 2

Key Features of the Identified Imbalances Under the Preventive Arm in 2012-13

Belgium	external competitiveness of goods and indebtedness, especially the high level of public debt
Bulgaria	level of external indebtedness as well as certain macroeconomic developments related to corporate sector deleveraging and the labour market adjustment process
Denmark	external competitiveness and potential risks related to household indebtedness
Spain	significant level of private sector debt, the large negative external debt position and the financial sector, which were influenced by housing market developments
France	export performance and competitiveness
Italy	high public indebtedness, export performance, external competitiveness
Cyprus	current account, public finances and the financial sector
Hungary	negative size of the net international investment position and public debt
Slovenia	corporate sector deleveraging and banking stability and unfavourable developments in external competitiveness
Finland	external competitiveness
Sweden	regarding private sector debt and the housing market
UK	household debt and the housing market deserve attention, unfavourable developments in external competitiveness

On 28 November 2012, the Commission published the second AMR in which fourteen Member States were selected for an IDR in 2013. This was the twelve Member States for which an imbalance was identified earlier in the year, plus the Netherlands (mainly due to high private sector indebtedness and housing) and Malta (mainly with reference to the very large banking sector). The second generation of IDRs were published on 10 April 2013.[24] In all cases imbalances were identified, except for Spain and Slovenia where excessive imbalances were found. Nevertheless, the corrective arm was not initiated[25] and the follow up in terms of recommendations was made under the preventive arm in the May European semester package.

---

[24] In the AMR Cyprus was selected for an IDR but in the meantime Cyprus entered a programme and accordingly no IDR was in th end necessary.

[25] At the time the Commission decided to judge the policy commitments made by Spain and Slovenia in the context of their National Reform Programmes, before deciding whether to launch the corrective arm or not. As the policy plans were deemed sufficient it was decided not to start the corrective arm but to instead monitor implementation with higher scrutiny. As the excessive imbalance has been identified the option to apply the corrective arm still remains.

4.2 A screening of country-specific policy advice given at EU level since 2000

Following the launch of the MIP, issues related to external and internal imbalances have become an integral part of EU policy advice. As argued above, such a broadening of the scope of macroeconomic surveillance, complemented with a structured monitoring and enforcement framework, is a substantial improvement of the EU economic governance architecture. Nevertheless, the potential risks related to the accumulation of these types of imbalances, including growing divergences inside the euro area and the building up of debt, were recognised already before the crisis erupted.[26]

In this respect, it is interesting to see whether and to what extent these policy discussions actually translated into specific country-specific policy recommendations issued to Member States under the BEPGs since the beginning of EMU. To this end, this section offers an overview of policy recommendations over the 2000-2013 period made to euro area members,[27] focusing on the areas falling under the scope of the MIP (external sustainability; export competitiveness; housing; indebtedness and financial sector vulnerabilities). The policy documents which include country-specific recommendations usually define challenges facing a Member States and address recommendations to tackle them. Therefore, the analysis also distinguishes between these two steps; *i.e.*, whether the issues related to the emergence of imbalances were recognised as "challenges" and whether there was a follow-up in terms of precise policy prescriptions.[28]

The following remarks can be made from a thematic perspective (see Table 3 for observations per country):

- **External sustainability.** In general external sustainability issues have not been picked up in the surveillance, neither in terms of recommendations nor as challenges. This can partly reflect the fact that the challenges related to external sustainability had not been straightforward to identify, particularly in the context of a monetary union. Also, as shown in Section 2, current account imbalances in the first half of the decade were considered as relatively benign supporting a catching up process and being led by "downhill" capital flows. The accumulation of risks related to the use of these flows for unproductive purposes, particularly in the construction sector, was not well captured. For Greece the issue came to the fore only in 2008, in Estonia in 2009 (after the adjustment started) and with a similar timing for Cyprus.
- **Competitiveness and trade performance.** Issues linked to productivity, such as product and labour market functioning, have always been at the core of the BEPGs. However, the perspective in the recommendations was not very much guided by an external perspective, but rather supply side factors, especially in the 2000-2005 period. Having said this, the increased

---

[26] For example, in its Communication on "EMU@10: successes and challenges after 10 years of Economic and Monetary Union" the Commission proposed a broad policy agenda aimed at improving the functioning of EMU. It stressed in particular the need to broaden economic surveillance in order to detect and address macroeconomic imbalances at an early stage. Enhanced surveillance efforts were seen as particularly warranted in the area of external competitiveness and current accounts where divergences between Member States had emerged since the launch of the euro. Moreover, in order to address these challenges, the Eurogroup agreed in July 2008 to initiate a regular review of competitiveness developments within the euro area. A key output of this work was a Commission report in 2010, which laid down the initial analytical basis for the MIP. See European Commission (2010).

[27] The current members entered the euro area at different points in time: 1999 Belgium, Germany, Ireland, Spain, France, Italy, Luxembourg, the Netherlands, Austria, Portugal and Finland; 2001 Greece; 2007 Slovenia; 2008 Cyprus and Malta; 2009 Slovakia; 2011 Estonia.

[28] Of course, such an exercise is by nature subjective and has its limits. First, the overarching strategic structures have changed over time. The surveillance has taken place in the context of 1) the Lisbon strategy until 2005 ; 2) the re-launched Lisbon process 2005 to 2010 followed by 3) the European semester. While the underlying Treaty base has remained the Broad Economic Policy Guidelines (BEPGs, TFEU 122), the approach to defining recommendations has changed somewhat over time. For example, in the initial Lisbon strategy, analytical documents and policy recommendations systematically covered all areas for all countries and were quite detailed and specific. In the re-launched Lisbon process, an effort was made to be more selective and strengthen Member State "ownership". In 2008, there were no recommendations to what was seen as "good performers" at the time (which included Ireland). With the European semester a step has been taken to move towards a more integrated approach.

Table 3

CSRs 2000-2012: Broad Observations for Non-fiscal Real Economy Imbalances

BE	Cost competitiveness from 2009 but with more focus in 2011-12. Else up to 2008 mainly supply side issues related to labour and product market functioning/competition. Private sector indebtedness only mentioned in 2012. Banking sector issues from 2011.
DE	Competitiveness was an issue in 2000-01, then on only labour market and supply side issues. Opening up of services disappeared over 2004-06 period, then back with more focus. Cost competitiveness issues with a view to safeguard competitiveness. Banking sector from 2011.
EE 2004-	External position recognised as challenge in 2004 but not in focus in the years after. Housing and/or indebtedness issues not picked up (not even in 2007-08). From 2009 more focus on competitiveness as a reaction to adjustment. In general labour and product market functioning is focus.
IE	Housing first mentioned in 2007 as an issue to watch but no policy recommendation (either in 2008). In 2009, housing, competitiveness and banking sector vulnerabilities recognised as challenges, however recommendations on fiscal and potential growth issues. Worries of overheating in 2000-01, loss of competitiveness in 2003-05.
EL	Before programme, overall focus on public finances and unemployment and product market inefficiencies. External competitiveness, including cost factors, or the deteriorating current account positions not covered (expect as a "one-off " in 2008).
ES	External sustainability issues only raised from 2008 and then with more focus in later years. Risks from developments in housing markets not raised until 2007-08 as potential risks. In the years before almost only focus on labour and product market functioning issues from a supply side perspective.
FR	Competitiveness in focus from 2011 in context of weakening external performance, including both business profitability and cost aspects. Before focus mainly on labour market functioning and competition in selected sectors.
IT	Competitiveness in context of weak export performance only from 2011. Before similar polices but from a domestic growth perspective with focus labour and product market functioning. Key macro issue of course fiscal.
CY 2004-	Challenges of external constraint, financial sector, housing, indebtedness only picked up with focus from 2011 (CA deficit features in 2009 but not before). Emphasis of policy advice in years before was on supporting skills and supporting diversification from tourism.
LU	Some focus on cost competitiveness issues as from 2009, before mainly focus on labour supply. The role of large financial sector not covered.
MT 2004-	Some focus on wage cost competitiveness from 2009, but mainly from inflationary perspective. Banking sector first covered in 2012. The housing boom and build-up of private sector debt not covered, same is true for large external deficits.
NL	Housing only in focus from 2012, although mentioned also in 2011, but nothing in the years before. Risks of private sector indebtedness mentioned in 2007 but not in other years (except 2012). Cost competitiveness and wage inflation issues in 2006-2007. Else, overall focus on labour supply and productivity.
AT	Focus in all years on labour supply, R&D and sectorial competition. Financial sector issues from 2009 but only with policy recommendations in 2012.
PT	In the immediate years before programme started (2011), the weak external position was acknowledged as a risk but not in recommendations(beyond fiscal, on education and flexicurity). Cost competitiveness an issue 2003-05 but not in other years.
SI 2006-	Issues linked to banking sector from 2011. Cost competiveness from 2009 although in recommendation only 2012. Else, beyond fiscal labour and product market issues.
SK 2004-	In all years focus on labour and product market issues, including R&D. Only fiscal on macro side.
FI	Issue of deteriorating current account position and weak external performance not in focus until 2012. Housing not mentioned before. Wage developments not in focus in 2009-11 despite large increases in ULC. Earlier years focus on competition in certain sectors and some labour market aspects.
EURO AREA 2003-	Some focus on risk of divergences in 2003, but then less in coming years until 2009. In-between focus on flexibility in labour markets and productivity. From 2009, more focus on divergences, financial stability and competitiveness.

flexibility and ability to cushion idiosyncratic shocks have been at the core of the policy discourse from the very beginning of the euro area's existence.

- **Private sector indebtedness.** Issues linked to the build-up of debt outside the government sector had generally not been picked up until the introduction of the MIP in 2012.
- **Housing and asset markets.** Similar to the issue of private sector indebtedness, issues linked to housing had not been on the radar screen. For example, it was not mentioned for Ireland until 2007 and similarly for Spain.
- **Financial sector stability.** Again an issue may not have been treated as being inside the scope of BEPGs until the last couple of years in the context of the crisis. However, it is interesting to note that in 2000-2001 the recommendations also included special sections on capital markets. Even if these were mainly focused on the provision of capital for investments (venture capital etc.), there was also mentioning of issues such as bankruptcy laws, banking supervision, etc.
- **Euro area recommendations.** Guidelines or recommendations for the euro area as a whole have been in place since 2003. Overall issues linked to increasing divergences inside the euro area, financial stability and competitiveness did not come in focus until 2009.

Overall, there has been a remarkable stability as regards the content of the recommendations. This is not surprising as structural issues are indeed medium- to long-term challenges that take time to address. For example, the horizontal BEPGs were used as a strategic tool and, starting from 2003, covered three-year periods, within the context of which the annual country specific policy advice was provided. Second, it is interesting to notice the clear focus on supply-side issues and inflation risks in the first half of 2000s. Only with the arrival of the crisis did descriptions of macro challenges gradually start to take into account issues such as the diverging current accounts and competitiveness. Third, and linked to this point, even if the new challenges have been increasingly recognised in later years there may have been some inertia for this to be reflected in the precise policy recommendations. Fourth, the overall strategic frameworks within which the surveillance is carried out (Lisbon I, II, Europe 2020) does matter for where the focus lies. For example, when the special sections on capital markets were abandoned in 2003, these issues arguably received somewhat less attention in the recommendations.

4.3 The Alert Mechanism Scoreboard: how it would have fared

All in all, it indeed appears that the gradual accumulation of macroeconomic imbalances before the onset of the crisis was not adequately identified and reflected in the EU policy advice. A dedicated surveillance procedure, therefore, can help fill in this gap. While the focus of the MIP is clearly forward-looking, aiming to prevent the emergence of the macroeconomic imbalances in the future, it is interesting to examine how it would have fared had it been in place already back in 2000s. To do this, we examine what signals the scoreboard would have given. A simple inspection of the scoreboard shows when and how key problems started to be clearly signalled.[29]

There are obviously many caveats that must be taken into account in such an exercise. The most important caveat is of course that the scoreboard has been designed on the basis of the lessons of the crises with a view to preventively capture the build-up of imbalances. Thus it can almost by definition be expected that the scoreboard should be doing well looking back. Moreover, even if a version of the MIP had been in place in 2000 it may be argued that it would have focussed on different issues. However, this may not be entirely sure. In 2000, there had indeed been not too distant experiences reminding very much of the crisis to come. For example, the Scandinavian

[29] The scoreboard tables are available as from 2001 in the statistical annex of the AMR-2013.

banking crises in the early 1990's included as ingredients property bubbles, unsustainable levels of mortgage debts as well as large losses of competitiveness and large current account deficits. Having this in mind it is not impossible that an early MIP would have captured many of the relevant issues in a timely fashion. Also, we are here using the figures of today and not the "real time" information which may play a role (the same is of course true for the thresholds, which are calculated based on information until 2007). Nevertheless, it should be kept in mind that the signals of the scoreboard do not lead automatically to any conclusions in the policy process, but that there is ample room for interpretation in an economic reading.

With these caveats in mind, Table 4 shows the years for which the indicators in the scoreboard "flash". The following observations can be made:

- **External sustainability** (indicators: NIIP and CA). Very strong signals early on for Estonia, Greece, Spain and Portugal. In some countries the CA was weak early on even if it did not show in the NIIP indicator (Cyprus, Slovakia and still Malta). In Ireland the indicators only picked up the deterioration from 2007. Catching-up processes and the role of different drivers (debt versus non-debt instruments) would have been mitigating factors in the reading.
- **Export performance and competitiveness** (indicators: export market shares; REER; ULC; CA). The gradual decline in export performance over a long period of time is very visible for countries like France, Italy.
- **Housing and asset markets** (indicators: house prices and credit). The situation in Spain came out clearly already in 2001 and in Ireland from 2003. Questions would also have been raised for Luxembourg, Malta, Slovenia from 2004. It is also noticeable that in the Netherlands there is basically no signal despite being one of the countries with the highest accumulated surge in house prices, something that in turn reflects the very long house price cycle in this country.
- **Private sector indebtedness** (indicators: private debt, credit, public debt). The difficulties as regards high level of indebtedness in the private sector was generally visible already in the early 2000s. This indicator was already flashing then for Belgium, Ireland, Cyprus, Netherlands, Portugal (and also Malta and Luxembourg had data been available). The potentially problematic nature of these levels of debt would have been seen together with high public debt Cyprus, Spain, Portugal and Malta. In the case of Spain and Ireland the link to high credit growth is also comes out strongly.

Overall it can be noted that as regards the current programme countries, Greece, Portugal and Ireland, the signals coming from the scoreboard at an early stage were both strong and broadly based, in line with the encompassing nature of the imbalances. In other cases the signals are perhaps less clear but the main point is of course that the key role of the scoreboard is to force a discussion and analyses of the different aspects involved. This is true today and would have been true also in previous years.

5 Concluding remarks

When the crisis struck, the existence of large imbalances proved highly damaging to the EU economies. The ongoing adjustment process has taken a heavy toll on economic growth and has been straining the functioning of the EMU. The economy of many Member States are still characterised by a relatively high level of labour and product market rigidities which, in the absence of appropriate reforms, are likely to lengthen periods of adjustment and to make them more costly in terms of unemployment. The unwinding of the external and internal imbalances also had adverse implications for public finances, particularly in countries with excessive private debt levels. Implicit or explicit government guarantees for the troubled banking sector resulted in the transfer of risk from private to public sector. Additionally, sharp contractions in the overblown

sectors, e.g., construction, and the related increases in unemployment contributed to the deterioration of public finances. This has increased divergences across EU countries in terms of the available macro-economic room of manoeuvre and exposure to vulnerabilities.

Despite important progress, many euro area countries are facing formidable adjustment challenges. They are the largest in countries which are facing the tightening in all three constraints: the external, the private and the public. Other countries face a "double" constrain stemming from the strained public finances and deleveraging pressures in the private sector. Finally, countries with a modest level of private (both households and firms) indebtedness may have room to allow the private sector to compensate for public sector consolidation effects.

The crisis experience pointed to the need for enhanced economic governance structures in the EU. The "six-pack" of legislative proposals was a key response in this context, strengthening the fiscal surveillance and extending surveillance to macroeconomic imbalances, indebtedness and competitiveness issues, in particular within the euro area. The MIP represents a key new block in the economic governance framework in the EU.

While the past policy advice issued to Member States before the start of the crisis contained a strong focus on flexibility-enhancing and competitiveness-promoting measures, many crucial aspects of accumulating macroeconomic imbalances were not captured. The emphasis on supply side issues and inflation risks in the policy advice (alongside a strong fiscal dimension) was highly relevant in increasing the resilience of euro area members to idiosyncratic shocks. However, the policy advice did not fully capture the increasing divergences and accumulation of external and private indebtedness, even though these issues were indeed examined and discussed, including in the Eurogroup. However, the EU surveillance was not alone in this perceived lack in the surveillance, it has also been acknowledged by other institutions such as the IMF.[30]

This also reflects the complexity involved when identifying the risks of imbalances in "real time" and the need for in-depth analysis. Macroeconomic imbalances can in many cases be justified by the underlying economic developments. For example, external imbalances do not necessarily need to be worrisome if deficits/surpluses are efficient market-based responses to changes in underlying fundamentals and the related saving and investment decisions of households or businesses. Similarly, "downhill" capital flows from rich to less well-off countries are usually seen as a positive development that facilitates economic convergence as they help catching-up countries cover their domestic financing gaps. To the extent that capital inflows are used for building up productive capacity, they boost future growth prospects and the ability to repay the borrowed capital. However, if they become excessive and are driven by policy or market failures, they can have dire repercussions.

Due to the existence of important cross-border spillovers, the adjustment to the existing imbalances raises important challenges for policy-makers in the euro area as a whole. The establishment of the banking union in general, and the introduction of appropriate macro-prudential supervision in particular, would address a large share of the financial market-related imbalances. However, the versatile nature of the imbalances requires a broad and integrated surveillance such as that introduced in the recent enhancements of the EMU economic governance structures.

The MIP should contribute to better economic outcomes through promoting adjustment and stability-oriented policies, reinstating external sustainability and avoiding asset booms. With the first application of the MIP in 2012, for the countries covered issues linked to external and internal imbalances was examined with more detail and focus, leading to more targeted policy advice. At

---

[30] See 2011 report by the IMF Independent Evaluation Office examining the performance of IMF surveillance over the 2004-07 period.

Table 4

Years when Values in the MIP Scoreboard Exceeded Threshold Values

Year 2001 to 2011	External Imbalances and Competitiveness					Internal Imbalances					
	3 year average of **Current Account Balance** as % of GDP	**Net International Investment Position** as % of GDP	years) of **Real Effective Exchange Rate with HICP**	% Change (5 years) in **Export Market Shares**	% Change (3 years) in **Nominal unit labour cost**	% y-o-y change in deflated **House Prices**	**Private Sector Credit Flow** as % of GDP	**Private Sector Debt** as % of GDP	**General Government Debt** as % of GDP	**Unemployment rate - 3-year average**	change in **Total Financial Sector Liabilities,** non-consolidated
Thresholds	**–4/+6%**	**–35%**	**±5%**	**–6%**	**+9%**	**+6%**	**15%**	**160%**	**60%**	**10%**	**16.5%**
BE	-	-	03, 04	07, 08, 09, 10, 11	09	04,05	01, 03 06, 07, 08	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11	-	-
DE	07, 08, 09, 10	-	01, 02, 03, 04	10,11	-	-	-	-	02, 03, 04, 05, 06, 07, 08, 09, 10, 11	05, 06, 07	-
EE	01, 02, 03, 04, 05, 06, 07, 08, 09	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11	08, 09	-	03, 04, 05, 06, 07, 08, 09	(not available before) 05, 06, 07	01, 02, 03, 04, 05, 06, 07	08, 09	-	01, 02, 03 10, 11	02, 04, 05, 07
IE	07, 08, 09	08, 09,10, 11	03, 04, 05 08, 09, 11	06, 07, 08, 10, 11	03, 04, 05, 06, 07, 08	03, 04, 05, 06	02, 04, 05, 06, 07, 08	02, 04, 05, 06, 07, 08, 09, 10, 11	09, 10, 11	10, 11	03, 04, 05, 06
EL	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11	01, 03, 04, 05, 09	09, 10, 11	(n.a. before) 03, 04 09, 10	01, 02 05, 06	06, 07, 08	-	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11	01, 02, 03, 04, 11	05, 07
ES	05, 06, 07, 08, 09, 10, 11	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11	03, 04, 05 08	08, 09, 10, 11	02, 03 06, 07, 08, 09	01, 02, 03, 04, 05, 06, 07, 08	01, 02, 03, 04, 05, 06, 07, 08	05, 06, 07, 08, 09, 10, 11	10, 11	01, 02, 03, 04, 05 09, 10, 11	05, 06, 07
FR	-	-	01, 03, 04, 05	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11	-	02, 03, 04, 05, 06	-	11	03, 04, 05, 06, 07, 08, 09, 10, 11	-	-
IT	-	-	01, 03, 04, 05	01, 02, 03, 04, 06, 07, 08, 09, 10, 11	03, 04 09	02, 03, 04	-	-	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11	-	-
CY	02, 05, 06, 07, 08, 09, 10, 11	10, 11	-	04, 06, 07, 08, 09, 10, 11	03, 04, 05	(not available before) 06, 07	05, 07, 08, 09, 10, 11	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11	01, 02, 03, 04, 05, 06 10, 11	-	04, 05, 06, 07, 09

Table 4 *(continued)*

Year 2001 to 2011	External Imbalances and Competitiveness					Internal Imbalances					
	3 year average of **Current Account Balance** as % of GDP	**Net International Investment Position** as % of GDP	years) of **Real Effective Exchange Rate with HICP**	% Change (5 years) in **Export Market Shares**	% Change (3 years) in **Nominal unit labour cost**	% y-o-y change in deflated **House Prices**	**Private Sector Credit Flow** as % of GDP	**Private Sector Debt** as % of GDP	**General Government Debt** as % of GDP	**Unemployment rate - 3-year average**	change in **Total Financial Sector Liabilities,** non-consolidated
Thresholds	**–4/+6%**	**–35%**	**±5%**	**–6%**	**+9%**	**+6%**	**15%**	**160%**	**60%**	**10%**	**16.5%**
LU	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11	-	04, 05	11	01, 02, 03, 08, 09, 10, 11	01, 02, 03, 04, 05	07, 09	(not available before) 06, 07, 08, 09, 10, 11	-	-	-
MT	01, 02, 05, 06, 07, 08, 09, 10, 11	-	08, 09	04, 05, 06, 07, 08	(not available before) 03 09	02, 03, 04, 05, 06, 07, 08	06, 08	(not available before) 04, 05, 06, 07, 08, 09, 10, 11	01, 03, 04, 05, 06, 07, 08, 09, 10, 11	-	(not available before) 05, 07, 10
NL	05, 06, 07, 08 11	-	03, 04	01 08, 09, 10, 11	01, 02, 03 09	01	-	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11	09, 10, 11	-	-
AT	-	-	-	09, 10, 11	09	(not available before 06) -	07	10, 11	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11	-	05
PT	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11	03, 04, 05	01 08, 09, 10, 11	01, 02, 03	-	01 06, 07, 08	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11	04, 05, 06, 07, 08, 09, 10, 11	10, 11	-
SI	08	08, 09, 10, 11	09	01 11	01, 02, 03, 04 08, 09, 10	04,05, 06, 07	07, 08	-	-	-	02, 05, 07
SK	01, 02, 03, 04, 05, 06, 07, 08, 09, 10	05, 06, 07, 08, 09, 10, 11	02, 03, 04, 05, 06, 07, 08, 09, 10	-	01, 02 09, 10	06,07, 08	-	-	-	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11	05, 07
FI	01, 02, 03, 04	01, 02	03, 04 09	03, 05, 06 09, 10, 11	09, 10, 11	03, 04, 05	07, 08	08, 09, 10, 11	-	-	10, 11

the same time, the overall governance framework of the EU is under rapid development, in particular as regards the financial sector and banking union, which also will change the conditions under which future imbalances may develop in the economy. Thus, looking forward, the MIP will crucially need to stay flexible to react to changing circumstances. To this end targeted efforts to develop analytical approaches and tools is required, guided by the requirements of the procedure in a learning-by-doing process. The second round of the MIP will be one further step in this direction.

REFERENCES

Blanchard, O. and F. Giavazzi (2002), "Current Account Deficits in the Euro Area: The End of the Feldstein-Horioka Puzzle", Brookings Papers on Economic Activity, No. 2, pp. 147-86.

Bouwen, P. and J. Fischer (2011), "Towards a Stronger EU Surveillance of Macroeconomic Imbalances: Rationale and Design of the New Procedure", in *Reflets et perspectives de la vie économique*, 2012/1.

Buti, M. and A. Turrini (2012), "Slow but Steady? External Adjustment within the Eurozone Starts Working", VoxEU.org, 12 November.

Chen, R., G.M. Milesi-Ferretti and T. Tressel (2012), "External Imbalances in the Euro Area", IMF, Working Paper, No. 12/236.

Cuerpo, C. and A. Hobza (2013), "The Surveillance of Macroeconomic Imbalances in the EU: The Sectoral Perspective", in B. Winkler *et al.* (eds.), *Macroeconomic Imbalances and Financial Stability*, Palgrave Macmillan, forthcoming.

Cuerpo, C., I. Drumond, J. Lendvai, P. Pontuch and R. Raciborski (2013), "Indebtedness, Deleveraging Dynamics and Macroeconomic Adjustment", European Economy, Economic Paper, No. 477, April.

Deroose, S., D. Hodson and J. Kuhlmann (2008), "The Broad Economic Policy Guidelines: Before and After of the Re-launch of the Lisbon Strategy", in *JCMS 2008*, Vol. 46, No. 4, pp. 827-48.

European Commission (2006), "The EU Economy 2006 Review", European Economy, 2006/6.

——————(2010), "Surveillance Of Intra-euro-area Competitiveness And Imbalances", European Economy, No. 1, May.

——————(2012a), "The 2012 Ageing Report: Economic and Budgetary Projections for the 27 EU Member States (2010-2060)", European Economy 2012/2.

——————(2012b), "2012 Sustainability Report", European Economy, No. 8.

——————(2012c), "Current Account Surpluses in the EU, European Economy, No. 9.

——————(2012), "Alert Mechanism Report 2012".

——————(2012), "Alert Mechanism Report 2013".

——————(2012), "Scoreboard for the surveillance of Macroeconomic Imbalances", Occasional Paper, No. 92, February.

Fischer, J. and I. Justo (2011), "Government Fiscal and Real Economy Responses to the Crises: Automatic Stabilisers Versus Automatic Stabilisation", in Banca d'Italia (ed.), *Fiscal Policy: Lessons from the Crises*, pp. 29-46, February.

IEO, Independent Evaluation Office of the IMF (2011), "IMF Performance in the Run-up to the Financial and Economic Crises", Evaluation Report, 2011.

Lane, P. (2010), "External Imbalances and Fiscal Policy", IIIS, Discussion Paper, No. 314.

——————(2013), "Capital Flows in the Euro Area", (forthcoming).

Lane, P. and B. Pels (2012), "Current Account Imbalances in Europe", *Moneda y Credito* (forthcoming).

Lendvai, J., L. Moulin and A. Turrini (2011), "From CAB to CAAB? Correcting Indicators of Structural Fiscal Positions for Current Account Imbalances", European Economy, Economic Paper, No. 442.

Merler, S. and J. Pisani-Ferry (2012), "Sudden Stops in the Euro Area", Bruegel Policy Contribution, No. 2012/06.

Ruscher, E. and G. Wolff (2012), "Corporate Balance Sheet Adjustment: Stylised Facts, Causes and Consequences", European Economy, Economic Paper, No. 449, Brussels.

WOULD THE STRENGTHENED EU FISCAL AND ECONOMIC GOVERNANCE FRAMEWORK HAVE HELPED SIGNALLING SOVEREIGN DEBT CRISES?

Christophe Kamps,[*] *Roberta De Stefani,*[**] *Nadine Leiner-Killinger,*[***] *Rasmus Rüffer*[****] *and David Sondermann*[*****]

In light of the lessons learned from the euro area sovereign debt crisis, the EU fiscal and economic governance framework was overhauled. Against this background, we analyse whether the strengthened governance framework would have been sufficient in signalling emerging imbalances. We argue that the strengthened governance framework would likely have led to more prudent fiscal and economic developments and thus be less prone to vulnerabilities. At the same time, we conclude that the increased reliance of the EU fiscal governance framework on unobservable magnitudes, such as structural budget balances, which tend to be wrongly measured in real time, will continue to impede the timely identification of underlying fiscal imbalances. By contrast, we argue that the Macroeconomic Imbalance Procedure would have been partly in the position to have identified excessive macroeconomic developments in real time and could also have helped to correct the real-time bias in structural balance estimates. A further strengthening of the governance framework should build on gradually establishing a more integrated surveillance using the synergies of the until now largely unrelated fiscal and economic governance frameworks.

1 Introduction

In light of the lessons learned from the euro area sovereign debt crisis, the EU fiscal and economic governance framework was overhauled. Against this background, we analyse whether the strengthened governance framework would have been sufficient in signalling emerging imbalances.

We argue that despite the important enhancements of fiscal governance, the fiscal framework would have remained prone to misjudging underlying fiscal positions and thus potential imbalances in real time. This relates notably to the weaknesses of potential output and output gap estimates, which are key inputs in the computation of the structural budget balance, which itself has become an important indicator of underlying fiscal positions and efforts with the 2005 and 2011 Stability and Growth Pact reforms. The increased reliance on structural balances to set policy guidelines seems to have made the framework prone to Goodhart's law, whereby "*any observed statistical regularity will tend to collapse once pressure is placed upon it for control purposes*" (Goodhart, 1981).

By contrast, we argue that the Macroeconomic Imbalance Procedure (MIP) with its wealth of alternative indicators might have been partly in the position to identify excessive economic developments in real time. In addition, we suggest that the MIP indicators contain valuable information for correcting the real-time bias in existing measures of underlying fiscal positions. Thus, there seems to be a strong case for a closer connection of the fiscal and macro frameworks,

---

[*] European Central Bank. E-mail: Christophe.Kamps@ecb.europa.eu

[**] European Central Bank. E-mail: Roberta.De_Stefani@ecb.europa.eu

[***] European Central Bank. E-mail: Nadine.Leiner-Killinger@ecb.europa.eu

[****] European Central Bank. E-mail: Rasmus.Rueffer@ecb.europa.eu

[*****] European Central Bank. E-mail: David.Sondermann@ecb.europa.eu

which so far have remained rather disconnected. Of course, early identification of imbalances is of little value unless the framework is rigorously implemented.

The paper is organised as follows. Section 2 first presents some stylised facts about the accumulation of fiscal imbalances in the euro area prior to the crisis, before assessing whether the strengthened fiscal governance framework would have been in a better position to signal arising imbalances. Section 3 reviews the build-up of economic imbalances prior to the crisis, before assessing whether the enhanced economic governance framework would have been able to identify accumulating imbalances. Section 4 builds upon the identified limitations of identifying fiscal imbalances and adjustment in real time and elaborates on a broader concept of fiscal and economic surveillance. Section 5 concludes.

2 Fiscal governance in the euro area

Fiscal developments varied widely across the euro area countries prior to the crisis. In some member states excessive budget deficits and high general government debt ratios had been prevalent for long, making them prone to sharp corrections in output growth. Others had recorded seemingly sound fiscal positions but at the same time accumulated very large macroeconomic imbalances, which painfully turned out to be unsustainable as the financial crisis erupted with very adverse feedback to fiscal positions. This section first presents some stylised facts regarding the accumulation of fiscal imbalances prior to the crisis and the underlying reasons. It then describes and assesses whether these issues have been remedied under the strengthened EU fiscal governance framework.

2.1 Fiscal imbalances prior to the crisis: A sketch of stylised facts

Looking back, the economic good times ahead of the crisis were in many euro area countries not sufficiently used to improve underlying structural fiscal positions. For the years for which ESA 95 data on structural budget balances is available prior to the crisis, Table 1 indicates that in eight euro area countries structural fiscal positions actually deteriorated in the economic good times of 2003-07. In most of the other countries, the improvement in structural balances remained rather limited. Overall, the improvement in the underlying structural positions was much smaller than what the Stability and Growth Pact would have foreseen. As a reference, none of the euro area countries complied consistently with the 0.5 per cent of GDP structural benchmark under the preventive arm of the Pact and only three euro area countries kept their structural deficit consistently below the 1 per cent of GDP benchmark.

This insufficient structural fiscal consolidation was in many countries driven by the fact that strong revenue growth, buoyed by the unsustainable boom in domestic demand, gave rise to structural increases in public expenditure as windfall revenues were spent instead of saved. In a similar vein, in many countries the "EMU interest dividend" resulting in a strong fall in the government interest burden was in general not used for debt reduction.

Output gaps and cyclical components tended to be underestimated, structural positions overestimated in real time. Table 2 illustrates this for the case of Spain. It presents bi-annual European Commission forecast vintages for Spain's cyclically-adjusted budget balance in 2007. Since 2005 and even in 2007, the cyclical component for Spain had been estimated to be negative in real time. Only in autumn 2008, cyclical component estimates started being revised upwards to positive territory. As a result, Spain's underlying fiscal position was overestimated in real time. As the Table shows, the government's plans for the cyclically-adjusted budget balance suffered from an even larger real time bias. This can also be explained by common political economy

Table 1

The Preventive Arm: Developments in Structural Fiscal Positions

Country	2003	2004	2005	2006	2007	2003-07	percentage of years with 0.5 p.p. improvement 2003-07	percentage of years below –1% of GDP 2003-07
Belgium	–1.1	–1.4	–0.9	–1.2	–1.2	–0.1	20	20
Germany	–3.2	–2.9	–2.2	–1.7	–0.9	2.3	60	20
Estonia	0.4	1.5	0.1	–1.1	–1.5	–1.9	20	60
Ireland	0.3	1.6	1.7	2.3	–1.5	–1.8	40	80
Greece	–5.6	–7.8	–5.3	–7.2	–7.7	–2.1	20	0
Spain	–0.8	0.3	0.8	1.6	1.0	1.8	40	100
France	–4.6	–4.6	–4.5	–3.9	–4.4	0.3	20	0
Italy	–5.4	–5.1	–5.4	–4.1	–3.3	2.2	40	0
Cyprus	–8.0	–4.9	–2.9	–1.1	2.6	10.6	80	20
Luxembourg	0.6	–0.9	–0.2	0.6	1.6	1.0	60	100
Malta	–6.2	–5.9	–3.8	–2.8	–2.8	3.4	40	0.0
Netherlands	–1.8	–0.9	0.5	0.4	–1.1	0.7	40	60
Austria	–0.9	–0.7	–1.3	–1.8	–1.9	–1.1	0	40
Portugal	–5.6	–5.7	–6.0	–4.4	–3.7	2.0	40	0
Slovenia	–2.6	–2.5	–2.0	–2.8	–2.9	–0.4	0	0
Slovakia	–2.1	–2.1	–1.8	–3.3	–3.6	–1.5	0	0
Finland	3.3	2.5	2.8	3.0	2.4	–0.9	0	100
Euro area	–3.3	–3.0	–2.6	–2.1	–2.0	1.3	-	-

Note: The column to the right of the table represents the number of years in which the structural balance improved by the 0.5 percentage points of GDP benchmark as a percentage of the total 5 years and (ii) in which the structural balance was below the 1.0 per cent of GDP benchmark for euro area and ERM II countries. This analysis is based on *ex post* data from the winter 2013 vintage of the AMECO database. The picture look very different when real-time data are used.
Source: Eurostat, own calculation.

Table 2

Cyclically-adjusted Budget Balances and the Cyclical Component for 2007: Different Forecast Vintages for Spain
(percent of GDP)

EC Forecast Vintages			Stability Programme Vintages	
	Cyclical Component	**CAB**	**CAB**	
EC Autumn 2010 Forecast	0.6	1.3		
EC Spring 2010 Forecast	0.7	1.2		
EC Autumn 2009 Forecast	0.7	1.2		2009-10 Stability Programme
EC Spring 2009 Forecast	0.6	1.6	-	(EC recalculation)
EC Autumn 2008 Forecast	0.3	2.0		2008 Stability Programme
EC Spring 2008 Forecast	–0.2	2.4	-	(EC recalculation)
EC Autumn 2007 Forecast	–0.2	2.0		2007 Stability Programme
EC Spring 2007 Forecast	–0.5	1.8	2.2	(EC recalculation)
EC Autumn 2006 Forecast	–0.5	1.6		2006 Stability Progeramme
EC Spring 2006 Forecast	–0.6	1.0	1.5	(EC recalculation)
EC Autumn 2005 Forecast	–0.2	–0.2		2005 Stability Programme
EC Spring 2005 Forecast	-	-	1.2	(EC recalculation)
			0.5	2004 Stability Programme (EC recalculation)

Source: Stability programmes as stored under http://ec.europa.eu/economy_finance/economic_governance/sgp/convergence/index_en.htm. The cyclically-adjusted budget balances are those as presented in the stability programmes, recalculated by the European Commission based on the commonly agreed cyclical adjustment methodology.
Eurostat, own calculation.

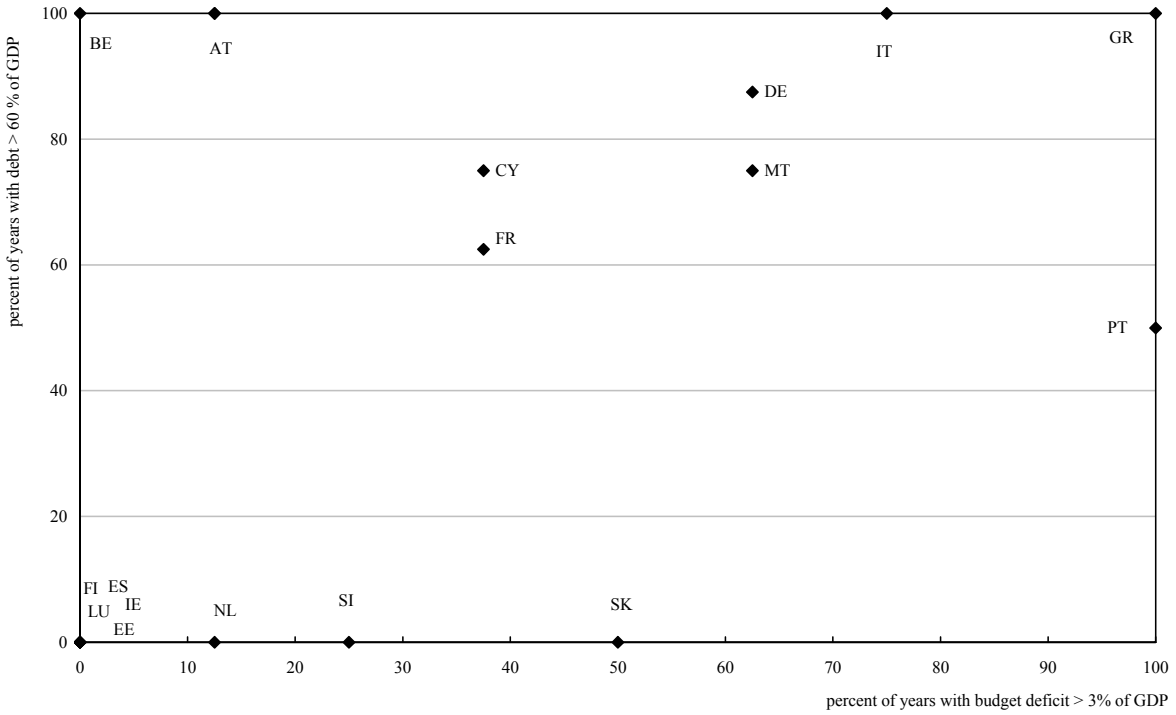
considerations according to which governments tend to rely on overoptimistic macroeconomic projections to profess compliance with the requirements of fiscal surveillance frameworks without commensurate effort.

Not only was the Stability and Growth Pact insufficient to enforce under its preventive arm that the economic good times ahead of the crisis were used to reduce fiscal imbalances. It also tended to prove insufficient under its corrective arm in timely following up breaches of the deficit and debt reference values.[1] Figure 1 presents the percentage of the eight years between 2000 and 2007 prior to the crisis in which a country breached the Maastricht reference values of 3 per cent of GDP for the general government deficit-to-GDP ratio and the 60 per cent for general government debt-to-GDP ratio. It shows that Greece had breached both Maastricht reference values in every single year of the time span considered. Portugal consistently recorded deficits above the 3 per cent of GDP reference value over 2000-07, while Italy, Belgium and Austria recorded government debt ratios in excess of the reference value over the entire period. Ireland and Spain, which came under pressure during the financial crisis, did not expose imbalances under the Treaty's rules. Both countries had complied with the Maastricht reference values in each of the eight years considered.

[1] Note that under the corrective arm of the Pact, an excessive deficit procedure is triggered if an excessive deficit is identified, which shall be corrected one year thereafter. However, for example, Greece, Italy and Portugal recorded budget deficits above the reference value for a number of years without this triggering immediately an Ecofin Council decision on the existence of an excessive deficit. See for this aspect also Morris *et al.* (2006).

Figure 1

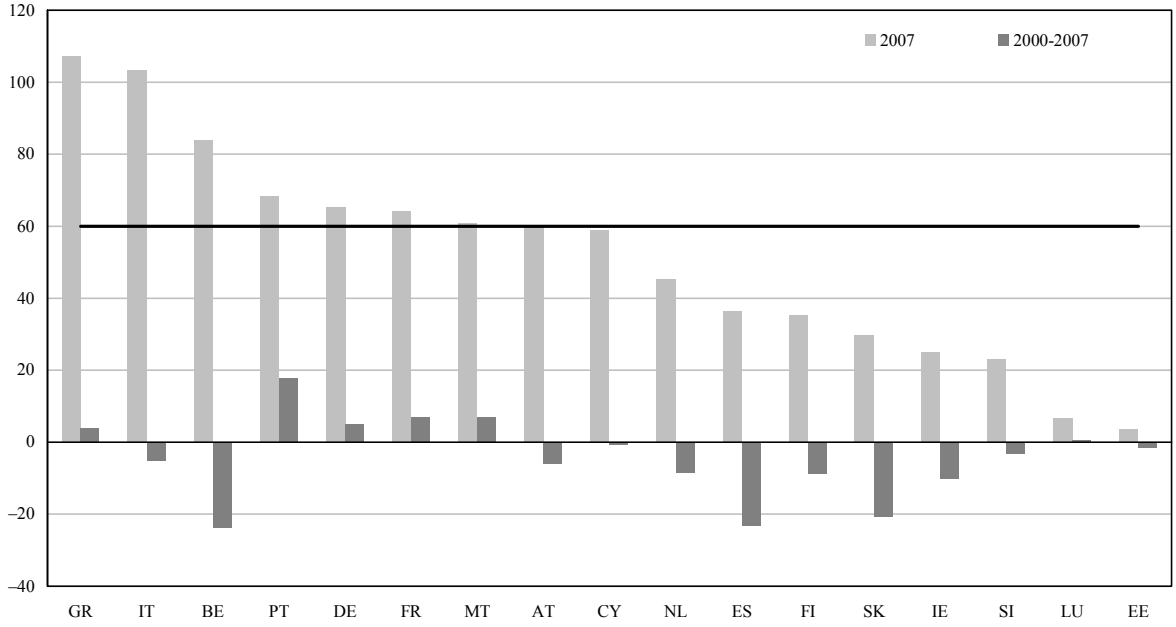
Fiscal Positions Ahead of the Crisis, 2000-07



Source: Eurostat, own calculations.

Figure 2

Change in Government-debt-to-GDP Ratios over 2000-07



Source: Eurostat, own calculations.

Consequently, while debt-to-GDP ratios declined in many euro area countries in the economic goods times ahead of the crisis, this reduction was much less than what would have been warranted at that time. As a consequence, half of the euro area member states entered the global financial and economic crisis with debt ratios at or above the Maastricht reference value (see Figure 2).

2.2 The new framework for fiscal governance

The Stability and Growth Pact foresees a complementary role for nominal and structural balances. It guides EU countries to avoid excessive deficits based on the 3 per cent of GDP deficit reference value and defines the fiscal effort required to achieve sound fiscal positions in structural terms. Specifically, with the reform of the Stability and Growth Pact in 2005, the so-called conditional compliance concept was introduced under its corrective arm, the excessive deficit procedure, which strongly relies on the structural balance as the key surveillance concept in order to account for unexpected developments outside the control of governments, such as severe economic downturns.

As the crisis brought the weaknesses of the Stability and Growth Pact to the surface, the EU's fiscal governance framework was overhauled.[2] On 11 December 2011, the so-called "six-pack" was ratified, which contains four reform elements pertaining to strengthened fiscal surveillance and enforcement (and two regulations related to strengthening economic governance, see Section 3). As regards fiscal surveillance, the six-pack includes (a) under the preventive arm of the Pact an expenditure rule linking real public spending growth to a potential growth benchmark as well as an increased focus on government debt, (b) under the corrective arm of the Pact an equal footing of the government debt criterion as well as (c) minimum requirements for national fiscal frameworks. As regards the enforcement of fiscal surveillance, a new regulation fostering earlier and gradually increasing sanctions was adopted, decided quasi-automatically based on the reverse majority voting principle in the Ecofin Council.

On 1 March 2012, 25 EU countries ratified the "Treaty on Stability, Coordination and Governance in EMU", which entails the so-called fiscal compact, to be introduced in countries' national laws. It notably requires countries to achieve balanced or in surplus structural budget balances (*i.e.*, the structural deficit must not exceed –0.5 per cent of GDP). This is more demanding when compared with the initial 1 per cent of GDP structural deficit target for euro area and ERM II countries under the preventive arm of the Pact. The fiscal compact entails an automatically triggered correction mechanism aimed at correcting deviations from the adjustment path towards Medium-Term Budgetary Objective (MTO), including their cumulative impact on the debt ratio.[3]

2.3 An assessment of the new framework for fiscal surveillance

The changes to the EU governance framework are an important step towards ensuring sounder fiscal policies. Several of these advances would likely have been unthinkable ahead of the crisis had the negative financial market reactions not put pressure on adjustments (see for this also

---

[2] See for a survey of the new fiscal rules also Barnes *et al.* (2012).

[3] The most recent strengthening of the EU fiscal governance framework marks the agreement of the European Commission, the European Parliament and the EU Council on the so-called two-pack, which entered into force on 21 May 2013. It entails a regulation on draft budgetary plans, which requires countries to have in place binding numerical fiscal rules and envisages, inter alia, closer monitoring of countries in EDP. It further includes a regulation according to which countries experiencing severe difficulties with financial stability or receiving financial assistance on a precautionary basis become subject to enhanced surveillance.

Larch *et al*., 2010). Still, the new governance framework has become highly complex, which renders the intended strengthened surveillance of fiscal policies difficult, even for experts. We have concluded above that the original governance framework did not properly identify fiscal imbalances in real time and that its rules were not properly enforced and implemented. The following will argue that the strengthened governance framework would have led to sounder fiscal positions than the old one but that important shortcomings remain. These relate notably to the fact that the role of unobservable magnitudes has overall increased within the strengthened governance framework.

1) Identification

Assuming that the strengthened fiscal governance framework would have existed prior to the crisis, would it have signalled arising budgetary imbalances in a more satisfactory manner? We will argue that difficulties remain, notably as fiscal governance continues to rest strongly on the structural budget balance as surveillance indicator.

Looking back, the structural budget balance had received core prominence under the 2005 reform of the Stability and Growth Pact. Under its preventive arm, following the reform, countries are supposed to implement more structural adjustment in economic good times and less in economic bad times. Under its corrective arm, the structural balance became the core tool to assess effective action as incorporated in the so-called conditional compliance concept (see also Larch and Turrini 2009).

However, the structural balance as gauged under the EU fiscal governance framework tends to suffer from a real-time bias (as shown in the previous section), which can be traced back to distortions due to the pro-cyclicality of the potential output estimates (see Bundesbank, 2012).[4] As shown for the case of Spain in Figure 3, real time output gaps have been consistently underestimated in the economic good times ahead of the crisis and overestimated in the crisis years. Further to be expected *ex post* revisions to these latter data are unlikely to change this picture. As a consequence, cyclically-adjusted budget balances had to be revised downwards *ex post*, implying that the average structural position was on average much worse than anticipated. As Figure 3 further shows, this pattern is common to most euro area countries when looking at the period 2003-12. The average revision of the structural balance has been around ¾ per cent of GDP for euro area countries. Revisions were exceptionally large for Greece, but have also been large for Estonia, Italy, Portugal and Spain. For these countries the volatility of structural balance estimates is more likely to be related to the uncertainty surrounding the macroeconomic outlook. Less clear-cut conclusions derive when looking at *changes* in the structural balance. On average, however, the real time estimates of annual changes in the structural balance have in the past tended to lead to an overestimation of the consolidation effort for some countries. For six euro area countries the revision in structural adjustment even exceeded 0.5 per cent of GDP, which is the benchmark under the Stability and Growth Pact. The structural balance is thus not always a reliable measure, neither of the underlying fiscal position nor of fiscal efforts, notably in an environment of rapid changes in macroeconomic conditions.

These problems associated with the pro-cyclicality of potential output growth projections also affect the effectiveness of the newly introduced expenditure benchmark.[5] The expenditure

---

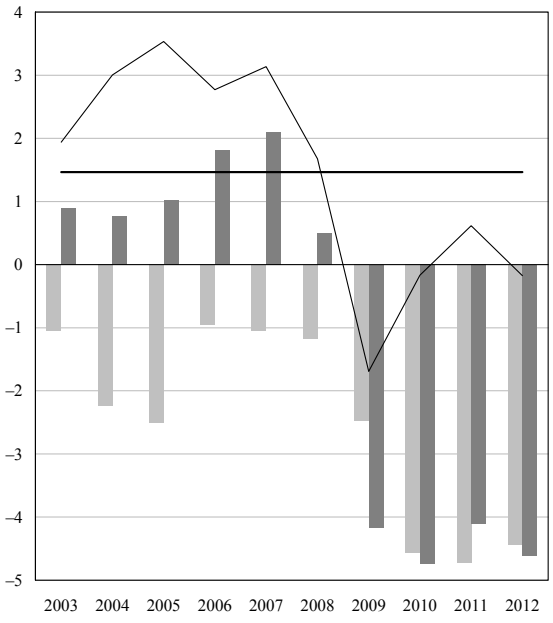
[4] See González Cabanillas and Terzi (2012) for an assessment of forecast errors in the European Commission's macroeconomic forecasts. The authors review real GDP growth, inflation, the general government balance, total investment, the total unemployment rate as well as the current account-to-GDP rate, but exclude potential growth and output gap estimates.

[5] See Banco de España (2011) for an analysis of how an expenditure rule would have worked during the expansion period in Spain. See Hauptmeier *et al.* (2007) for an analysis of public expenditure reforms in industrialised countries.

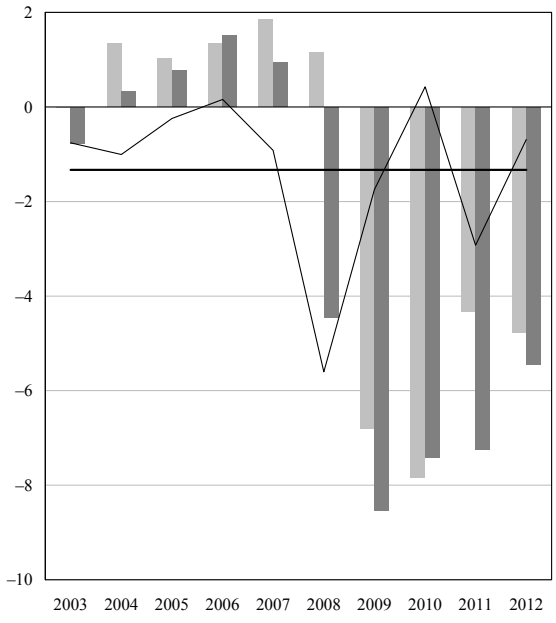
Figure 3

Quality of Structural Balance Estimates

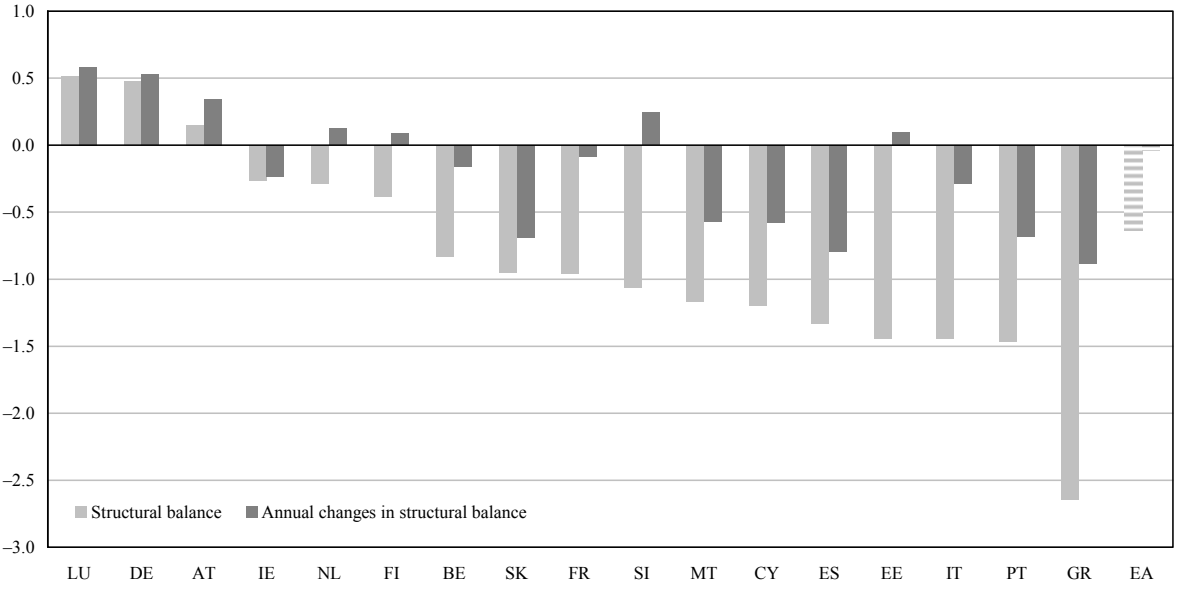
Spain: Output Gap Estimates
(percent of GDP)



Spain: Structural Balance
(percent of GDP)



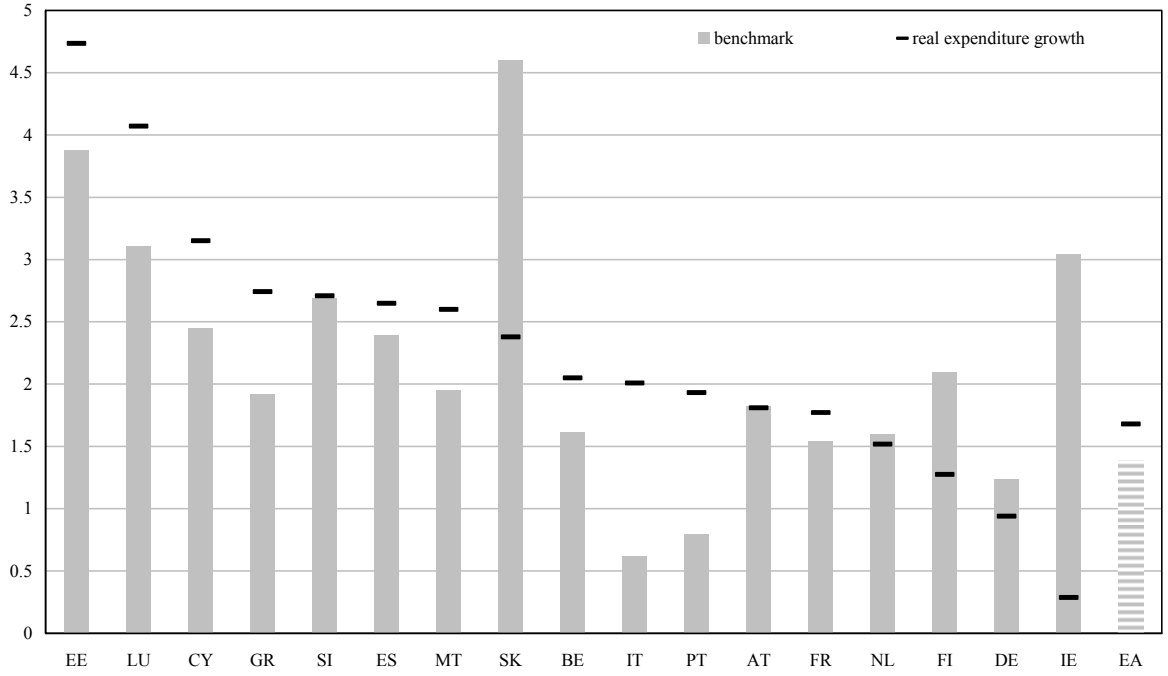
Average Revision of Structural Balance Over the Period 2003-12
(percent)



Source: Eurostat, own calculations.
Note: Real time structural balance estimates before autumn 2006 are based on temporary measures as specified in the Spring 2007 European Commission's economic forecast.

Figure 4

The Expenditure Benchmark and Real Public Expenditure Growth
(average 2003-12)



Source: European Commission's spring 2013 economic forecast, own calculations.
Note: The expenditure benchmark is calculated as a moving average over 6 years (*i.e.*, the past 3 years, the current and the projected next 2 years).

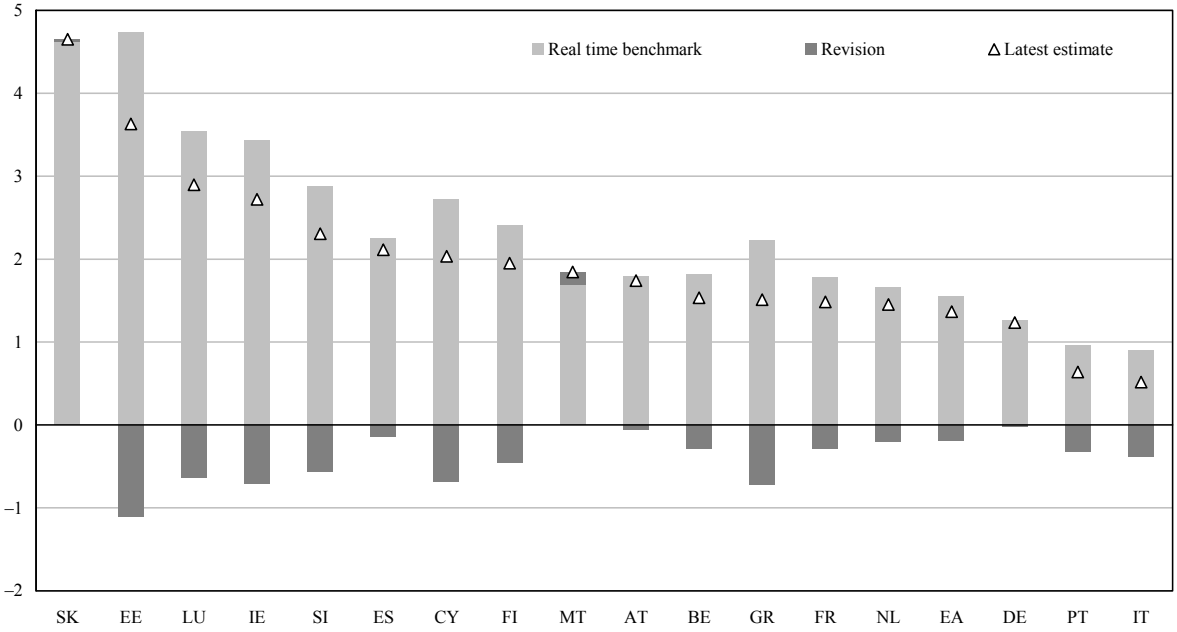
benchmark constrains a measure of real public expenditure growth to potential output growth developments. Specifically, the benchmark to which this measure of expenditure growth is applied is a moving average of potential growth over the past 5 years, the current and the projected next four years. The expenditure rule constitutes an important improvement in the fiscal governance framework. In fact the application of a modified benchmark (set up as stretching out over 6 instead of over 10 years due to data availability and covering total real expenditure) as a ceiling to total public expenditure over the period 2003-12 would have markedly restrained public expenditure growth in several countries (Figure 4).

Nevertheless, the expenditure rule is still subject to weaknesses. When reconstructing this benchmark in real time as a moving average over 6 years, it turns out that it would have shown systematically larger scope for expenditure increases than justified *ex post* over the period 2003-12. Consequently, expenditure growth according to this benchmark would have been systematically larger in real time than what the benchmark aims for.

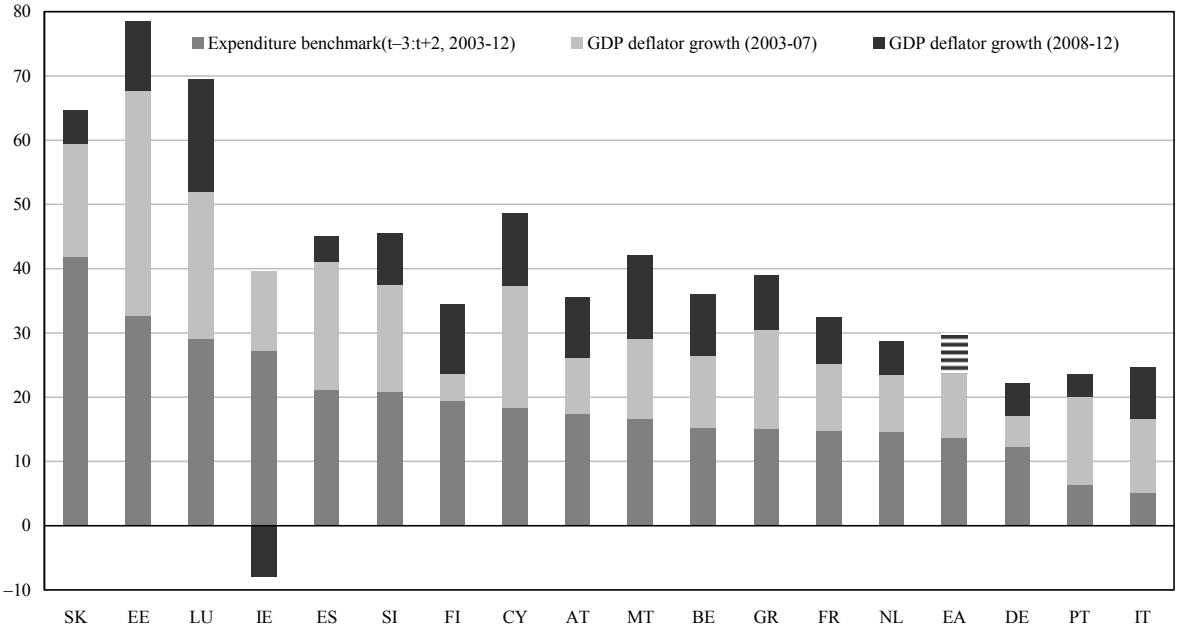
In addition, since the expenditure rule is defined in real terms, the inflation dimension is disregarded. In nominal terms in fact even a high expenditure growth can be compliant with the EU fiscal rules as these do not "penalize" high inflation countries. A comparison between the average benchmark in the period 2003-12 and the average GDP deflator growth shows that the expenditure rule would have lead to a ceiling for expenditure which may still have resulted in unsustainable expenditure developments. The expenditure benchmark in its current form does thus not correct for the gradual erosion of competitiveness associated with persistent excess inflation compared to

Figure 5

The Expenditure Benchmark Revisited in Real Time, 2003-12
Potential Growth Benchmark Revisions
(moving average, t–3:t+2)



Potential Growth Benchmark and GDP Price Deflator Growth
(2003-12, cumulative)



Source: European Commission's economic forecast.
Note: Actual data in line with spring 2013 EC economic forecast. Real time forecast are EC autumn projections for the same year. Revisions are calculated as actual - forecast. The expenditure benchmark is calculated as a moving average over 6 years (*i.e.*, the past 3 years, the current and the projected next 2 years). Negative revisions indicate overestimation of the expenditure benchmark.

developments in the euro area as a whole. This is a major weakness of the current expenditure benchmark.

One can therefore conclude that the strengthened fiscal governance framework would have contributed to more prudent fiscal positions, mainly through the requirement of reaching more demanding structural fiscal positions, by, *inter alia*, restraining real expenditure growth. Notwithstanding these improvements, weaknesses remain. These relate notably to the insufficient reliability of the structural budget balance as real-time surveillance indicator. It is therefore essential that fiscal governance is complemented by surveillance of other indicators, which may provide a better picture of underlying imbalances in real time.

2) Enforceability and implementation

Under the strengthened governance framework, the EU semester was set up as the major tool to coordinate and steer the EU countries' economic and budgetary policies towards achieving sustainable growth and sound fiscal positions. To be effective, it requires that emerging economic and fiscal imbalances are identified and followed-up in a timely and strict manner. However, as outlined above, the fact that structural balances are an "unobservable" and difficult to measure in real time impedes the timely identification of fiscal imbalances. This notwithstanding, the so-called conditional compliance concept was further amended and first applied under the 2013 Spring assessments under the excessive deficit procedure. Countries that fail to meet the 3 per cent of GDP nominal deficit reference value by the EDP deadline and do not comply with the recommended structural adjustment effort may still be assessed as having undertaken effective action if their structural adjustments, corrected for revisions in potential output growth and revenue elasticities that occurred since the EDP was launched, remains in line with countries' initial commitments. With the application of this amended concept, the role of unobservable magnitudes for fiscal surveillance has further increased, further reducing the transparency of the framework.

From a fiscal perspective, it is therefore important that the assessment of a country's structural efforts to return to sound public finances encompasses a thorough so-called "careful analysis", which the Commission needs to conduct in case the corrected structural effort adjusted for revisions in potential output growth and revenue elasticities falls short of the required effort under the EDP. However, in the absence of a commonly agreed method, more reflection is still needed on its modalities.

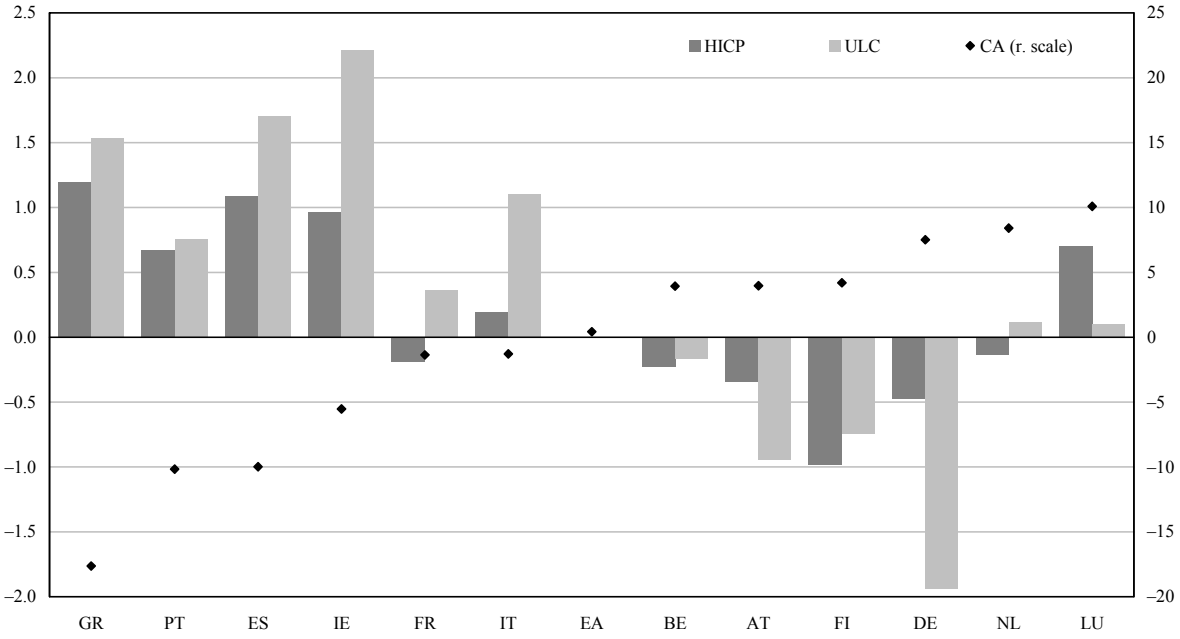
The strengthened EU fiscal surveillance thus continues to have problems in correctly assessing underlying fiscal positions imbalances in real time, which hinders the effective enforcement of the framework. To the extent that the conditional compliance concept leads to a delay in the reduction of excessive nominal deficits, it adds to government debt and thus negatively affects debt sustainability. It is thus not necessarily in line with the Stability and Growth Pact's overarching objective to ensure debt sustainability. The following therefore explores whether variables captured in the scoreboard of the MIP are better indicators for a country's position in the economic cycle than the real-time output gaps used in the strengthened Stability and Growth Pact.

3 Economic governance in the euro area

Since the inception of the euro, several euro area countries experienced a build-up of substantial macroeconomic imbalances, despite existing rules stipulating the need for sustainable economic policies in EMU countries. This section first presents some stylised facts about the accumulation of macroeconomic imbalances prior to the crisis. It then surveys and assesses the new economic governance framework.

Figure 6

Current Account Balance *(percent of GDP in 2007)*, **HICP Inflation and ULC Growth Relative to EA Average** *(average 2001-07)*



Source: European Commission. Note: Countries are grouped in ascending order of the current account balance (avg. 2001-07). It covers the countries which joint the EA by 2001.

3.1 Economic imbalances prior to the crisis: a sketch of stylised facts

In the year prior to the crisis, low real financing costs coupled with overly optimistic assumptions of households, firms and the public sector about future economic developments. These were some of the key factors contributing to the successive build-up of macroeconomic imbalances. In particular, they led to a significant cumulative deterioration in competitiveness, with wage growth persistently above productivity growth and inflation rates above the euro area average (see Figure 6).[6] A number of countries saw unsustainable credit-financed domestic demand growth and housing bubbles. Owing to deteriorating competitiveness and strong import growth on the back of robust domestic demand, current account deficits increased significantly in some euro area countries (Figure 6). Given that the strong demand largely reflected developments in private and public consumption and investment in the non-tradable sector (in particular in construction sector, leading to a housing bubble in some countries) there was no corresponding increase in the capacity to service the growing external debt burden.

With the start of the crisis in 2008, these macroeconomic imbalances, which were facilitated by unsustainable economic policies, became painfully exposed. However, caution needs to be

[6] In the first years of EMU substantially increasing relative costs and prices can be partly attributed to the normal process of real and nominal convergence. However, empirical work has been unable to find unambiguous evidence of catching-up effects (in the form of Balassa-Samuelson effects) at play after the start of Stage Three of EMU. Earlier studies on the Balassa-Samuelson effect in the euro area (e.g., Hofmann, B. and H. Remsperger (2005), "Inflation Differentials Among the Euro Area Countries: Potential Causes and Consequences", paper presented at the *ASSA Annual Meeting*, and Katsimi, M. (2004), "Inflation Divergence in the Euro Area: The Balsa-Samuelson Effect", *Applied Economics Letters*, Vol. 11, Issue 5, pp. 329-32) did not find any significant contribution of cross-country price convergence to national inflation rates in Stage Three of EMU.

applied when attributing these developments solely to a lack of awareness among political leaders about the consequence of unsustainable economic policies. At least the legal fundament of the EU suggests that European Head of State or Government have – at least to some extent – thought about their implications: In 1992 the Treaty on European Union ("Maastricht Treaty") elaborated about the importance of "conduct[ing] economic policies with a view to the achievement of the objectives of the Community" (Art. 102a), that the "Member States shall regard their economic policies as a matter of common concern and shall coordinate them within the Council" (Art. 103(1)). Moreover, it is defined that whenever the "economic policies of a Member State are not consistent with the broad guidelines […] or that they risk jeopardising the proper functioning of economic and monetary union, the Commission […] may make the necessary recommendation to the Member State concerned" (Art. 103(4)).[7]

Thus, while the potential risk of unsustainable national economic policies was already visible and identified early on, the shortcoming was related to the weak enforcement possibilities of the provisions and a limited willingness to pursue its implementation. With respect to the first, economic policies which were at risk to jeopardise the smooth functioning of EMU could at most receive a warning issued by the Commission, which however was not legally binding and was not linked to any form of sanctions which could help forcing the respective country to change its policies. Moreover, the recommendation would need to have been endorsed by the Council (including the targeted Member State) with a qualified majority. Beyond the question of how effective warnings against unsustainable economic policies could have been, it is important to note that this option has only been used once since the Treaty was enacted in 1992. In 2001, the Commission (endorsed by the Council) submitted a warning about the Irish economic policy being inconsistent with the Broad Economic Policy Guidelines adopted by the Council in 2000. Euro area governments heavily criticised the Commission at that time (the warning turned out to be fully appropriated with hindsight) and the Commission did not use this instrument anymore thereafter.

3.2 The new framework for macroeconomic surveillance

With the inception of the crisis, it became soon apparent that the existing EU economic governance framework has been insufficient in preventing the built-up of macroeconomic imbalances in euro area Member States. The shortcoming related to both the identification and correction of macroeconomic imbalances. As a result, the Council decided to implement an EU macroeconomic surveillance framework. The "Macroeconomic Imbalance Procedure" (MIP) was agreed upon as part of the "six pack" of economic governance reforms.

As laid down in two Council regulations,[8] the MIP begins with the publication of the Alert Mechanism Report. In this report, the European Commission provides an economic reading of the scoreboard of eleven indicators[9] and corresponding thresholds, which try to capture the major sources of macroeconomic imbalances in all EU Member States. Countries currently subject of EU/IMF-programmes are excluded from the MIP given that enhanced macroeconomic surveillance is already conducted as part of the respective programmes.

On the basis of this report, the Commission selects countries which should receive an

---

7 The provisions are today included in the Treaty of the Functioning of the European Union (TFEU, "Lisbon Treaty"), Art. 121.

8 The procedure of the MIP is laid down in Regulations (EU) No. 1176/2011 of 16 November 2011 and No. 1174/2011 of 16 November 2011.

9 See Table 3 for the eleven scoreboard variables capturing indicators of external imbalances, competitiveness, and internal imbalances. For a detailed description of all indicators and thresholds, see European Commission (2012), "Scoreboard for the Surveillance of Macroeconomic Imbalances", Occasional Paper, No. 92, February. During the first exercise in 2012, the scoreboard only consisted of 10 indicators, with the growth rate of financial liabilities being added only for the second exercise in 2013.

in-depth review, to see whether early indications regarding macroeconomic imbalances are confirmed. The in-depth reviews include fact-finding missions to the countries in question and go beyond the initial reading of the scoreboard.

On the basis of each in-depth review, the Commission issues an assessment as to whether the country in question (a) is not experiencing any imbalances, (b) experiencing imbalances, (c) experiencing excessive imbalances. In the first case, the MIP is terminated. Where it is decided that imbalances are identified, the country concerned will receive country-specific policy recommendations under the "preventive arm" of the procedure (together with the overall country-specific recommendations at the end of the European Semester) with a view to averting potentially harmful developments. Where macroeconomic imbalances are found to be sufficiently severe to be considered excessive, the Excessive Imbalance Procedure (EIP) is triggered under the "corrective arm" of the procedure. In this case, the country concerned has to submit a corrective action plan outlining policy measures aimed at addressing the excessive imbalances. This action plan has to be agreed with by the Council of the European Union. In order to ensure the implementation of such corrective actions, financial sanctions can be imposed in case of repeated failure to implement corresponding actions.

It is noteworthy that within the MIP, in contrast to the fiscal framework and its main surveillance indicators general government budget balance and debt, most indicators of macroeconomic imbalances are no direct control variables of policy makers and are therefore more difficult to adjust. More precisely, while the budget balance can be adjusted with law makers agreeing, e.g., on expenditure cuts, the current account deficit of an economy is the mirror image of saving and investment preferences of actors in the respective country and can largely be indirectly influenced through policy measures changing the economic conditions under which businesses and individuals operate.[10]

While the possibility to enforce recommendations to change national economic policies have clearly increased with the new governance framework, to be effective its actual implementation is crucial. The first application of the Macroeconomic Imbalance Procedure in 2012 resulted in a selection of 12 EU countries (including 7 euro-area Member States) for an in-depth review following an initial economic reading of the scoreboard of indicators. All 12 countries only received country-specific recommendations via the preventive arm, while for no country the corrective arm was applied. The Council followed with this decision the recommendation issued by the Commission.

The 2011 scoreboard of ten indicators used for the surveillance of macroeconomic imbalances (Table 3) depicts the respective thresholds breached by the individual euro area countries. The number of exceeding thresholds remains particularly high, since despite adjustment in flow variables (such as current account, unit labour costs and the REER) the stock variables pose severe vulnerabilities: External, private and public debt variables feature the highest number of exceeding thresholds (grey background).

3.3 An assessment of the new framework for macroeconomic surveillance

Recalling the shortcomings in the governance framework which existed prior to the crisis, we emphasised (1) the lack of identification tools, (2) the limited legal enforceability as well as (3) the implementation of the existing rules. In a stylised *ex post* analysis, the new governance framework is assessed against these shortcomings.

---

[10] While this holds overall, policy makers can also influence the current account balance more directly through changes in public investment and consumption, which would then in turn impact to some extent also the trade balances (through imports) and therefore the current account balance.

Table 3

European Commission Scoreboard 2011

	Current Account Balance *(percent of GDP, 3-year average)*	Net International Investment Position *(percent of GDP)*	Export Market Shares *(5-year percentage change)*	Real Effective Exchange Rate, HICP Deflated *(3-year percentage change)*	Nominal Unit Labour Cost *(3-year percentage change)*	Private Sector Credit Flow *(percent of GDP)*	Private Sector Debt *(percent of GDP)*	General Government Debt *(percent of GDP)*	House Prices, Consumption Deflated *(y-o-y percentage change)*	Unemploy-ment Rate *(3-year average)*	Financial Liabilities *(y-o-y percentage change)*
Threshold	**+6/–4%**	**–35%**	**–6%**	**+/–5%**	**+9%**	**+15%**	**160%**	**60%**	**+6%**	**+10%**	**+16.5%**
Belgium	–0.3	65.7	–10.2	–0.5	6.2	11.6	236	98	–0.1	7.8	4.7
Germany	5.9	32.6	–8.4	–3.9	5.9	4.8	128	81	1.4	6.9	2.1
Estonia	2.8	–57.8	11.1	0.8	–6.2	6.8	133	6	3.3	14.4	–4.4
Ireland	0.0	–96.0	–12.2	–9.1	–12.8	4.0	310	106	–15.2	13.3	–0.6
Greece	–10.4	–86.1	–18.7	3.1	4.1	–5.5	125	171	–5.1	13.2	–3.4
Spain	–4.3	–91.7	–7.6	–1.3	–2.1	–4.1	218	69	–10.0	19.9	3.7
France	–1.6	–15.9	–11.2	–3.2	6.0	4.0	160	86	3.8	9.6	7.3
Italy	–2.9	–20.6	–18.4	–2.1	4.4	2.6	129	121	–2.0	8.2	3.8
Cyprus	–8.4	–71.3	–16.4	–0.9	8.8	16.1	288	71	–8.5	6.6	–0.2
Luxembourg	7.5	107.8	–10.1	0.8	12.5	2.5	326	18	1.5	4.8	11.3
Malta	–4.3	5.7	11.7	–3.0	5.8	2.2	210	71	–2.3	6.8	1.4
Netherlands	7.5	35.5	–8.2	–1.6	5.8	0.7	225	66	–4.0	4.2	7.2
Austria	2.2	–2.3	–12.7	–1.0	5.9	4.1	161	72	–8.0	4.4	–0.3
Portugal	–9.1	–105.0	–9.5	–1.9	0.9	–3.2	249	108	–3.6	11.9	–0.7
Slovenia	–0.4	–41.2	–6.1	–0.3	8.3	1.9	128	47	1.0	7.1	–1.3
Slovak Rep.	–2.1	–64.4	20.9	4.3	4.4	3.3	76	43	–5.6	13.4	1.2
Finland	0.6	13.1	–22.9	–1.3	9.1	4.6	179	49	–0.3	8.1	30.8

Source: European Commission, *2013 Alert Mechanism Report*.
Note: Cells with grey background denote that the country has exceeded the respective threshold of the indicator.

1) Identification

Assuming the new MIP would have existed at the start of Stage 3 of EMU in 1999, would the scoreboard of indicators have issued early warnings for the current group of vulnerable countries?[11] Table 4 depicts a simple sum of indicators exceeding the relevant scoreboard indicators per country in a given year. The calculation of thresholds, which are based on statistical distributions from in most cases 1995-2007, is assumed to remain identical.[12] The calculations suggest that macroeconomic imbalances in the three EU/IMF-programme countries, particularly in Greece would have been identified early on (e.g., around 2003-04). Interestingly alarm bells would have even been clearer for Spain, which exceeded six or even seven out of the eleven indicators continuously since 2005. Similarly, macroeconomic imbalances would have been identified more timely in Cyprus. However, several caveat needs to be attached to assessing the simple sum of indicators exceeding thresholds. This relates to both the selected variables as such, but also to the threshold computed.

With respect to the eleven scoreboard variables they were chosen as to provide a rough filter for a preliminary list of countries which could be exposed to macroeconomic imbalances. The respective regulation (1176/2011, Art. 4(4)), however, clearly indicates that underlying economic developments need to be considered, *i.e.*, an "economic reading" of the indicators applied. A comparison of Cyprus and Estonia, both with six to seven indicators exceeding the thresholds from 2005-07, serves as an example which suggests that the scoreboard cannot offer more than a first indication. Both relatively new euro area Member States would have experienced several breaks of multiple thresholds. However, whereas for Estonia there are indications that typical catching-up processes were at work (e.g., current account deficits have been largely financed by foreign direct investment), though alongside some signs of overheating, the indicators for Cyprus suggest rather unsustainable, non-catching-up effects to prevail.

Moreover, the variables are used in different representations. While, e.g., for the current account balance its developments are assessed as percent of GDP on a three year average, the export market share is shown as five year percentage change, and again the financial liabilities or house prices as year on year change. In particular the variables which only look at shorter horizons are likely to miss the stock problem of the variables. E.g., while persistently and strongly rising house prices would indeed be captured by the scoreboard, once the strong rises stop, the indicator would not signal imbalances, despite the fact that house prices remain significantly overvalued (as, e.g., in Spain in 2008). Such developments need to be found in the economic reading of the variable.

Also the threshold symmetry of some scoreboard variables needs to undergo a close scrutiny during the economic reading. Such symmetry has been applied to the current account and the REER. While the current account surplus threshold is slightly higher than the deficit threshold (+6/–4 per cent of GDP), still exceeding the threshold on the positive side is seen as indication of macroeconomic imbalances. However, past experiences suggest that fundamental differences exist between current account surpluses and deficits, with the latter posing much more serious risks. This is also acknowledged by the ECOFIN concluding, "that unlike current account deficits, large and sustained current account surpluses do not raise concerns about the sustainability of external debt or financing capacity that affect the smooth functioning of the euro area; the risks of negative spill-overs for current account surpluses are therefore less pressing than for current account deficits."[13] Similar arguments can be found for a depreciation of the HICP deflated real effective

---

[11] The group of vulnerable countries captures the three full EU/IMF programme countries, plus Spain, Italy and Cyprus.

[12] Due to data limitation with the Eurostat and European Commission datasets, backward calculations of thresholds before 1995 are hardly possible.

[13] Council of the 2013 Annual Growth Survey (3220th Economic and Financial Affairs Council Meeting, Brussels, 12 February 2013).

Table 4

Retrospective Evaluation of the Scoreboard Since 1999

Country	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Belgium	3	3	3	2	4	3	2	3	4	4	4	3	3
Germany	2	3	1	2	2	2	2	2	3	2	2	3	2
Estonia	(6)	(6)	(5)	(6)	(6)	(7)	(6)	(6)	(7)	(5)	(5)	(4)	2
Ireland	0	2	0	2	3	5	5	6	5	7	5	5	6
Greece	(3)	(5)	5	4	6	6	7	5	5	4	6	5	5
Spain	4	2	3	4	5	5	7	7	7	6	7	6	6
France	3	3	2	1	3	3	3	3	2	2	2	2	3
Italy	3	4	4	2	4	4	2	2	2	2	3	2	2
Cyprus	(3)	(3)	(2)	(4)	(4)	(6)	(7)	(6)	(6)	4	5	6	6
Luxembourg	2	1	2	2	2	2	2	2	3	3	4	3	4
Malta	(2)	(1)	(1)	(1)	(3)	(5)	(6)	(6)	(6)	7	5	5	3
Netherlands	3	3	3	2	3	2	2	2	2	3	4	3	4
Austria	3	3	2	1	1	1	2	1	2	1	3	3	3
Portugal	3	6	6	4	5	5	5	5	5	6	5	6	6
Slovenia	(2)	(2)	(2)	(2)	(2)	(1)	(2)	(1)	3	4	3	2	2
Slovakia	(3)	(4)	(4)	(4)	(4)	(4)	(6)	(5)	(6)	(5)	5	5	2
Finland	4	6	2	2	3	2	1	1	1	2	4	4	4

Source: European Commission, ECB calculations. Note: Cells with light (medium; dark) grey background denote that the respective country exceeded 5 (6; 7) thresholds of the 11 indicators. Countries are in brackets before they joined the euro area. Generally in these cases no background colouring has been attributed.

exchange rate, which is less problematic than a persistent appreciation, which in a monetary union is likely to reflect strong and persistently increasing prices.

Lastly, indicators are currently represented in absolute terms, *i.e.*, not relative to developments of other euro area countries. However, one of the main aims of the scoreboard, to identify losses in competitiveness, needs to be looked at in relative terms. More precisely, given that costs and prices in a monetary union are the main channels through which adjustment in cases of shocks can be achieved, their developments should be assessed relative to the euro area average to indicate losses versus other Member States.

One could therefore conclude that the new governance framework, with the implementation of the scoreboard of indicators of macroeconomic imbalances, has eliminated the lack of identification tools with respect to unsustainable economic policies in EU Member States. However, several issues with respect to the construction of the scoreboard indicators and thresholds need to be targeted, either by changes to the scoreboard itself or through an enhanced "economic reading" of the variables.

2) Enforceability

However, the ability to identify the problem does not imply that the necessary rules are in place to ensure the enforceability. Prior to the crisis, EU institutions couldn't act beyond the issuance of warnings in case a Member State conducted economic policies not in line with the smooth functioning of EMU. The Regulations covering the new Macroeconomic Imbalance Procedure, however, give the EU institutions sanction mechanism at hand for countries under the corrective arm which should ensure compliance with the set of actions required from Member States. Should a country fail twice to present a sufficient corrective action plan (CAP) the Council can decide to directly impose a fine of 0.1 per cent of GDP. On the contrary, if the Member State submits a sufficient CAP but fails to take sufficient action in implementing it, the Council is in the position to impose an interest-bearing deposit of 0.1 per cent of GDP. In case of repeated non-compliance the deposit can, upon decision of the Council, be converted into an annual fine of the same magnitude. The voting procedure for the overall procedure was changed as well in order to introduce a greater degree of automaticity: Following the so-called "reversed qualified majority voting", the recommendation of the Commission to, e.g., apply the corrective arm, or later impose fines would need to be rejected in the Council by a qualified majority.

However, these enforcement possibilities only exist for countries under the corrective arm of the MIP. Should a Member State not comply with recommendations received under the preventive arm, no instrument exists to enforce related policy measures. Consequently, recommendations under the preventive arm are not much different to the framework of economic policy coordination which existed before the crisis.

Consequently, given that tools to identify the problem and legal enforcement possibilities have been added, an effective implementation of the new governance framework remains the cornerstone.

3) Implementation

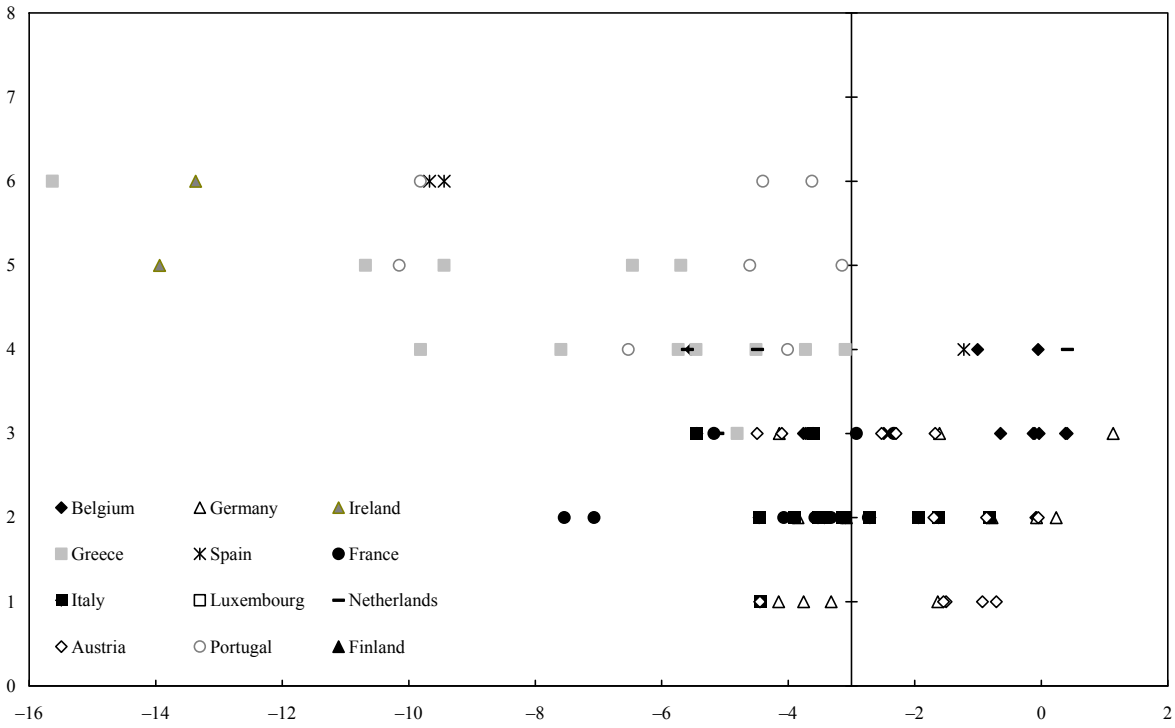
In contrast to the *corrective* arm of the SGP with the reference values for the budget deficit of 3 per cent of GDP and 60 per cent for the general government debt ratio which should automatically trigger corrective action via the launch of an excessive deficit procedure, the rules of the MIP framework do not imply the same degree of automaticity. However, as long as no automaticity is attached to the rules, room for discretion remains for the exercising and deciding bodies, rendering a bold interpretation of the framework most important to ensure an effective implementation.

With respect to the MIP, it is within the power of the European Commission, as the exercising body, to identify countries for an in-depth review (Art. 3(3)), and – at a later stage – to evaluate whether the Member State in question is affected by imbalances, and of whether these imbalances are excessive (Art 5(3)). However the final decision rests with the Council as, the issued recommendation of the Commission needs to be adopted by the Council (in accordance with Art. 121(4) TFEU). Eventually, assuming the case in which the Commission recommended the opening of the Excessive Imbalance Procedure and the Member State did not comply with the corrective actions agreed on, the Council has to reject by qualified majority the assessment of non-compliance and the subsequent sanctions. In a nutshell, this means that the full implementation of the procedure in case a country exhibits excessive imbalances requires two actions: First, the Commission needs to come to the conclusion that excessive imbalances exist in a Member State (and subsequently corrective actions not complied with) and issue recommendations accordingly. Second, the Council needs to adopt the Commission's recommendations, *i.e.*, not reject the recommendation by qualified majority.

Figure 7

Interconnection Between SGP/MIP (1999-2011)

(x-axis: deficit in percent of GDP; y-axis: number of indicators' thresholds exceeded in MIP)



Source: Authors calculations. Note: Only countries are shown which in a given year have a debt to GDP ratio above 60 per cent of GDP.

With the implementation of the "reversed qualified majority voting" the likelihood that a Commission recommendation will not be voted down has increased and with it the effective implementation of the procedure. However, in contrast to the fiscal governance framework, the Macroeconomic Imbalance Procedure is much more dependent on the assessment of indicators by the Commission. In contrast to the clearly defined Maastricht thresholds of not more than 3 per cent budget deficit and 60 per cent of public debt both in terms of GDP, the MIP regulations remain relatively vague on the criteria to establish "excessive imbalances" in a country. It therefore rests with the Commission to construct a conclusion from the large set of indicators available. Consequently, a rigorous implementation of the new procedure becomes to a much larger extent the responsibility of the EU.

4 Interaction between fiscal and macroeconomic governance framework

The limitations of identifying fiscal imbalances and adjustment in real time calls for a broader concept of fiscal and economic surveillance (see for this argument also Larch *et al*., 2010).

However, the SGP and MIP are rather separate from each other. Fiscal policy indicators are only to a little extent included in the MIP, precisely by the government debt to GDP ratio as one of the eleven scoreboard indicators. However, as the Commission clarifies this indicator is *"…included in the scoreboard not to monitor risks of unsustainable public finances, which are*

covered by the Stability and Growth Pact, but to be considered together with the indicator on private debt and thereby to offer a broader picture of Member States' indebtednes".[14] Conversely, the strengthened SGP is also not tied explicitly to the development of macroeconomic imbalances. However, the developments of past years have in fact indicated the interconnectedness of the unsustainable fiscal policies and macroeconomic imbalances. Applying the identification mechanism of both procedures retrospectively for each year suggests a similar set of problematic countries. Figure 7 suggests a high correlation between SGP and MIP outcomes. Looking at countries with a public debt of over 60 per cent of GDP, the higher their budget deficit to GDP ratio the higher tends to be the threshold exceeded in the scoreboard of the MIP. All three EU-IMF-programme countries as well as Spain rank in this upper/left part of the figure. This suggests a strong correlation of both procedures.

Against the finding presented in Section 2, it seems that the currently applied method to derive cyclically-adjusted budget balances by making use of the real-time output gap estimates would have led with hindsight to a substantial underestimation of the structural deficit and henceforth the need for consolidation. At the same time, Figure 7 suggests a strong correlation of fiscal and macroeconomic developments. Against this background it should be investigated whether specific variables captured in the scoreboard of the MIP, could provide valuable information for a country's position in the economic cycle in addition to the real-time output gaps used in the strengthened SGP.

Figure 8 recalls the substantial projection error of the output gap estimates in real-time by comparing it against the latest vintage of estimates (using the example of three[15] full-programme countries (Greece, Ireland and Portugal) as well as Spain with its financial sector programme).

In order to determine whether the MIP framework would outperform the output gap estimates in terms of accuracy, we apply a simple Principal Component Analysis (PCA). Primarily, we make use of the flow variables captured in the MIP scoreboard, *i.e.*, unit labour costs, inflation, the current account balance and the unemployment rate.[16] The first principal component of this set of variables has a surprisingly strong correlation with the final output gap measure. This suggests that the information used for the MIP might indeed help removing the real-time bias of the output gap, thereby potentially addressing some of the weaknesses in the fiscal governance framework.

While the above mentioned macro variables seem to provide a better fit of the final output gap measure, the question remains whether the final estimate is the appropriate underlying measure to derive the structural budget balance. It is sometimes argued, e.g., by Borio *et al*. (2013), that the output gap has been persistently underestimated applying the standard estimation framework. By contrast, the inclusion of financial indicators would result in a more precise mapping of the true output gap. We augmented the set of indicators used in the PCA, by adding private credit growth and financial liabilities and find that the financially augmented output gap would have been sizeably larger.[17] This, in turn, suggest that the cyclically-adjusted deficit would have been significantly larger, consequently implying the need for tighter fiscal policies (see Figure 9). While the approach applied here is admittedly simplistic and can only be a starting point, it should be seen as food for thought on further steps towards constructing measures of potential output which are less prone to revisions than current estimates.

---

[14] "Scoreboard for the Surveillance of Macroeconomic Imbalances", *European Economy*, Occasional Paper, No. 92, February 2012.

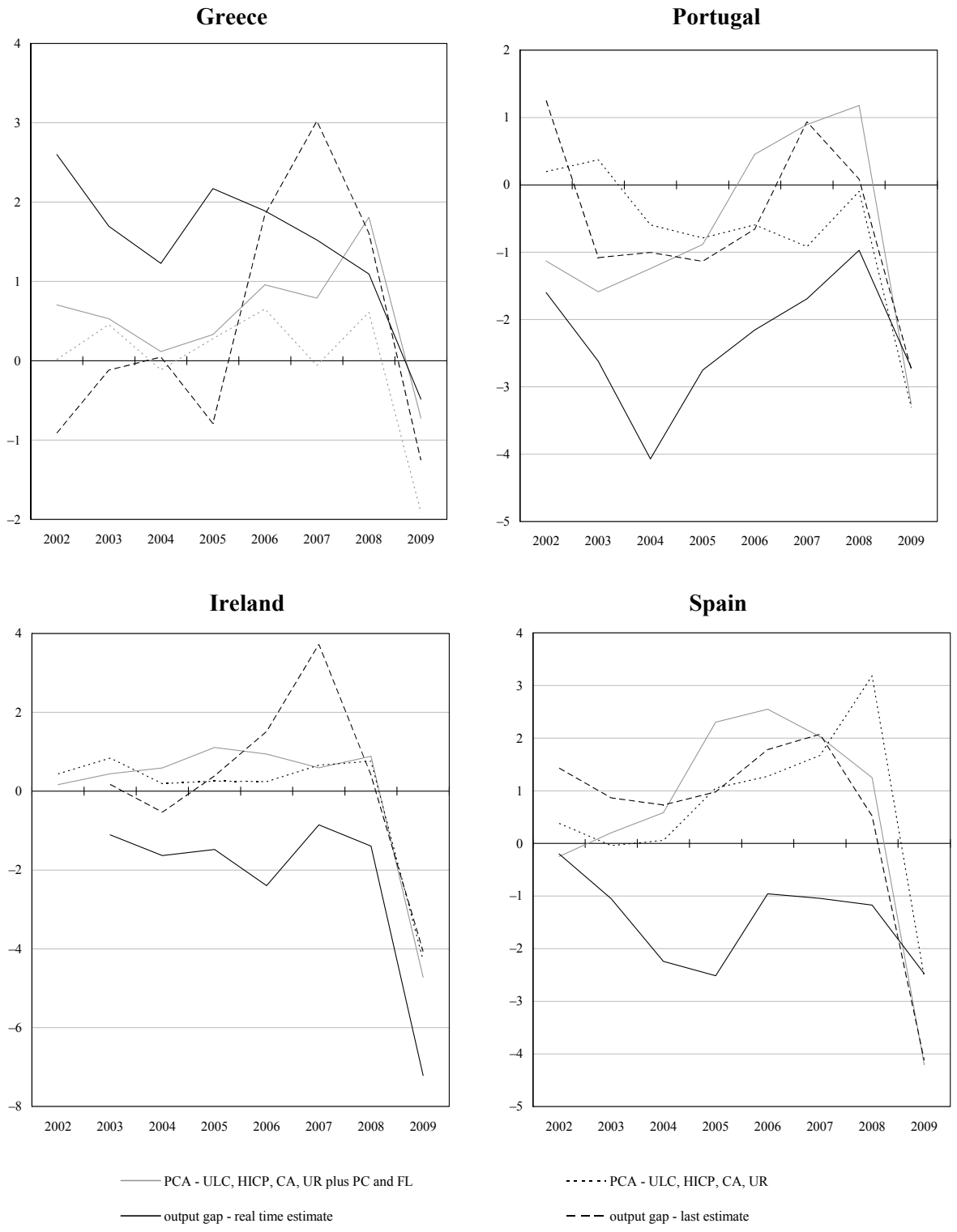
[15] Cyprus is excluded given limited data availability.

[16] The underlying variables are used for the exercise, since year on year developments give a timelier signal of economic developments, in contrast to the multiple year averages as for example the case for the current account indicator in the scoreboard.

[17] Adding house prices exemplifies this trend for course with large housing booms, e.g., Spain. While this overall patterns remains largely unchanged when turning to several euro area non-programme countries (see Figure 10 in the Annex), the correlation with the final estimate is somewhat less strong.

Figure 8

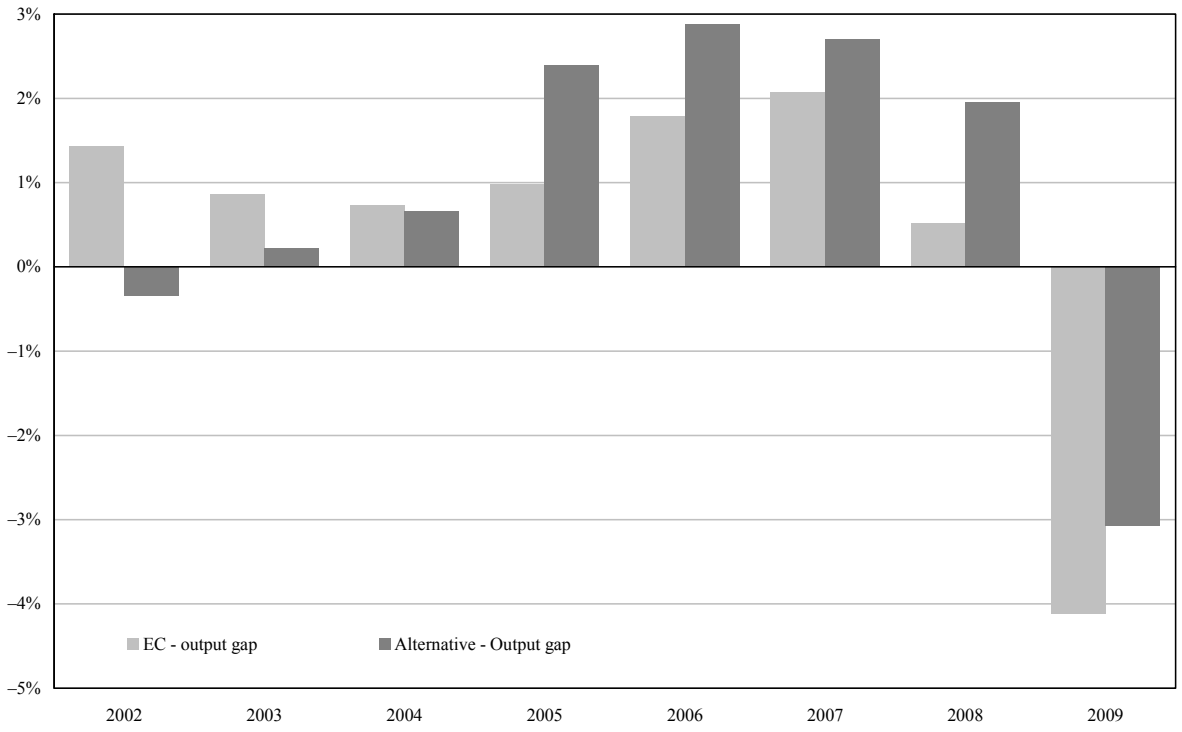
Comparison of Output Gap Estimates

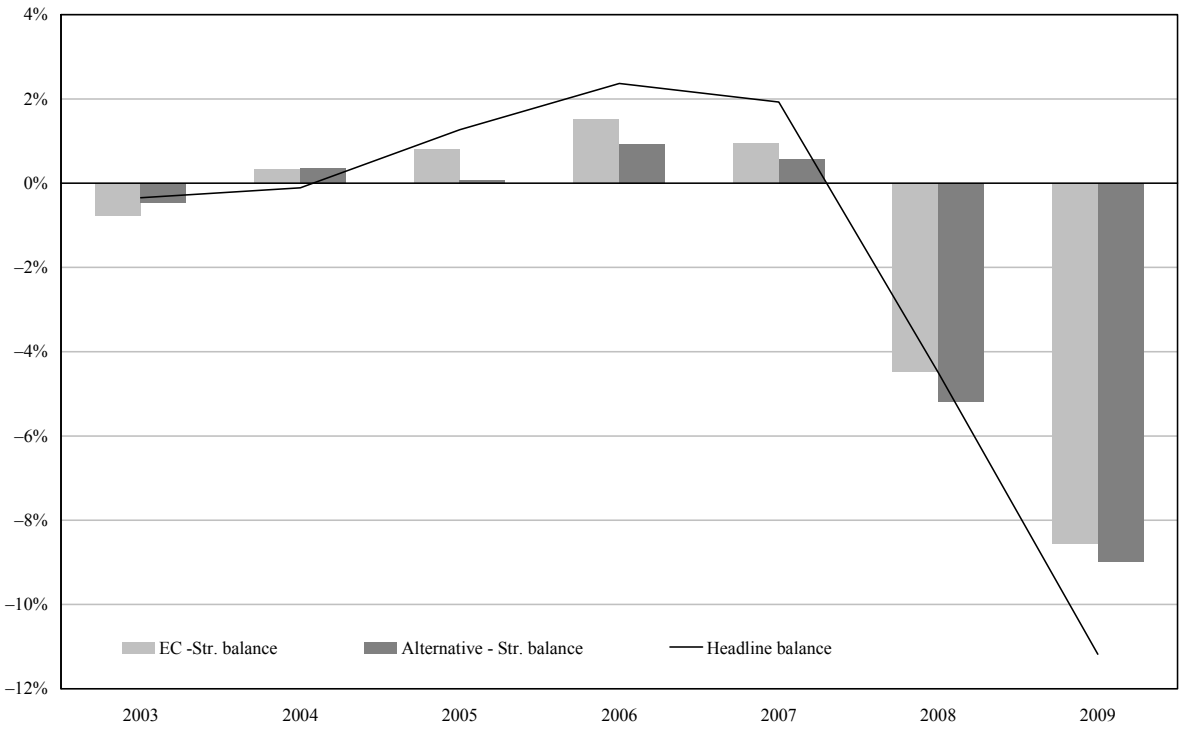


Source: Data from Eurostat and European Commission, authors' calculations.
Note: Due to data limitations, output gap data for Ireland only start in 2003.

Figure 9

Structural Balances Based on Different Output Gap Measures





Source: European Commission.

5 Conclusions

Important progress in strengthening the resilience of EMU has been achieved since the start of this crisis, particularly through a new governance framework stipulating a stronger control of fiscal and economic policies. Would the current framework have been in place already at the start of Stage Three of EMU, it would most certainly have led to more limited economic and budgetary imbalances. As regards fiscal positions, the balanced budget rule, the expenditure benchmark as well as the debt benchmark provide important tools to constrain unsustainable fiscal policies. Still, the fiscal framework would have remained prone to misjudging underlying fiscal positions and thus potential imbalances in real time. This relates notably to the weakness of the structural budget balance as real-time surveillance indicator of underlying fiscal positions and efforts. Recent studies suggest that the real-time bias in structural balance estimates may be attenuated through inclusion of financial variables. Against this background, we take a related approach by using core information from the Macroeconomic Imbalance Procedure. First results are encouraging, although we argue that a broad economic reading or a slightly amended scoreboard would help to improve the identification of imbalances further. However, much more in-depth analysis and robustness checks are needed before firm conclusions should be drawn.

One of the key findings of the paper is therefore that a stronger connection between the EU fiscal and macro governance frameworks might in principle facilitate the early identification of unsustainable developments. The indicators captured in the MIP scoreboard turn out to be a good indicator of real-time fiscal and economic developments. Moreover, when also taking into account the financial indicators of the scoreboard, it seems that even the last vintage of output gaps underestimated the cyclical position. Assuming that this measure more accurately captures cyclical developments, fiscal policies would need to have been tighter to achieve sustainable structural positions.

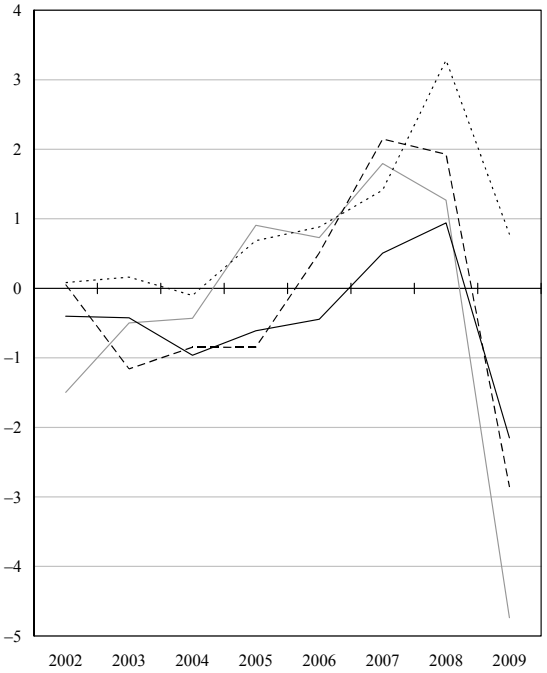
To conclude, the EU fiscal and economic governance has important tools at hand to identify fiscal and economic imbalances. A further strengthening of the governance framework should build on gradually establishing a more integrated surveillance using the synergies of the until now rather unrelated fiscal and economic governance frameworks. The effectiveness of any governance framework, however, always depends on the stringency with which its rules are implemented. The European Commission as the guardian of the strengthened EU governance framework therefore has an important role to play to ensure indeed fiscal and macroeconomic imbalances are prevented, identified and corrected in a timelier manner than ahead of the crisis.

ANNEX

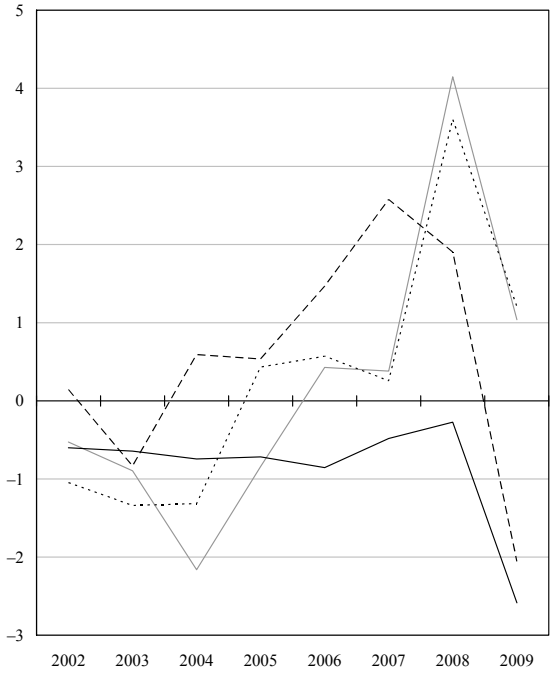
Figure 10

Comparison of Output Gap Estimates for Non-programme Euro-area Countries

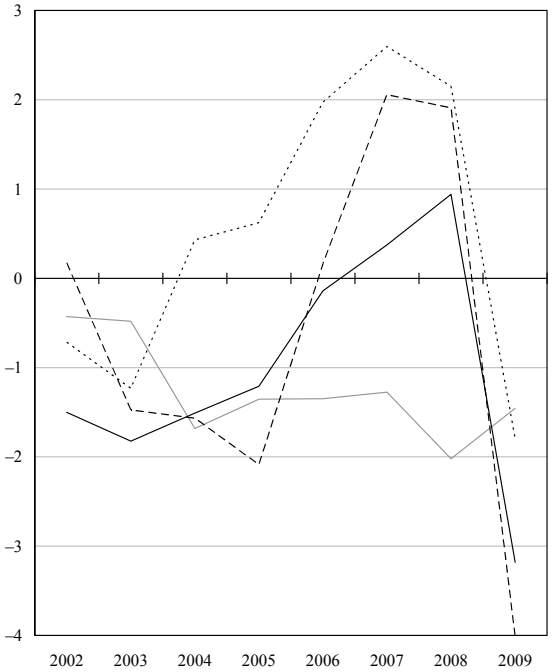
Austria



Belgium



Germany



Finland

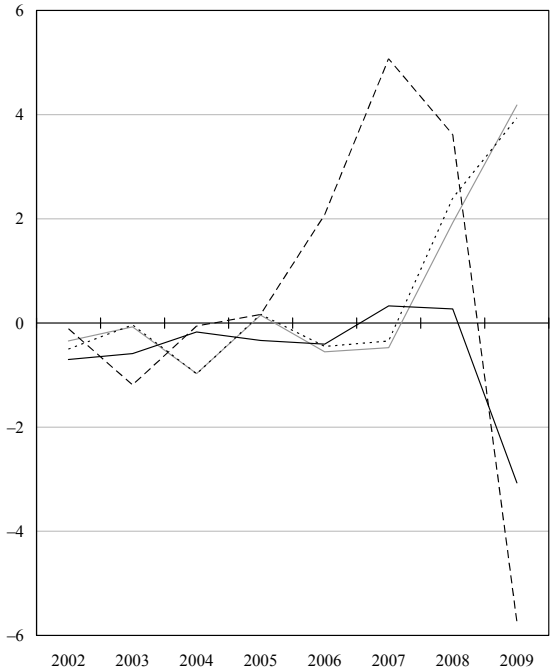


Figure 10 (continued)

Comparison of Output Gap Estimates for Non-programme Euro-area Countries

Source: Data from Eurostat and European Commission, authors' calculations. Limited data availability constrains the set of euro area countries used for this purpose.

REFERENCES

Banco de España (2011), "The Reform of the Fiscal Framework in Spain: Constitutional Limits and the New Public Spending Growth Rule", *Economic Bulletin*, October, Madrid.

Barnes, S., D. Davidsson and L. Rawdanowisz (2012), "Europe's New Fiscal Rules", OECD, Working Paper, No. 972, Paris.

Borio, C., P. Disyatat and M. Juselius (2013), "Rethinking Potential Output – Embedding Information of the Financial Cycle", BIS, Working Paper, No. 404, Basel.

Bundesbank (2012), *Some Evidence on Biased Cyclical Adjustment Within Fiscal Rules*, Monthly Report, August, Frankfurt.

González Cabanillas, L. and A. Terzi (2012), "The Accuracy of the European Commission's Forecasts Revisited", *European Economy*, Economic Paper, No. 476, Brussels.

Goodhart, C. (1981), "Problems of Monetary Management: The U.K. Experience", in A.S. Courakis (ed.), *Inflation, Depression, and Economic Policy in the West*, Rowman & Littlefield, pp. 111-46.

Hauptmeier, S., M. Heipertz and L. Schuknecht (2007), "Expenditure Reform in Industrialised Countries: A Case Study Approach", *Fiscal Studies*, Vol. 28, No. 3, pp. 293-342.

Larch, M. and A. Turrini (2009), "The Cyclically-adjusted Budget Balance in EU Fiscal Policy Making: A Love at First Sight Turns into a Mature Relationship", *European Economy*, Economic Paper, No. 374, Brussels.

Larch, M., P. van den Noord and L. Jonung (2010), "The Stability and Growth Pact: Lessons from the Great Recession", *European Economy*, Economic Paper, No. 429, Brussels.

Morris, R., H. Ongena and L. Schuknecht (2006), "The Reform and Implementation of the Stability and Growth Pact", ECB, Occasional Paper, No. 46, Frankfurt am Main.

THE FINANCIAL CYCLE AND THE EUROPEAN BUDGETARY REVERSAL DURING THE CRISIS: CONSEQUENCES FOR SURVEILLANCE

Niels Gilbert[*] *and Jeroen Hessel*[*]

We investigate from a real-time perspective the budgetary problems which emerged in EMU member states during 2008 and 2009. The estimated fiscal starting positions before the crisis were suboptimal, but do not fully explain the current problems. Another factor is the large budgetary reversal, which was sometimes larger than what budgetary rules were designed to deal with – especially in the euro-area periphery. This is due to the turn of the financial cycle and the correction of macroeconomic imbalances, which have a much larger budgetary impact than normal business cycles. Financial sector bailouts only play a modest role, more important are the deep downturn and the large decline in public revenue due to weak domestic demand. Real-time estimates of the cyclically-adjusted balance are unusually unreliable during these turns of the financial cycle, due to larger unreliability of potential GDP and the larger sensitivity of public revenues. It is therefore crucial to better incorporate the financial cycle in the budgetary surveillance framework, for instance via more robust government expenditure rules.

1 Introduction

The sovereign debt crisis in the euro area is often attributed to a lack of budgetary discipline. Part of this may be because the initial stage of the debt crisis was dominated by events in Greece, where lack of discipline was indeed a major concern (Lane, 2012). In any case, this diagnosis soon led to calls for a much stricter enforcement of European budgetary rules. According to Sinn (2010), what was needed is "*a new Stability and Growth Pact, one that would be formulated to impose ironclad debt discipline*". Since then, several improvements have been implemented, like the six-pack, two-pack and the Treaty on Stability, Coordination and Governance. These are important steps forward (De Haan *et al.*, 2012).

But as the debt crisis progressed, it was slowly recognized that lack of budgetary discipline may not have been the only reason for the budgetary problems (see also Gilbert, Hessel and Verkaart, 2013). Looking back, nobody had expected before the financial crisis that public finances would so quickly become a problem. The European Commission (2008) was still very optimistic in its public finance report from July 2008, only two months before the collapse of Lehman Brothers. The report stated: "*structural fiscal deficits are at their lowest levels since the early 1970s*". Especially Ireland and Spain looked perfectly healthy at the time, with budget surpluses and public debts of only 25 and 36 per cent of GDP. This raises the question whether a strict enforcement of the Stability and Growth Pact (SGP) could have prevented the budgetary problems.

To answer this question, we quantify and decompose the budgetary reversal in individual EMU member states during the financial crisis in 2008 and 2009. Rather than looking at *ex post* data, we take a pragmatic *real-time* perspective. We compare the budgetary outcomes for 2009 to the European Commission forecasts from the Spring of 2008 – just a few months before the global financial crisis erupted. We argue that this real-time perspective is the best way to appreciate the sheer size of the shock. It is also illustrates best the problems that policymakers faced, for several

---

[*] De Nederlandsche Bank, Economics and Research Division.
Contact details: Niels Gilbert: n.d.gilbert@dnb.nl, +31 20 524 3670; Jeroen Hessel: j.p.c.hessel@dnb.nl, +31 20 524 2828.
The views in this paper are our own and do not necessarily represent the views of De Nederlandsche Bank.

reasons. First, the budgetary process is often relatively lengthy, making it difficult to implement sudden policy changes.

Policymakers therefore usually make spending and tax decisions of a longer horizon. Second, fiscal health is usually assessed over a medium-term horizon, and projections for the budget balance are very important for this. Third, projections also play a crucial role in the European budgetary surveillance process, where the cyclically-adjusted budget balance is a key indicator.

We first establish that budgetary discipline before the crisis indeed was far from ironclad. As a result, several member states did not have the budgetary position to absorb large shocks when the crisis hit. At the same time, the financial crisis caused an unusually large fiscal deterioration, which was in several cases larger than what the budgetary framework in EMU was designed to deal with. In Spring 2008, the European Commission projected a 2009 budget deficit of 1.1 per cent of GDP in the euro area. The actual outcome of the budget deficit for 2009 amounted to 6.3 per cent of GDP, which was 5.2 percentage points higher than foreseen. The deterioration was even larger in the EMU periphery. In Portugal, Ireland, Greece and Spain, the 2009 budget deficit increased by 11.2 per cent of GDP on average. Also countries that had stuck to the rules of the Stability in Growth Pact got into trouble because of this reversal.

We then argue that the unusually large budgetary reversal in some euro-area countries is related to the turn of the financial cycle, which corrected the macroeconomic imbalances that had built before the crisis. By decomposing the rapid fiscal deterioration, we establish that stimulus and financial sector bailouts played only a modest role. The deterioration is primarily caused by the deep and prolonged downturn itself. Not only was the economic downturn extremely severe, in multiple countries public finances were also much more sensitive to the slowdown than expected on the basis of the standard elasticities. This effect was concentrated on the revenue side, and amounted up to 3.5 per cent of GDP in Spain and Portugal. We find that the unexpected decline in revenues is strongly correlated with the decline in domestic demand and with the size of imbalances before the crisis.

We also establish that the real-time estimates of the cyclically-adjusted balance are even more unreliable than usual during turns of the financial cycle. The real-time cyclically-adjusted balance for 2009 increased by 4.3 per cent of GDP on average, and even by 8.7 per cent on average in Greece, Ireland, Portugal and Spain. This is due to an unusually large unreliability of potential GDP during turns of the financial cycle, as well as due to a larger than normal sensitivity of public revenues. With hindsight, real-time estimates of the structural budget balance before the crisis were a near worthless indicator.

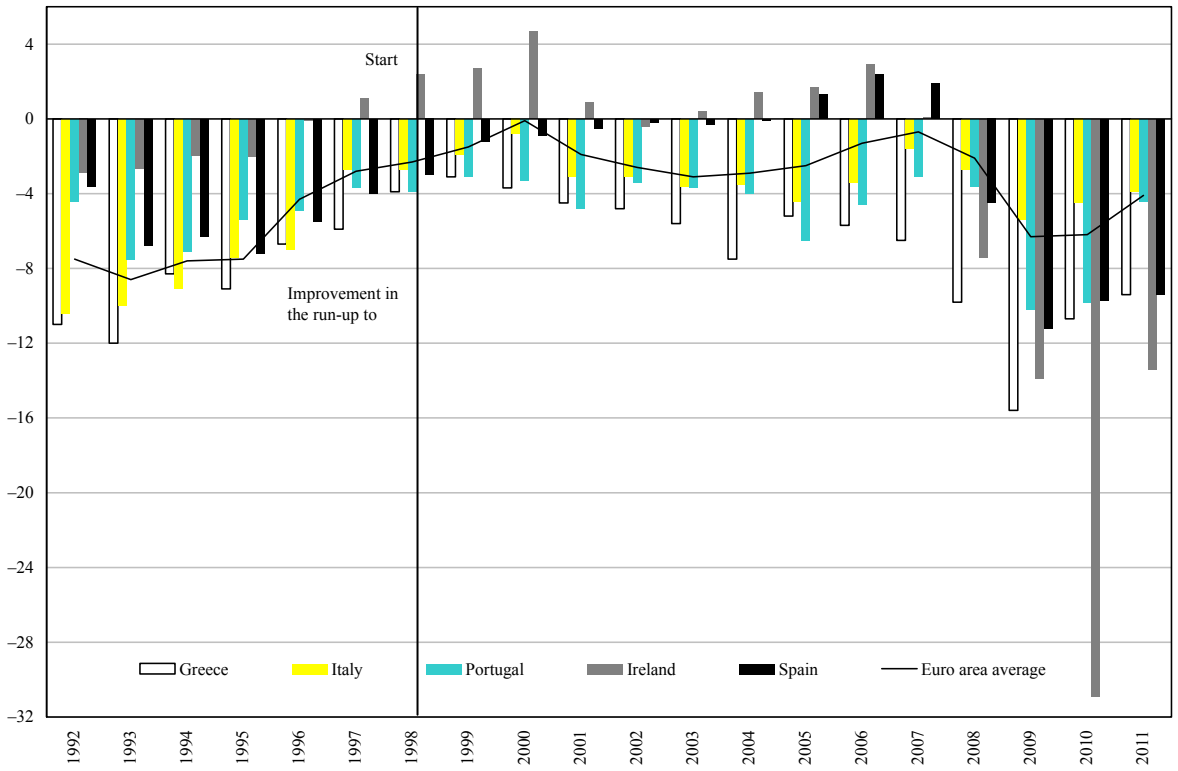
We conclude with policy implications. To prevent future budgetary crises countries must create larger buffers in good times. This does not only require iron-clad discipline, but also more robust indicators of the underlying fiscal situation. To this end, it is crucial to better incorporate the financial cycle in the budgetary surveillance framework and in the calculations of the cyclically-adjusted budget balance. It also means that more attention should be given to the growth of government expenditure, which we show to be a solid predictor of budgetary problems during 2009. Paying due attention to the financial cycle in real-time will prove complicated and requires expert judgment. We argue that such discretion is best placed in the hands of a fully independent budgetary authority (De Haan *et al.*, 2013).

2 Compliance with the SGP and the budgetary starting position

The dire fiscal situation in EMU member states is often attributed to a lack of budgetary discipline, and to some extent rightly so. Although many countries had improved their budgetary

Figure 1

Budget Discipline in the Euro Area



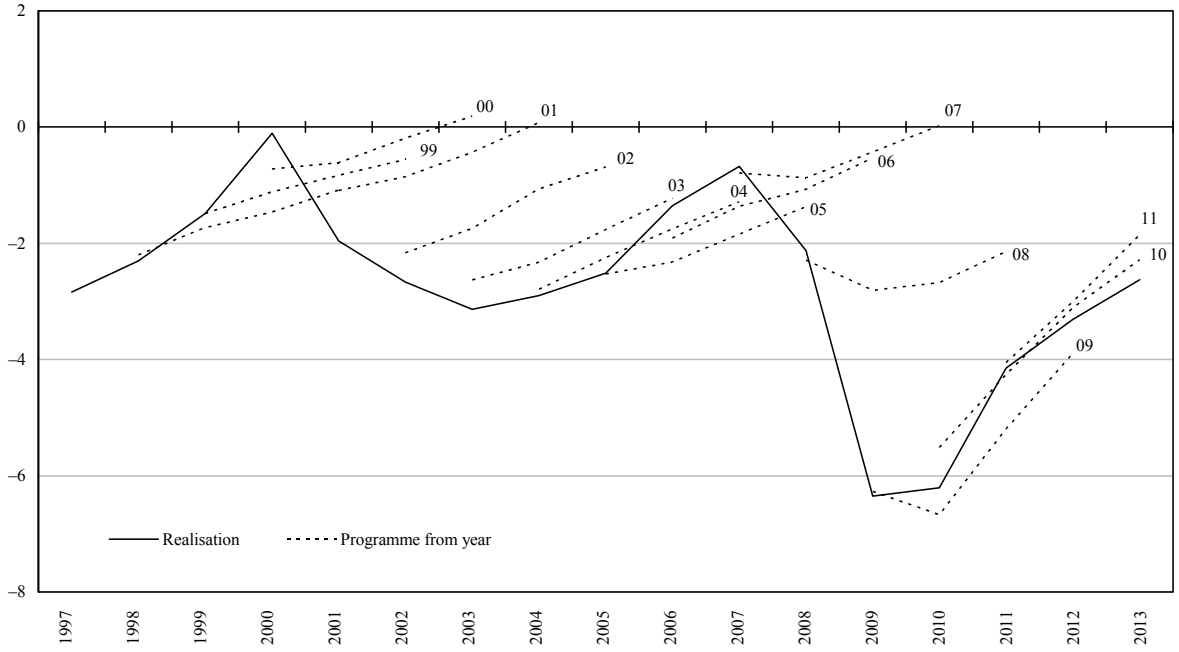
positions in the run-up towards EMU-membership (Figure 1), it is by now well documented that several countries loosened their belt considerably once their place in the monetary union was secured (CPB, 2011). Whereas EMU-accession was a credible carrot, the Stability and Growth Pact (SGP) lacked credible sanctions to enforce discipline thereafter. As is by now well-established, the Ecofin Council proved to be too politicized to provide sufficient peer pressure and to ensure an effective enforcement of EMU's budgetary rules (De Haan *et al.*, 2004). This became most clear in 2005, when the Council failed to impose sanctions when Germany and France were running excessive deficits.

Nevertheless, Figure 1 also illustrates that the 3-per-cent rule was still relatively well adhered to for the euro area as a whole. It however served more as a benchmark for the average deficit than as an upper limit. Only twice was a balanced budget within sight, in 2000 and 2007 (during economic booms), when the average euro-area budget deficit dipped below 1 per cent. The preventive arm of the SGP, which stipulates that countries should aim for a balanced budget over the cycle, thus clearly failed.

The failure of the preventive arm of the SGP, and thereby the failure to create buffers in economic good times, is most clearly reflected in Figure 2. Whereas EMU member states submitted Stability Programs to the European Commission in which they outlined how they would reach a balanced (cyclically adjusted) budget balance, the budgetary adjustment that was actually implemented in practice was much less ambitious (Beetsma, Giuliodori and Wierts, 2009). An important reason behind the failure of the preventive budgetary supervision in EMU was the lack of any formal enforcement mechanism in the preventive arm of the Stability and Growth Pact (De Haan *et al.*, 2012).

Figure 2

Weighted Average, Euro-12 Budget Deficit, Plans vs. Outcome
(percent of GDP)



Source: EC and national stability plans of the respective countries. Figure based on Wierts (2006).

As a result of all this, both budget deficits and government debts were much higher than they could have been if the rules of the SGP had been fully adhered to. Several EMU member states did not have the budgetary starting position that was necessary to absorb large economic shocks when the crisis hit. Only a small subsection of EMU member states had achieved their medium term objective (MTO) for the cyclically-adjusted budget balance in 2007, and some countries still had an actual budget deficit above the threshold of 3 per cent of GDP (Table 1, which is based on numbers from the European Commission Spring Forecast 2008 – with the exception of Greece – and thereby provides a real-time estimate of the budgetary situation). Government debt was also too high in many countries, with an average debt ratio of 66 per cent of GDP for the euro area as a whole (see Table 1).

The bad starting position was most obvious in some of the current problem countries: Greece, Portugal and Italy. But it was completely absent in Spain and Ireland, that had budget surpluses and very low government debts in 2007. Indeed, there turns out to be very little correlation between the budgetary performance before the crisis and the size of sovereign bond spreads now (Pisani-Ferry, 2012). The countries with the most infringements of the SGP before the crisis were Germany and France. Lack of budgetary discipline is therefore not sufficient to explain the budgetary crisis that started during 2009.

3 Major budgetary reversal during the crisis

Another important cause of the current debt crisis is the large and sudden deterioration of the fiscal position that occurred as a result of the global financial crisis (Gilbert and Hessel, 2012). The

Table 1

Budgetary Starting Situation in 2007
(percent of GDP)

	GR*	PT	FRA	ITA	EMU	GER	NL	IRL	SP
Budget balance	–6.4	–3.1	–2.7	–1.5	–0.7	0.3	0.2	0.1	1.9
Cyclically-adjusted budget balance	–7.1	–2.6	–2.6	–1.3	–0.8	–0.1	0.1	0	2.1
Government debt	105	68.3	63.9	104	66.2	64.9	45.3	25	36.1

Source: EC Spring Forecast (2008).
* For Greece, numbers from after the revision of budgetary aggregates in 2009 are reported.

2009 recession was a major one, with an 4.4 per cent decline of euro-area GDP in 2009. The average budget deficit increased from 2.1 in 2008 to 6.3 per cent in 2009. Those are big numbers. Yet, the actual shock experienced by policy makers was even bigger. These *ex post* numbers for 2009 do not fully capture this: part of the shock for instance already took place in the second half of 2008.

Perhaps the best way to truly capture the severity of a shock is therefore to compare what actually happened to what was expected to happen in the plans and projections of policymakers. The European Commission was still relatively optimistic in the 2008 Spring Forecast, just a few months before the collapse of Lehman Brothers. The Spring Forecasts expected GDP growth of 1.7 in 2008 and 1.5 per cent in 2009. The average budget deficit in 2009 was projected to be only 1.1 per cent of GDP for the euro area, which would have been the third-lowest deficit since the inception of EMU.

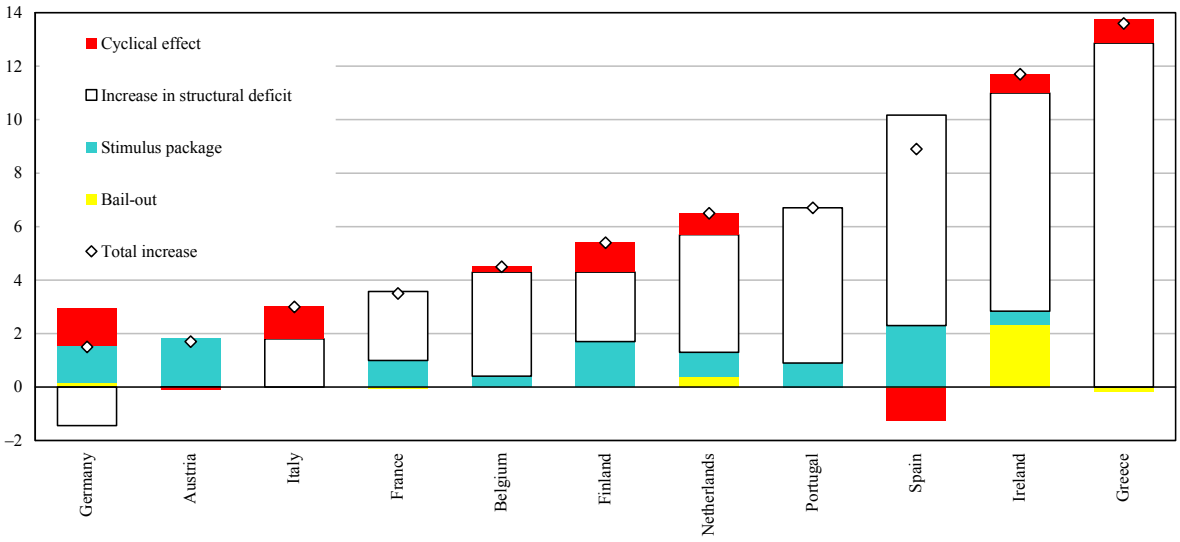
Unfortunately, the actual deficits for 2009 were much larger than foreseen just before the crisis. The average budget deficit for the euro area eventually amounted to 6.3 per cent of GDP for 2009, which is 5.2 per cent higher than foreseen. The budgetary effects of the European stimulus package and of financial sector support explain part of the increase in the deficit in almost all countries (Figure 3). But with the exception of Germany and Austria, most countries had an even larger endogenous increase in the budget deficit. As a result of this increase, almost all member states breached the 3-per-cent threshold for the budget deficit in 2009, including the countries that stuck to the rules before the crisis and were expecting to run surpluses. EMU countries would therefore only have been able to stay within the 3-per-cent deficit ceiling if they had originally targeted – on average – a surplus of over 2 per cent of GDP for 2009.

The differences between EMU member states are surprisingly large (Figure 3). The deterioration of public finances was by far the largest in most of the countries that are currently under pressure from financial markets, with the exception of Italy where the increase in the deficit was relatively contained. In Portugal, Ireland, Greece and Spain, the budget deficit for 2009 increased by an enormous 11.2 per cent of GDP on average.[1] In these countries, by far the largest part of the increase in the deficit was endogenous. The budgetary reversal was in some cases much larger than what the budgetary rules were designed to deal with. The higher deficits are also the main factor behind the substantial increase in government debt in the euro area. The average debt in the euro area increased by almost 22 per cent of GDP between 2007 and 2011. In Portugal,

[1] The situation in Greece differs in one important aspect from the situation in the other countries, as the deterioration of the (actual) deficit is partly driven by an upward revision of the deficit figures for previous years.

Figure 3

Difference Between the Forecast and the Realization of the 2009 Deficit



Sources: EC, Eurostat. Calculated between the projections in the European Commission Spring Forecasts 2008 and the realizations in the Spring Forecast 2012.

Ireland, Greece and Spain the debt ratio increased by 51.2 per cent of GDP on average between 2007 and 2011. Budgetary stimulus packages played a marginal role and the financial sector bailout only had a significant effect on debt in Ireland, but the Irish debt also increased strongly without these costs.[2] These results are in line with Reinhart and Rogoff (2009a, 2009b), who show that financial crises usually lead to a large increase in government debt, caused primarily not by financial sector bailouts but by the deep and prolonged economic downturn.

Remarkably, a major share of the deterioration of the budget balance translated into a deterioration of the cyclically-adjusted budget balance (Figure 3) – which should in theory be immune to the cycle. The estimated cyclically-adjusted deficit for 2009 increased by 4.3 per cent of GDP on average, excluding the effects of bank bailouts and stimulation packages. But the increase was an even larger 8.7 per cent of GDP on average in Portugal, Ireland, Greece and Spain. While it is well-known that the cyclically-adjusted deficit can be unreliable in real time, especially around turning points in the business cycle (Hughes Hallet, Kattai and Lewis, 2012), it is not familiar that the uncertainty can be this large. Even the countries that fulfilled all the requirements of the SGP and thought they had an adequate safety margin, must conclude in retrospect that the figures provided a much too rosy picture. Even ironclad enforcement of the requirements of the SGP could therefore not have prevented all problems.

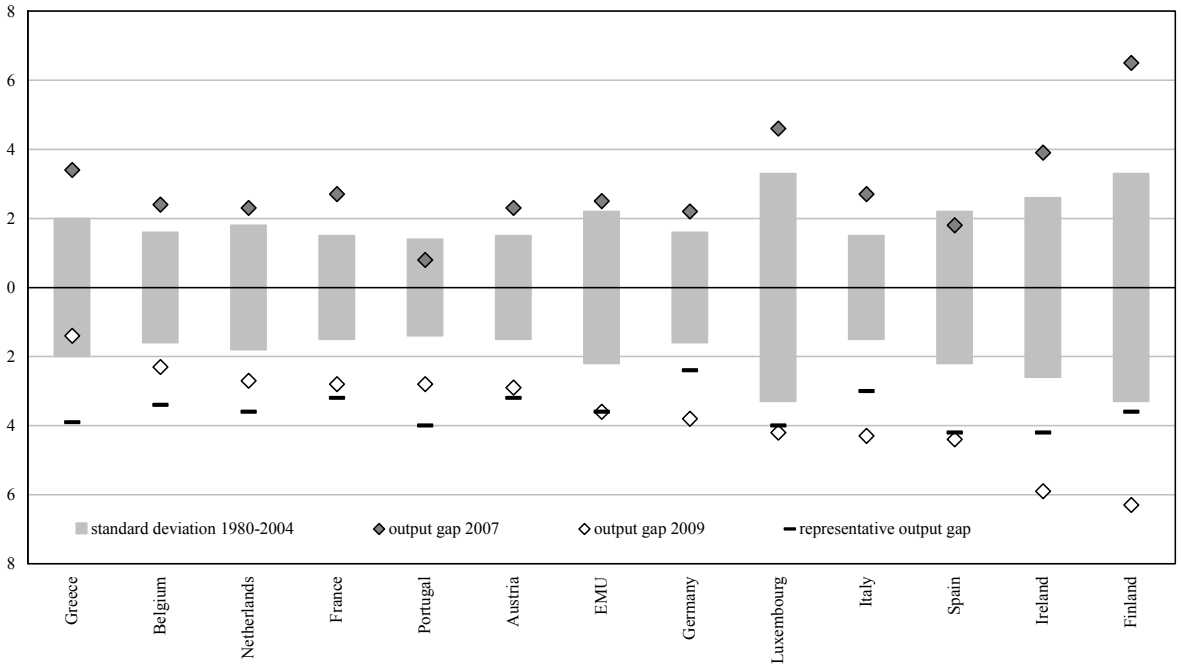
4 Financial cycle affected the size of the shock

An important question is *why* the economic downturn could cause such a large swing in the budgetary position of member states. This seems to be because the crisis was not a turn in the

[2] Fears of bigger financial sector losses could of course have contributed to rising bond yields in various countries; in addition their might also still be an unpaid bill in several countries.

Figure 4

The 2009 Output Gap in Historical Perspective



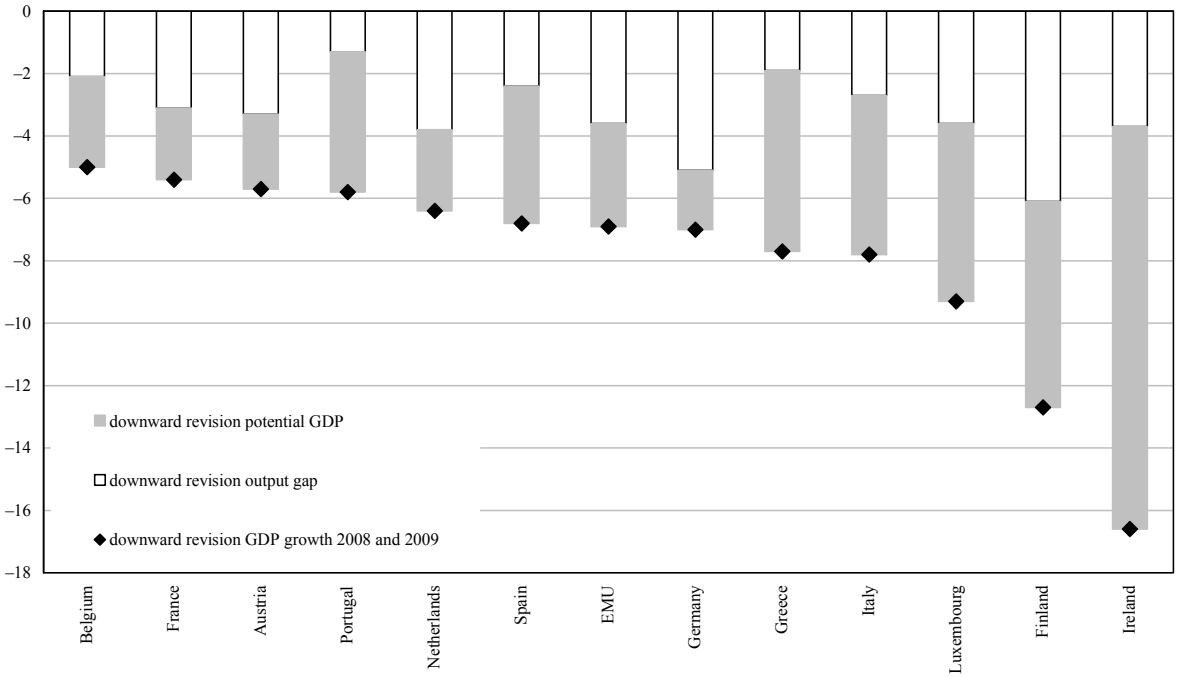
Source: The standard deviation and the representative output gap come from European Commission (2006), *Public Finances in EMU 2006*. The output gaps from 2007 and 2009 come from the Spring Forecasts (2012).

normal business cycle, but a turn in the financial cycle. This turn led globally to a correction of the macroeconomic and financial imbalances that had been building over much of the decade before the crisis. In the euro area, this correction was largest in the countries in the periphery, that had large current account deficits, driven by strong and persistent growth in credit, house prices and unit labour costs. Recent research into the characteristic of the financial cycle show that i) it is driven by growth in credit and house prices, ii) it has a much longer duration and a wider amplitude than normal business cycles, and iii) the correction of the financial cycle is often accompanied by a financial crisis (Drehmann, Borio and Tsatsaronis, 2012; Borio, 2012a,b). Recent research also underlines that a turn of the financial cycle has a much larger negative impact on public finances than a turn of the normal business cycle (Borio, 2012b; Bénétrix and Lane, 2012). As the normal methods of cyclical adjustment do not correct properly for the budgetary effects of the financial cycle, the real-time estimates of the cyclically-adjusted balance are even more unreliable around a turn of the financial cycle than usual.

The fiscal effects of the financial cycle run through two channels. This paragraph describes the first channel, which is GDP growth. The financial crisis was an unusually large negative shock. One may wonder whether the medium-term objectives for the cyclically-adjusted budget balance under the SGP provide an adequate safety margin for such big shocks. After all, they were calculated over the period 1980-2005 (European Commission, 2006), when growth was relatively stable due to the so-called Great Moderation. A comparison of *ex post* realizations of the output gap indeed underlines that the cyclical swing surrounding the financial crisis was larger than usual (Figure 4). In most countries, the output gap *before* the crisis – in 2007 – was more positive than the historical standard deviation between 1980 and 2004. Meanwhile, the output gap *during* the crisis – in 2009 – was much more negative than usual. Nevertheless, and surprisingly, the negative

Figure 5

Downward Revision GDP Growth, 2008 and 2009



Difference between projections in the Spring Forecasts 2008 and the outcome in the Spring Forecast 2012. The output gap and potential GDP are measured in levels, while GDP growth is measured as the cumulative growth in 2008 and 2009.

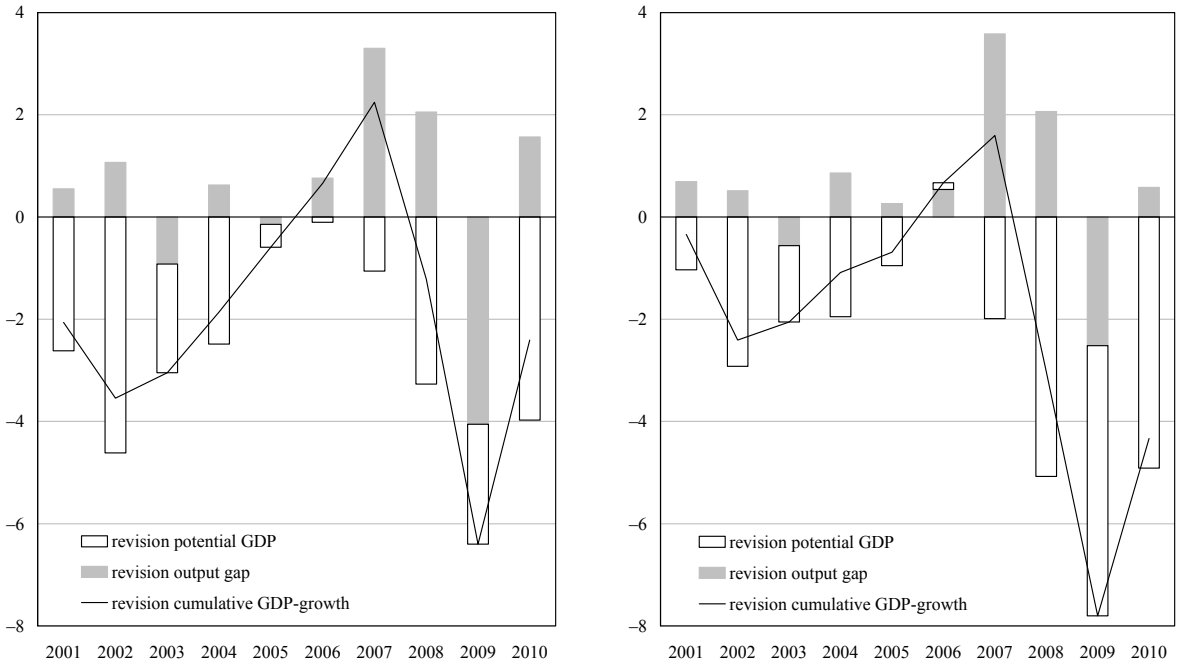
output gap in 2009 was for most countries more or less comparable with the so-called *representative* output gap that the European Commission uses to calculate the individual benchmarks (Medium Term Objectives, or MTOs) for the cyclically-adjusted budget balance.[3] In theory, the MTOs should therefore have provided an adequate safety margin for most countries.

Crucially however, the change in the *ex post* calculations of the output gap during the crisis do not capture the entirety of the recession. They may therefore underestimate the potential budgetary impact. In *real time*, the slowdown in growth *vis-à-vis* the projections was much larger than can be derived from the (*ex post*) output gap alone. Total GDP-growth over 2008 and 2009 for the euro area was, for instance, almost 7 percentage points lower than projected before the crisis (Figure 5). These slowdowns also lead to a downward revision of the real-time structural balance, because the real-time estimate of potential growth declines (European Commission, 2007). Potential growth is overestimated during upswings, for instance because high growth is projected to continue. The slowdown leads to the realization that growth was more temporary than previously thought. This has also played an important role during the financial crisis (Figure 5). In addition to the decline in the output gap, the level of potential GDP was also revised downward. In most countries, the downward revision of potential GDP was even larger than the revision of the output gap. The downward revision of potential GDP is one of the explanations why the budgetary safety margins that were estimated as adequate in real time, turned out to be inadequate *ex post*.

[3] The representative output gap for each member state is calculated as the average of the highest and the lowest value of three alternatives: i) the largest negative output gap in the period 1980-2004, ii) the unweighted average of the largest negative output gaps in the period 1980-2004 or iii) two times the country-specific standard deviation of the output gap taken with minus sign. See European Commission (2006).

Figure 6

Real-time Revisions in GDP Growth, Output Gap and Potential GDP, 2001-10



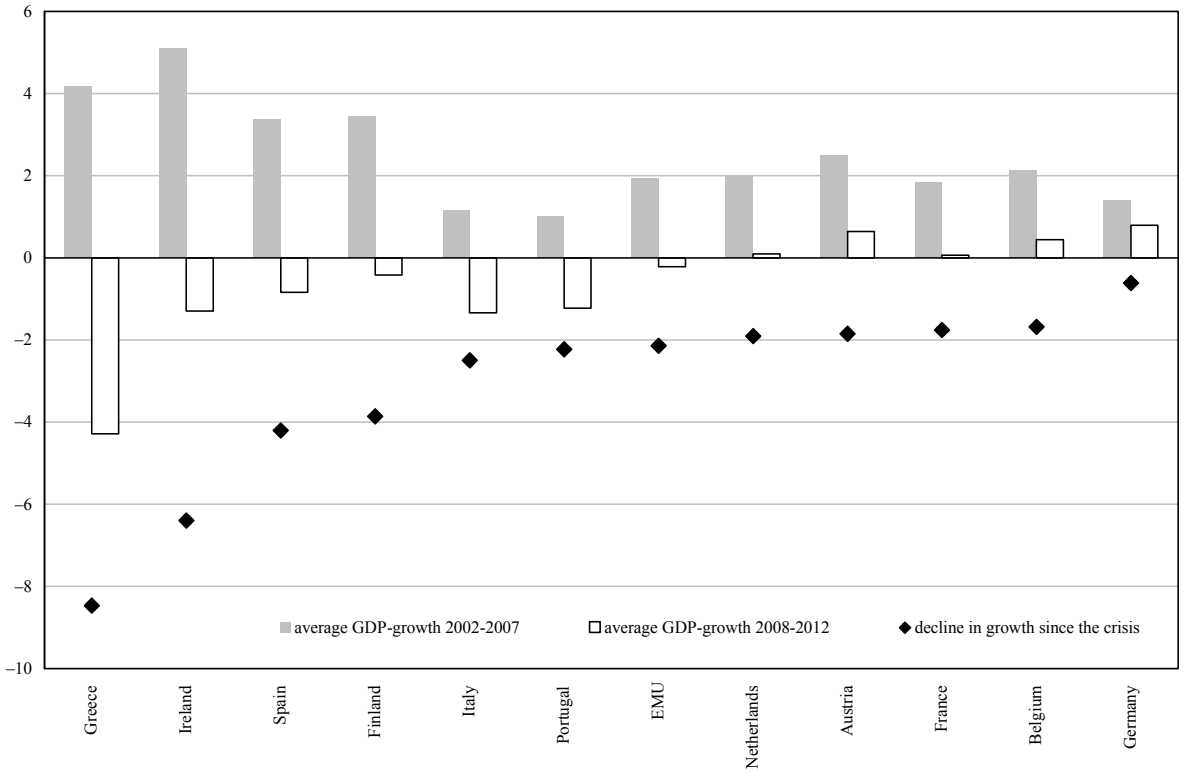
Explanation: Calculated is the difference between i) the projection in the Spring Forecast in the year preceding the relevant year (*t*–1) and ii) the outcomes in the Spring Forecast two years after the relevant year (*t*+2). The output gap and potential GDP are measured in levels, while GDP-growth is measured as the cumulative growth in the relevant year and in the year before. The core countries are Austria, Belgium, Germany, the Netherlands, Finland, France and Luxemburg. The peripheral countries are Greece, Ireland, Italy, Portugal and Spain.

The unreliability of the cyclically-adjusted budget balance is by now a well-known phenomenon, that also played an important role during the European recession in 2002. However, the unreliability of potential GDP in real time may be larger than usual during a major economic shock like the financial crisis. Indeed, recent research suggest that normal calculations of potential GDP do not adequately take into account the effects of the financial cycle (Borio, Disyatat and Juselius, 2013). The conventional methods to calculate potential GDP are suitable for fluctuations at the frequency of the business cycle, which is thought to be up to 8 years. By contrast, the frequency of the financial cycle is thought to be roughly between 16 and 20 years. These longer-term fluctuations in the financial cycle therefore appear to be of a structural nature in the conventional methods of cyclical adjustment.

A comparison of the real-time revisions of potential GDP since the start of EMU indeed provides some indications that potential GDP – and hence the structural budget balance – is more unreliable around turning points for the financial cycle (Figure 6). We repeat our calculations on the downward revisions in growth for 2009 above for all years since the start of EMU. Calculated is the difference between i) the projection in the Spring Forecast in the year preceding the relevant year (*t*–1) and ii) the outcomes in the Spring Forecast two years after the relevant year (*t*+2). As expected, the downward revisions of potential GDP can be substantial, especially around turning points in the business cycle. For the *core* countries in the euro area, the downward revision of potential GDP in 2009 was not particularly large (Figure 6a). It was smaller than the downward

Figure 7

GDP Growth Before and After the Crisis



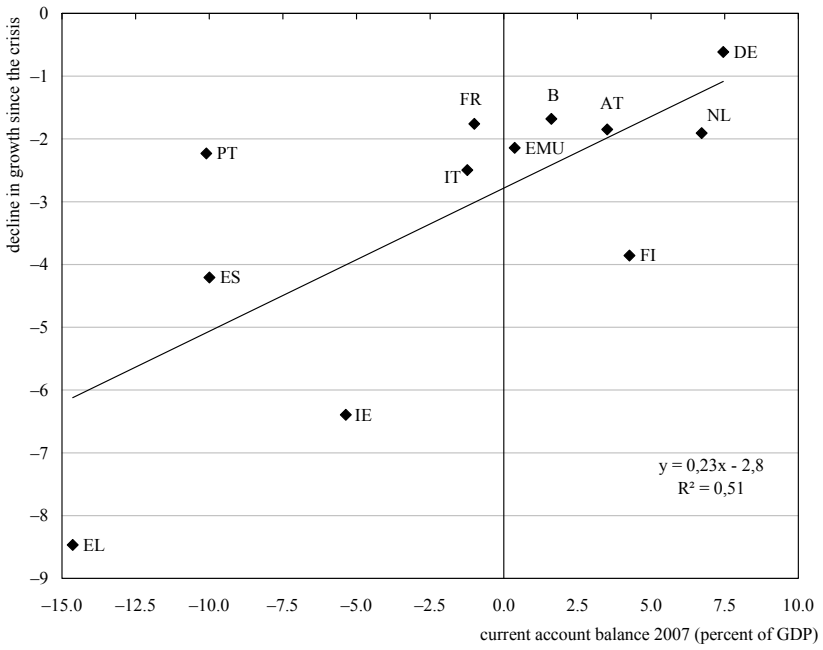
revision in 2002, when projections turned out to be overly optimistic after the bursting of the dotcom-bubble. As the macroeconomic and financial imbalances in these core countries were relatively small, the financial cycle was also relatively mild. The downward revision of growth for 2009 was therefore mainly of a cyclical nature.

By contrast, it is striking that the downward revision of potential GDP in 2009 was – on average – far larger in the countries in the periphery of the euro area (Figure 6b). For these countries, the downward revision is larger than in 2002, when several of these countries experienced only mild recessions on the back of strong growth in house prices, credit and domestic demand. But as these countries had accumulated large macroeconomic and financial imbalances before the crisis, the turn of the financial cycle was especially severe. While the total downward revision in growth was – on average – only somewhat higher than in the core countries, the downward revision of potential GDP is much larger (Figure 6b). The slowdown in the periphery is more of a structural nature than of a cyclical nature.

Indeed, several of the countries in the periphery have experienced a much larger and much longer lasting slowdown in GDP growth, due to the turn of the financial cycle and the correction of macroeconomic imbalances (Figure 7). While several peripheral countries were growing rapidly in the five years before the crisis (2002-07), all of them have experienced negative GDP-growth on average in the five years since the crisis (2008-12). By contrast, Germany has experienced only a very gradual decline in average GDP-growth, notwithstanding the large decline in 2009 itself. There is indeed a relatively clear relationship between this decline in average GDP growth an the size of the macroeconomic imbalances before the crisis – proxied by the current account balance in 2007 (Figure 8). Part of the downward revisions in potential GDP can thus be traced back to the financial cycle.

Figure 8

Imbalances and Decline in GDP Growth



How has this affected the change in the budget deficit for 2009? The downward revision of potential growth explains an important part of the increase in the structural budget balances in many member states (Figure 9). The effect amount to around 2.5 per cent of GDP on average. However, it is far from the only explanation for the budgetary reversal during the crisis, as the downward revision of potential GDP explains only part of the structural budgetary deterioration. Especially in the countries in the periphery of the euro area, other factors have been more important. This brings us to the second channel through which the financial cycle affects public finances.

The second reason for the large swing in the budget balances is that public finances were much more sensitive to the slowdown than expected. In many countries, the increase in the budget deficit was larger than could be foreseen on the basis of the decrease in GDP growth and the standard budgetary sensitivities that had been estimated over a longer period. This underestimation of the budgetary sensitivity amounted to around 1.5 per cent of GDP on average in the euro area, but the effects differ widely between euro-area countries (Figure 9). There was almost no underestimation in France and Italy, while the budgetary sensitivity was even overestimated in Germany, Austria and Finland. By contrast, the underestimation was especially severe in the peripheral countries Portugal, Spain and Greece. Together with the decline of potential GDP, this underestimation explains why the budgetary reversal in these countries was so large, and why the estimated structural deficit increased so much.

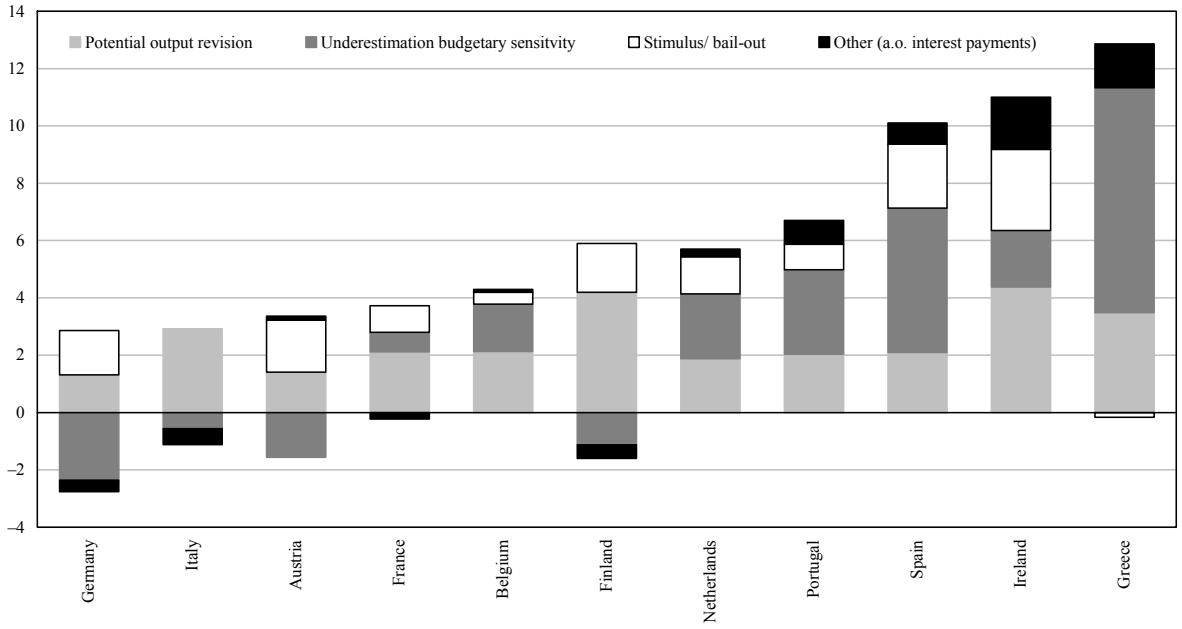
This higher sensitivity was concentrated on the revenue side, with the exception of Greece, where expenditure increased due to data revisions, and Belgium (Figure 10).[4] This confirms that the underestimation is not related to lack of budgetary discipline, as this would primarily lead to higher government spending. The effect was most pronounced in the countries that are currently under pressure from financial markets, and amounted up to a massive 3.5 per cent of GDP in Spain and Portugal.

---

[4] The budgetary sensitivity tells us how much the primary EMU-balance changes when growth (or formally, the output gap) changes 1 percentage point and is built up by combining estimates of revenue and expenditure sensitivities. Sensitivities are calculated by computing the respective elasticities and then weighing them by their share in GDP (EC, 2006). We compute the *ex post* elasticity of expenditure as follows: ((2009 primary expenditures – stimulus – bail-out) – forecasted 2009 primary expenditures) / forecasted 2009 primary expenditures. The weight used to translate this into a sensitivity is the average share of primary expenditure (minus stimulus and bail-out costs) in GDP in the forecast for 2009 and its realization. Revenue sensitivity is calculated similarly.

Figure 9

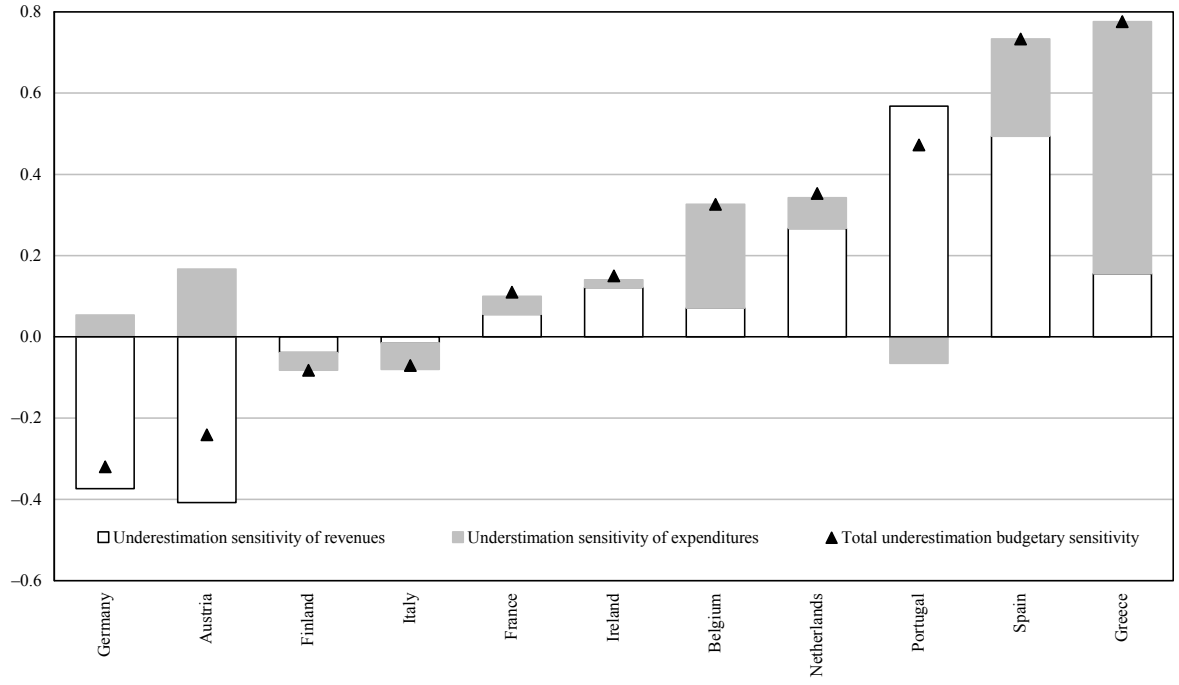
Deterioration of Structural Budget Balance, 2009



Sources: EC, Eurostat, own calculations. Calculated between the projections in the European Commission Spring Forecasts 2008 and the realizations in the Spring Forecasts 2012.

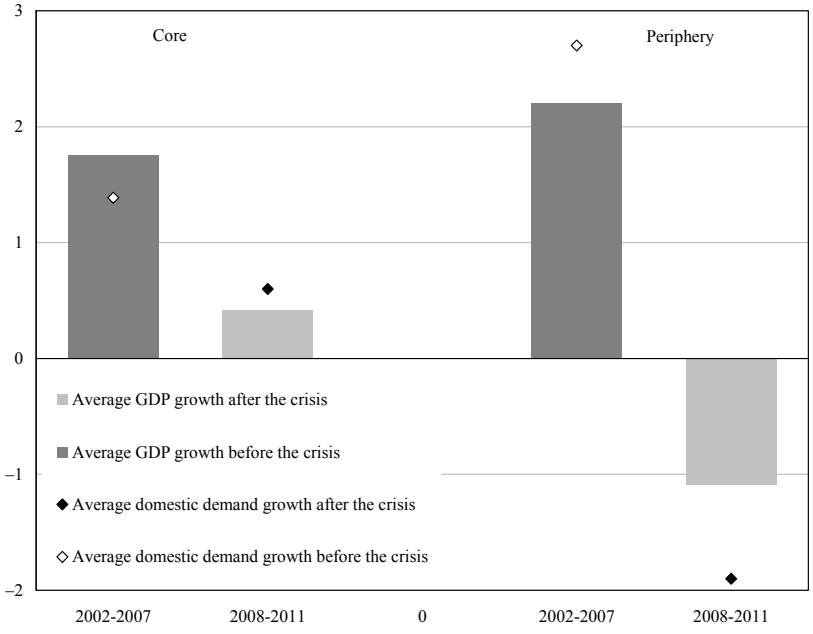
Figure 10

Underestimation of Budgetary Sensitivities, 2009



Source: EC, own calculations.

Figure 11 Growth of GDP and Domestic Demand



5 Financial cycle affected government revenue

The explanation for the unusual decline in revenue is again that the recession in 2009 coincided with a severe turn of the financial cycle, especially in Greece, Ireland, Italy, Portugal and Spain. Recent research shows that such financial cycles have large effects on government revenues that go beyond the effects of GDP growth described above (Bénétrix and Lane, 2011; Borio, 2012b). Booms lead to a large temporary increase in government revenues. Rising asset prices increase revenues in capital gains and transaction taxes, while wealth effects drive up the share of domestic demand in the economy and thereby the revenues from indirect taxes (Eschenbach and Schuknecht, 2004; Dobrescu and Salman, 2011; Lendvai, Moulin and Turrini, 2011). These temporary revenues are usually mistaken for structural improvements. The current methods of cyclical adjustment do not only overestimate potential GDP during the upswing in the financial cycle (as mentioned above), they do not correct properly for the variation in the sensitivity of government revenue either. The temporary tax windfalls therefore usually lead to procyclical government spending, until the turn in the financial cycle causes an unusually strong decline in revenue.

The periphery of the Eurozone indeed experienced a much stronger swing in domestic demand than other member states, due to the correction of macroeconomic imbalances (Figure 11). For core countries of the euro area, the average decline in domestic demand growth since the financial crisis is somewhat smaller than the decline in GDP growth. By contrast, for the periphery of the Eurozone the decline in domestic demand growth is much larger than the – already sizeable – decline in GDP growth. Domestic absorption was unusually strong in the periode 2002-07, but this has reversed dramatically in the period 2008-11. This is a major factor behind the unexpected decline in revenues. The size of this unexpected decline in revenues in 2009 is strongly correlated with the size of imbalances before the crisis – again proxied by the current account balance in 2007 (Figure 12).

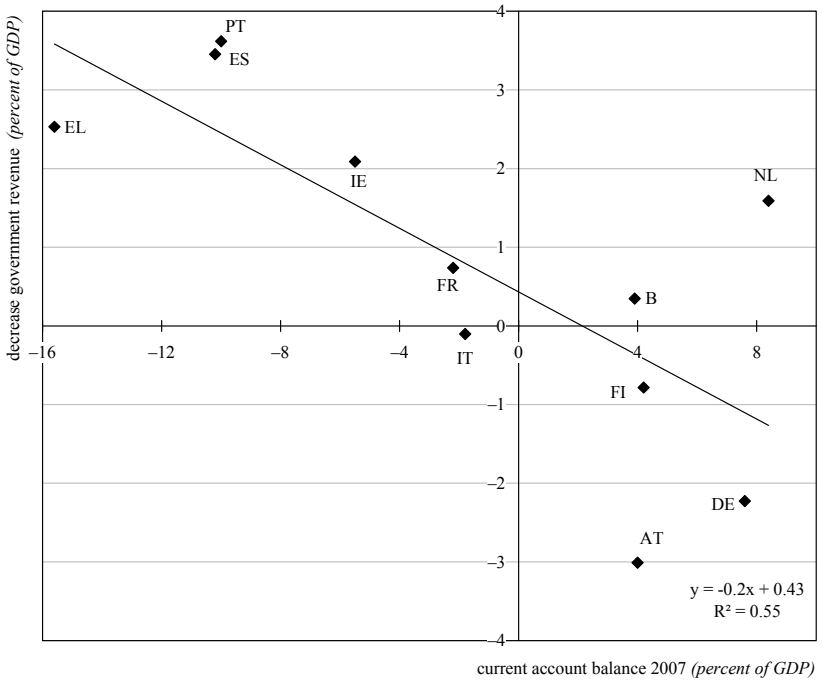
6 Conclusion and policy implications

Our analysis implies that the improvements in budgetary discipline that have been implemented since the start of the debt crisis are very necessary, but may not be sufficient to

prevent the type of budgetary problems that we currently face.[5] The preventive arm of the Stability and Growth Pact has been strengthened, but continues to rely strongly on estimates of the cyclically-adjusted balance (CAB). The budgetary effects of the financial cycle have not yet been incorporated in the framework.

Figure 12

Imbalances and Sensitivity of Public Revenue



While reliance on the CAB makes perfect sense in theory,[6] the CAB proves very unreliable in real time, especially around turns in the financial cycle. The implications hereof are illustrated in Figure 13. The real-time estimate of the 2008 CAB is only slightly correlated with the actual deficit during 2009. Countries that were thought to have a solid structural fiscal position on average did not do much better during the crisis than the countries without such a solid position. The practical usefulness of (unadjusted) real-time estimates of the CAB therefore seems limited under the current circumstances. Financial cycles worsen the unreliability of the cyclically-adjusted budget balance considerably, especially in real time. This is not only due to a larger unreliability of potential growth around turning points of the financial cycle, but also because the larger sensitivity of public revenues.

European budgetary surveillance should therefore pay much more attention to the effects of the financial cycle on public finances. This could eventually prevent that temporary revenues are spent, and contribute to higher buffers in good times. One potential avenue to strengthen surveillance is to better assess the effects of the financial cycle on potential growth, public revenue and on estimates of the CAB. For example Bénétrix and Lane (2011), Dobrescu and Salman (2011) and Lendvai, Moulin and Turrini (2011) already try to improve the estimation of the structural budget balance by including indicators for the financial cycle, such as credit growth, current account balances or domestic absorption gaps. This improves the *ex post* estimation of the structural position, sometimes by up to several percentage points. However, there is no evidence yet on how such estimates behave *in real time*. The unreliability may still be relatively high, because it remains difficult to measure the exact size of financial imbalances in real time. This is an important question for further research.

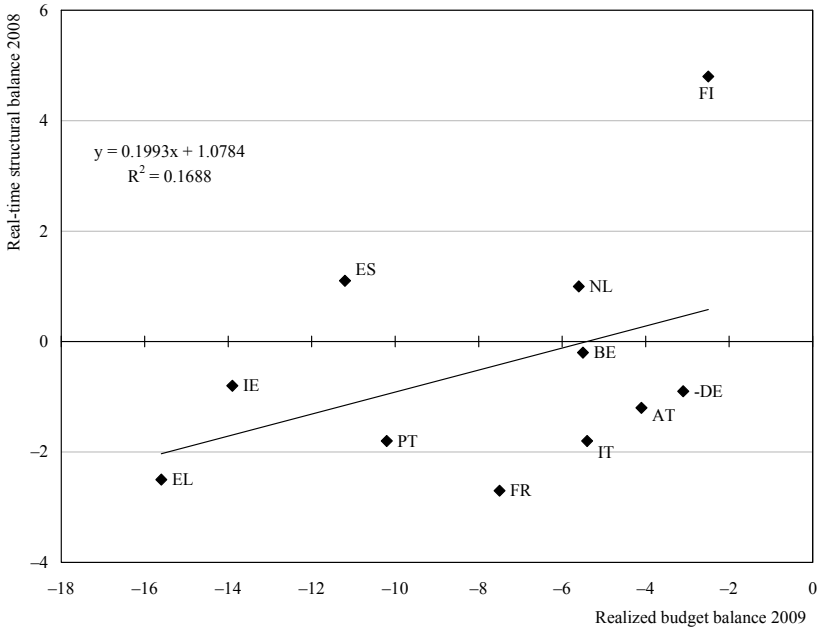
---

5 The new rules are included in the so-called sixpack, two-pack and fiscal compact.

6 As one might expect, the *ex post* estimate of the 2008 CAB (the underlying budgetary "starting position" before the crisis) is strongly correlated with the actual deficit during 2009 (correlation of 0.93). Countries with better starting positions thus also fared better during the crisis.

Figure 13

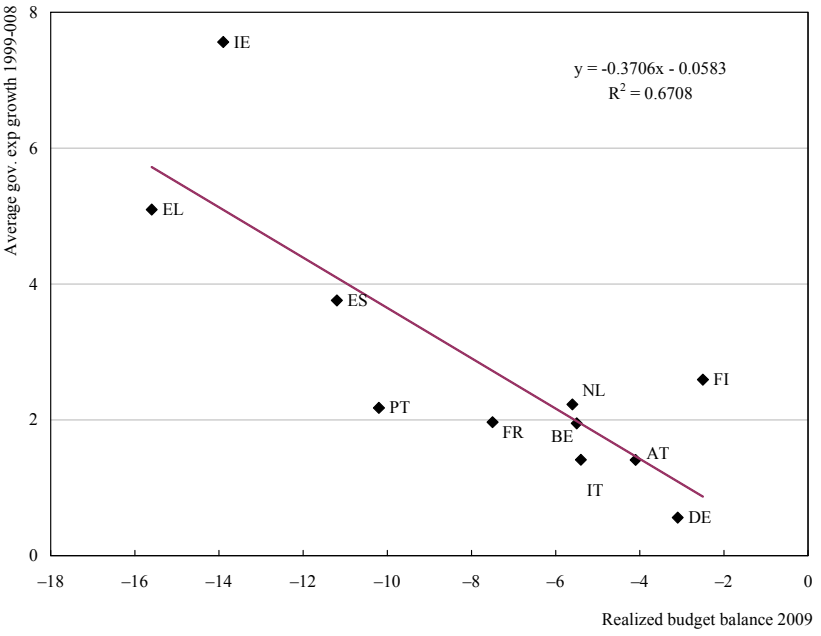
Real-time CAB as Predictor of 2009 Deficit



Source: EC Spring Forecast 2008, Eurostat.

Figure 14

Expenditure Growth as Predictor of 2009 Deficit



Another possible avenue is to develop complementary, more robust indicators of the health of public finances. It seems particularly worthwhile to keep an eye on real public expenditure growth. While the faults of the CAB mainly lie on the revenue side, the expenditure side of the budget is less dependent on cyclical developments and offers a wider range of possibilities for discretionary policies (CESifo, 2004). As shown in Figure 14, the annual growth of government expenditures in the years before the crisis (1999-2008) is a surprisingly good predictor of fiscal developments during the crisis. Countries with high expenditure growth before the crisis fared badly, as this expenditure growth proved unsustainably and backfired when revenues decline during the during the crisis.

From this perspective, it is a major improvement that the Stability and Growth Pact now also contains an expenditure benchmark. This stipulates that annual expenditure growth net of discretionary revenue measures cannot exceed a reference rate of potential GDP growth (Pench, 2012). Although this still makes the rule dependent on (some sort of average of) real-time

estimates of potential GDP, it is not dependent on budgetary sensitivities. In this way, one major source of uncertainty is removed. As shown by Hauptmeier *et al.* (2010) a real-time expenditure rule would have performed decently in the first decade of EMU. It is however a missed opportunity that the expenditure benchmark will be used only to evaluate progress towards the MTO. The monitoring of expenditures will therefore still only play a secondary role in the current SGP (Schuknecht *et al.*, 2011).

A better implementation of budgetary rules and a better assessment of the budgetary effects of the financial cycle would create a larger safety cushion against major shocks. However, it requires unrealistically high budget surpluses to cushion a budgetary reversal as large as the euro-area periphery experienced during the crisis. It therefore is at least as important to reduce the risks of macroeconomic and financial imbalances themselves. To some extent, stricter fiscal discipline might help prevent busts, as booms will no longer be fuelled by excessive government expenditures. But additional improvements in the governance of the Eurozone is necessary. In this respect, especially the macroeconomic imbalances procedure (MIP) offer clear steps in the right direction. The MIP provides a starting point to recognize persistent divergences. At the same time, member states should become much better equipped to contain financial cycles within the euro area. Especially strong macro prudential policy frameworks are very important instruments to counteract financial cycles.

Finally, a thorough assessment of the budgetary effects of the financial cycle – such as the *real-time* assessment of potential growth and financial imbalances – will not be easy and will most likely require discretionary expert judgment. Any procedure with room for discretion also creates room for political games. This risk only increases further due to the long duration of financial cycle, which makes it tempting for policymakers and politicians to "decide" that the unusually high growth of GDP and of government revenues is structural. As argued by Lane (2010) and De Haan *et al.* (2012, 2013), responsibility for this assessment should therefore preferably be placed in the hands of a budgetary authority with both the required expertise and some kind of formal independence.

REFERENCES

Beetsma, R., M. Giuliodori and P. Wierts (2009), "Planning to Cheat: EU Fiscal Policy in Real Time", *Economic Policy*, Vol. 24, Issue 60, October.

Bénétrix, A. and P. Lane (2012), "Financial Cycles and Fiscal Cycles", *Journal of International Money and Finance*, forthcoming.

Borio, C. (2012a), "On Time, Stocks and Flows: Understanding the Global Macroeconomic Challenges", lecture in the Munich Seminar Series, November 9th.

——————(2012b), "The Financial Cycle and Macroeconomics. What Have We Learnt?", BIS, Working Paper, No. 395, December.

Borio, C., P. Disyatat and M. Juselius (2013), "Rethinking Potential Output: Embedding Information about the Financial Cycle", BIS, Working Paper, No. 404, February.

CPB Netherlands Bureau of Economic Policy Analysis (2011), *Europa in Crisis*, Uitgeverij Balans.

CESifo (2004), DICE Report 4/2004, pp. 60-64.

de Haan, J., H. Berger and D. Jansen (2004), "Why Has the Stability and Growth Pact Failed?", *International Finance*, Vol. 7, No. 2, pp. 235-60.

de Haan, J., N. Gilbert, J. Hessel and S. Verkaart (2012), "Beyond the Fiscal Compact: How Well-designed Eurobonds May Discipline Governments", *Zeitschrift für Staats- und Europawissenschaften (ZSE*) (*Journal for Comparative Government and European Policy*), No. 3, pp. 323-37.

——————(2013), "How to Enforce Fiscal Discipline in EMU: A Proposal", *Swiss Journal of Economics and Statistics*, Vol. 149, No. 2, pp. 205-18.

Dobrescu, G. and F. Salman (2011), "Fiscal Policy During Absorption Cycles", IMF, Working Paper, No. 11/41, February.

Drehmann, M, C. Borio and K. Tsatsaronis (2012), "Characterizing the Financial Cycle: Don't Lose Sight of the Medium Term!", BIS, Working Paper, No. 380, June.

Eschenbach, F. and L. Schuknecht (2004), "Budgetary Risks from Real Estate and Stock Markets", *Economic Policy*, Vol. 19, pp. 313-46, July.

European Commission (2006), Public Finances in EMU 2006, *European Economy*, No. 3.

——————(2007), Public Finances in EMU 2007, *European Economy*, No. 3.

——————(2008), Public Finances in EMU 2008, *European Economy*, No. 4.

European Central Bank (2012), "A Fiscal Compact for a Stronger Economic and Monetary Union", ECB, *Monthly Bulletin*, pp. 79-94, May.

Gilbert, N. and J. Hessel (2012), "De Europese overheidsfinanciën tijdens de crisis" (European Public Finances During the Crisis), *Economisch Statistische Berichten*, Vol. 97, pp. 166-69.

Gilbert, N., J. Hessel and S. Verkaart (2013), "Towards a Stable Monetary Union: What Role for Eurobonds?", De Nederlandsche Bank, Working Paper, No. 379.

Hauptmeier, S., J.S. Fuentes and L. Schuknecht (2010), "Towards Expenditure Rules and Fiscal Sanity in the Euro Area", ECB, Working Paper, No. 1266, November.

Hughes Hallet, A., R. Kattai and J. Lewis (2012), "How Reliable are Cyclically-adjusted Budget Balances in Real Time?", *Contemporary Economic Policy*, Vol. 30, Issue 1, January.

Lane, P. (2010), "External Imbalances and Fiscal Policy", in S. Barrios, S. Deroose, S. Langedijk, L. Pench (eds.), *External Imbalances and Public Finances in the EU*, European Economy, Occasional Paper, No. 66.

——————— (2012), The European Sovereign Debt Crisis, *Journal of Economic Perspectives*, No. 26, pp. 49-68.

Lendvai, J., L. Moulin and A. Turrini (2011), "From CAB to CAAB? Correcting Indicators of Structural Fiscal Positions for Current Account Imbalances", European Commission, Economic Paper, No. 442.

Pench, R. (2012), "The New Fiscal Rules: What Will Change in Practice?", *ETLA Fiscal Policy Seminar*, Helsinki, October.

Pisani-Ferry, J. (2012), "The Euro Crisis and the New Impossible Trinity", Bruegel Policy Contribution, No. 2012/1, January.

Reinhart, C.M. and K.S. Rogoff (2009a), "The Aftermath of Financial Crises", NBER, Working Paper, No. 14656, January.

——————— (2009b), *This Time Is Different. Eight Centuries of Financial Folly*, Princeton University Press.

Sinn, H.W. (2010), "How to Save the Euro", *Wall Street Journal*, April 19th.

Schuknecht, L., P. Moutot, P. Rother and J. Stark (2011), "The Stability and Growth Pact: Crisis and Reform", ECB, Occasional Paper, No. 129, September.

Wierts, P. (2006), *Fiscal Rules and Fiscal Outcomes in EMU: Theory and Evidence*, Ph.D. thesis, University of Reading.

PORTUGAL'S FISCAL POLICY
IN A CONTEXT OF LOW GROWTH AND MACROECONOMIC IMBALANCES

Jorge Cunha[*] *and Cláudia Rodrigues Braz*[*]

This paper develops the presentation made at the 15th Banca d'Italia Public Finance Workshop. The data was updated with the information available in 2013. The text is organized as follows. Section 2 summarises macroeconomic developments in Portugal from 1995 to 2012, emphasising low growth and increasing indebtedness since the turn of the century. The main features of fiscal developments in Portugal are analysed in Section 3, with a special focus on the factors underlying the evolution of public expenditure. Section 4 tries to explain the very limited success of the efforts of expenditure containment even after Portugal incurred for the first time in excessive deficit. Section 5 presents the most important measures included in the fiscal block of the ongoing Economic and Financial Assistance Programme to Portugal, assessing its results up to now, as well as its main merits and limitations. Finally, Section 6 draws some key lessons for the conduct of fiscal policy in Portugal in the coming decades.

1 Introduction

In the last three decades the Portuguese economy has been subject to very important structural changes and shocks, driven by both domestic and external developments. Among the structural changes it is noteworthy the increase in the degree of economic and financial integration and the participation in EMU. Concerning shocks, the accession of new countries to the world markets, the 2008 financial crisis and the Great Recession are good examples of external developments with a major impact on the Portuguese economy.

In the second half of the nineties, Portugal was still growing above the euro area, mainly on account of an increase in domestic demand, but this trend reversed after 2000. On the contrary, net exports were never able to contribute to GDP growth until the recent past. In this context, the indebtedness of the private and public sectors, in particular after 2000, reached historically high levels, ultimately leading to the Portuguese government demand of economic and financial assistance in 2011.

The full extent of the role of fiscal policy and public policies in general in Portugal's meagre macroeconomic performance after the inception of the euro is yet to be established. Certainly they contributed to the excessive growth of domestic demand, in particular public consumption, and to the shift of resources from the tradable sector to the non-tradable sector, amplifying macroeconomic imbalances and the overall indebtedness of the Portuguese economy. Further the postponement and/or the lack of ambition of structural reforms limited the potential growth of the economy. The Economic and Financial Assistance Programme to Portugal agreed with the European Commission, the ECB and the IMF tackles all this issues but it is too soon to evaluate its success. In this context, this paper focuses on fiscal developments in Portugal, with a particular emphasis on expenditure growth and the difficulty in ensuring its effective control.

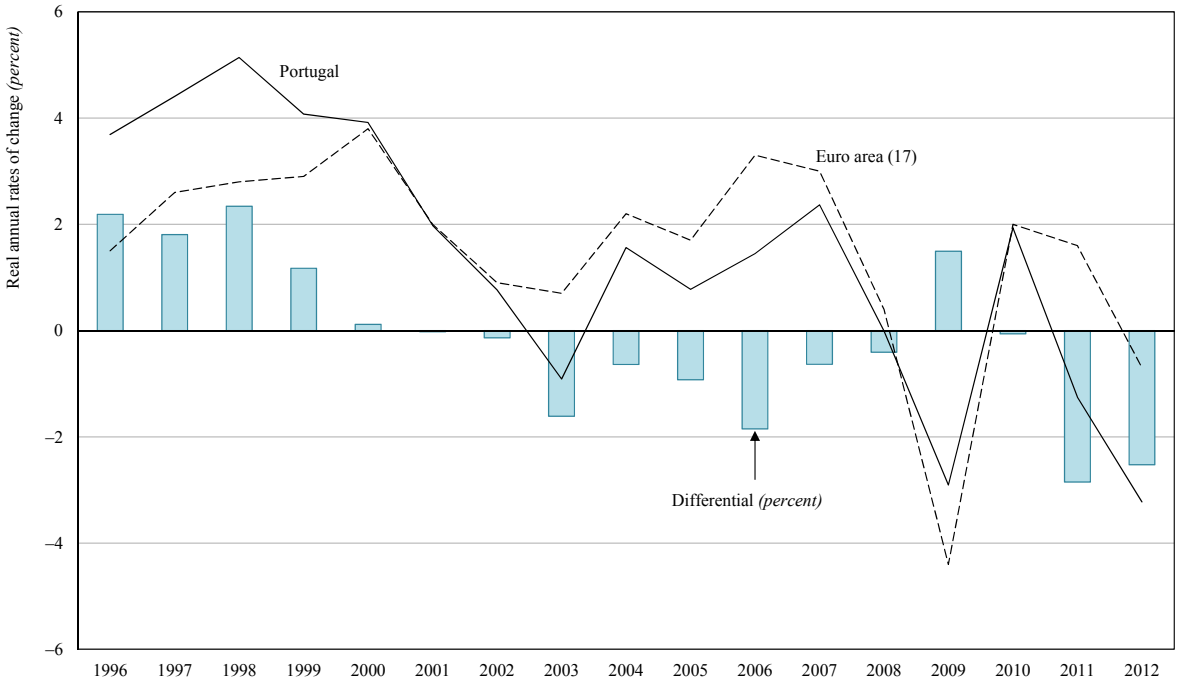
---

[*] Banco de Portugal, Economics and Research Department, Av. Almirante Reis no.71, 1150-012 Lisboa, Portugal. E-mail address: jmmccunha@bportugal.pt and crbraz@bportugal.pt; Phone: +351 213128358 or +351 213130549.

The opinions and findings expressed in the text represent the views of the authors, which do not necessarily reflect those of Banco de Portugal or the Eurosystem.

Figure 1

GDP



Sources: Eurostat, Statistics Portugal and Banco de Portugal.

2 Basic facts on growth and macroeconomic imbalances

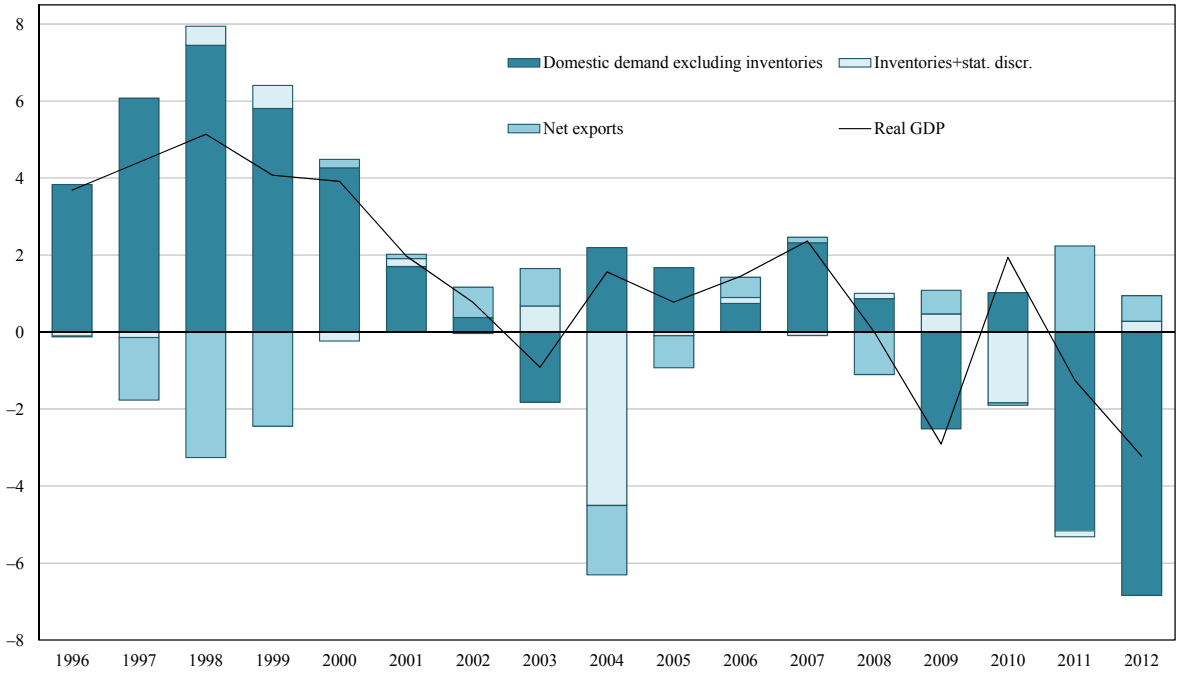
In the second half of the nineties, Portugal was growing above the euro area (at an average rate of 4 per cent) but the situation reversed after 2000 (Figure 1). Since then, Portugal has shown a poor economic performance, diverging in relation to the euro area as a whole. Indeed, in the period from 2001 to 2012, GDP in Portugal grew on average 0.2 per cent per year, while the comparable figure for the euro area as a whole was 1.1 per cent.

Domestic demand recorded a fast expansion until 2000, but its growth afterwards was subdued (Figure 2). The strong increase of domestic demand occurred in a context where access to credit was facilitated by financial integration and low interest rates. In the 1996-2000 period, private consumption[1] and investment grew on average 4.3 and 8.3 per cent per year, respectively. After 2001 (and until 2010), both aggregates recorded a marked deceleration as their average growth rates declined to 1.3 and –0.3 per cent, respectively. Public consumption also followed the same pattern, with expansionary policies leading to an average annual growth rate of 4.1 per cent up to 2000, while some deceleration took place afterwards, though much less pronounced than that that of private consumption and investment. On the opposite, net exports were not able to contribute to GDP growth, in particular until 2010. This situation was reversed in the last years, given the ongoing adjustment process. Indeed, in a context of subdued growth of external demand, behind the evolution of exports were important gains in market share (of around 3 per cent per year).

[1] Private consumption in Portugal represents around 64 per cent of GDP, in nominal terms.

Figure 2

Contributions to Real GDP Rate of Change
(percent)



Source: Statistics Portugal.

As a result of the external imbalances, the current plus capital account deficit stood at very high levels, reaching a maximum of 11.1 per cent of GDP in 2008 (Figure 3). In 2009 and 2010, this deficit declined slightly, but the biggest improvement occurred in 2011 and 2012, year where a small surplus was already recorded. The negative contribution of the goods and services component was evident over the entire period, with the exception of 2012.

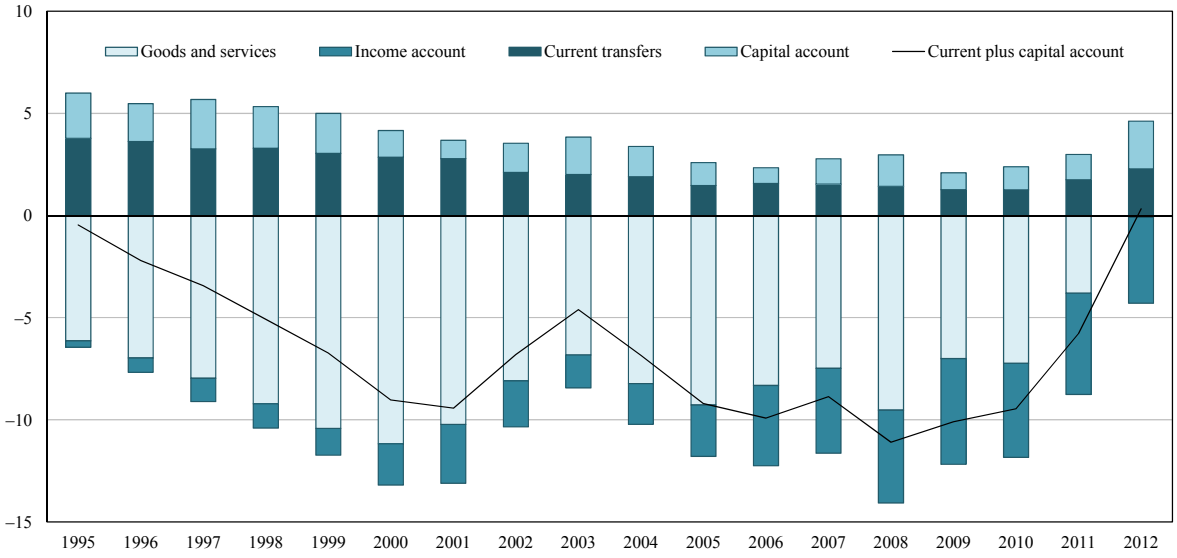
In this context, the significant deterioration of the international investment position was unavoidable, which peaked in 2009 at around 10 per cent of GDP, declining only to a minor extent afterwards and deteriorating again in 2012 (Figure 4).

The expansionary stance of monetary policy, through low interest rates and easy access to credit, and the loosening of fiscal policy led to a significant increase of the indebtedness of the private and public sectors, in particular after 2000 when nominal GDP evolved more unfavourably, reaching historically high levels (Figures 5 and 6).

In this period, the Portuguese economy displayed a number of structural weaknesses which are closely related to the poor macroeconomic performance. The progressive reallocation of resources from tradable to non-tradable sectors and the decline in corporate and public investment in recent years are among these factors. In this context, it is worth mentioning that an inefficient judicial sector did not provide a secure environment crucial for promoting investment decisions. Concerning human capital, the average qualification of the population, which has been improving but is still at a very low level, stands as a major structural handicap for the evolution of the Portuguese economy. In addition, population is ageing rapidly given the very low fertility rate and the rise in life expectancy. Another structural weakness relates to the high degree of segmentation

Figure 3

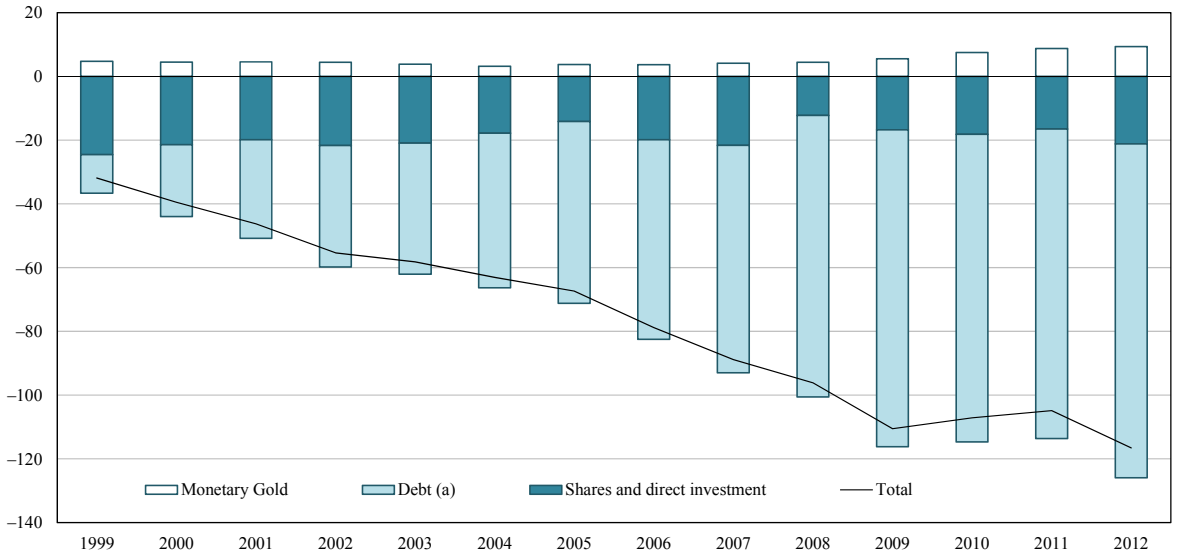
Current Plus Capital Account
(percent of GDP)



Sources: Statistics Portugal and Banco de Portugal.

Figure 4

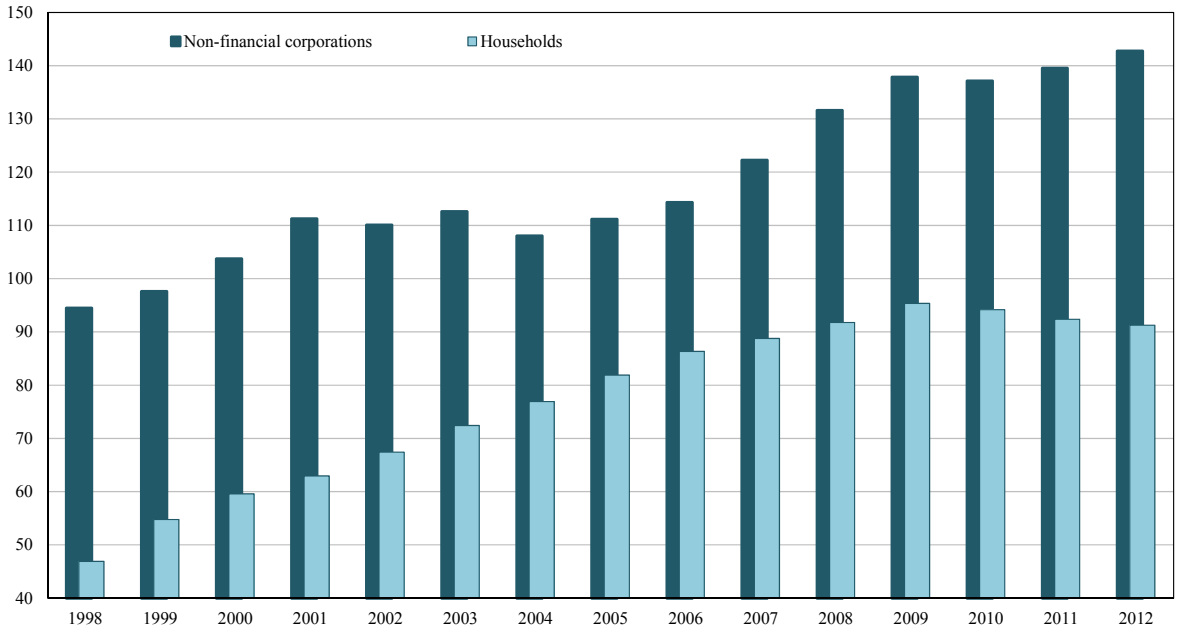
International Investment Position
(percent of GDP)



Sources: Statistics Portugal and Banco de Portugal.
Note: (a) Includes debt securities, other investment, fi nancial derivatives, participation units in investment funds, securitisation units and others. This debt concept is different from the one published in Table A.3.2 of the Statistical Bulletin of Banco de Portugal, since participation units in investment funds, securitisation units and other participation securities are recorded as debt. Additionally, the debt concept used here does not include the difference between direct investment assets and liabilities, presented as other capital, regarding available funds and liabilities over subsidiaries and direct investors. In this chart these elements are included in "Shares and direct investment". This way, this different treatment does not change the total value of the International Investment Position.

Figure 5

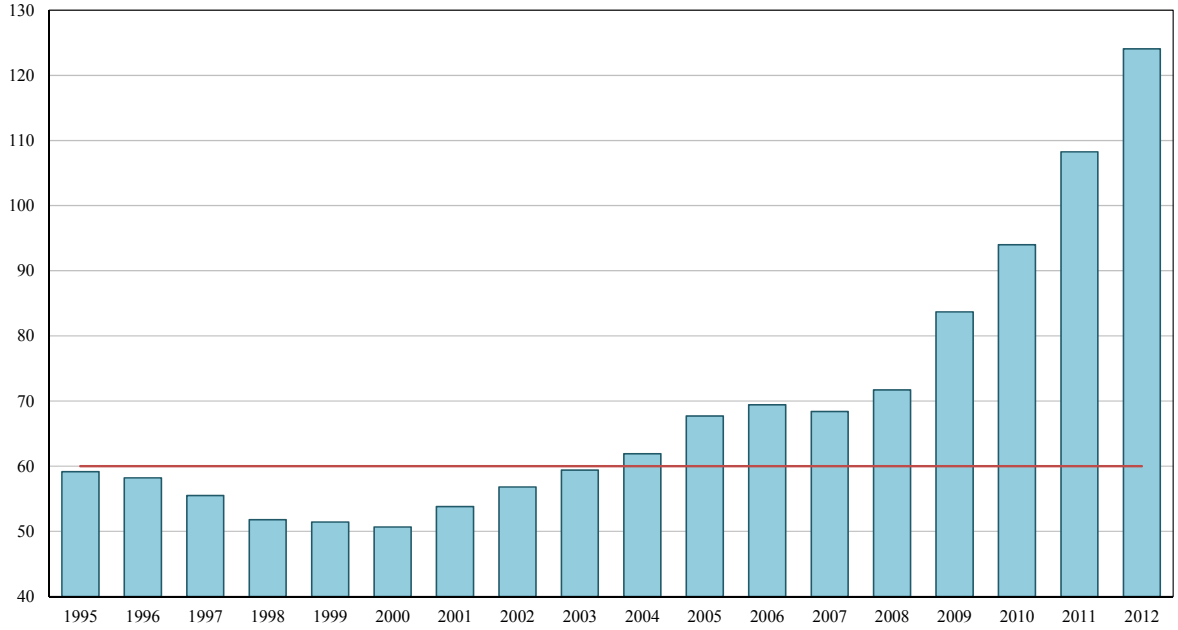
Indebtedness of the Non-financial Private Sector
(percent of GDP)



Sources: Statistics Portugal and Banco de Portugal.

Figure 6

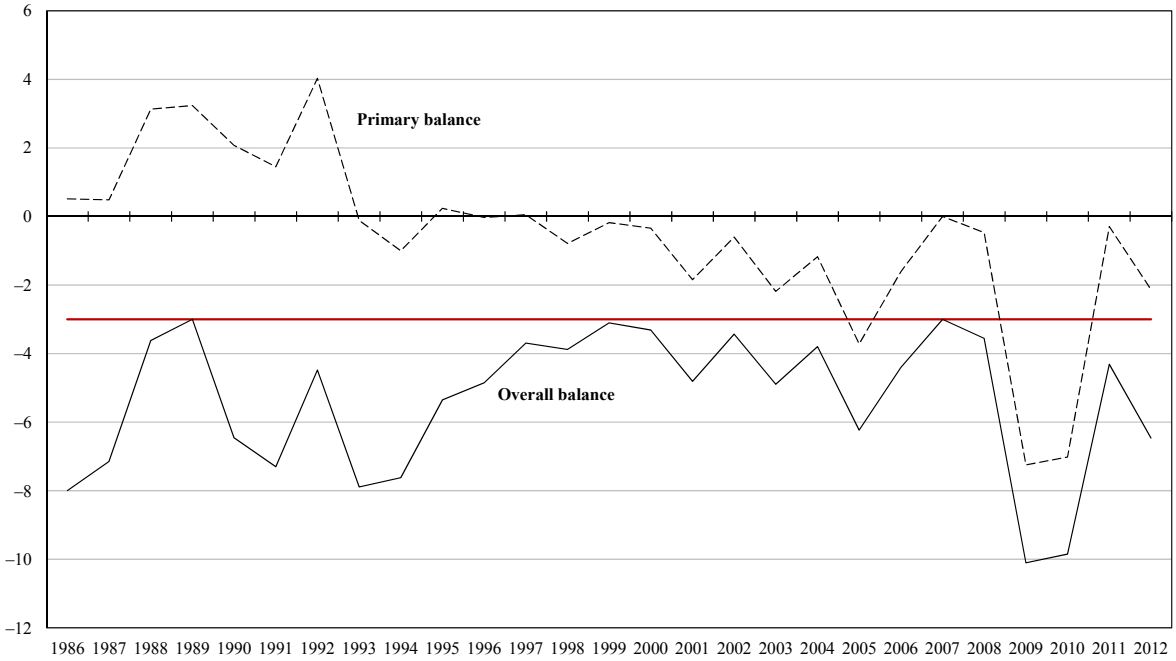
Public Debt, EDP Definition
(percent of GDP)



Sources: Statistics Portugal and Banco de Portugal.

Figure 7

Fiscal Balances in Portugal: 1986-2012
(percent of GDP)



Source: Statistics Portugal.

in the labour market, as permanent contracts enjoy large returns to tenure and fixed-term contracts bear the bulk of the quantity and price adjustment costs.

3 Key features of fiscal developments in Portugal

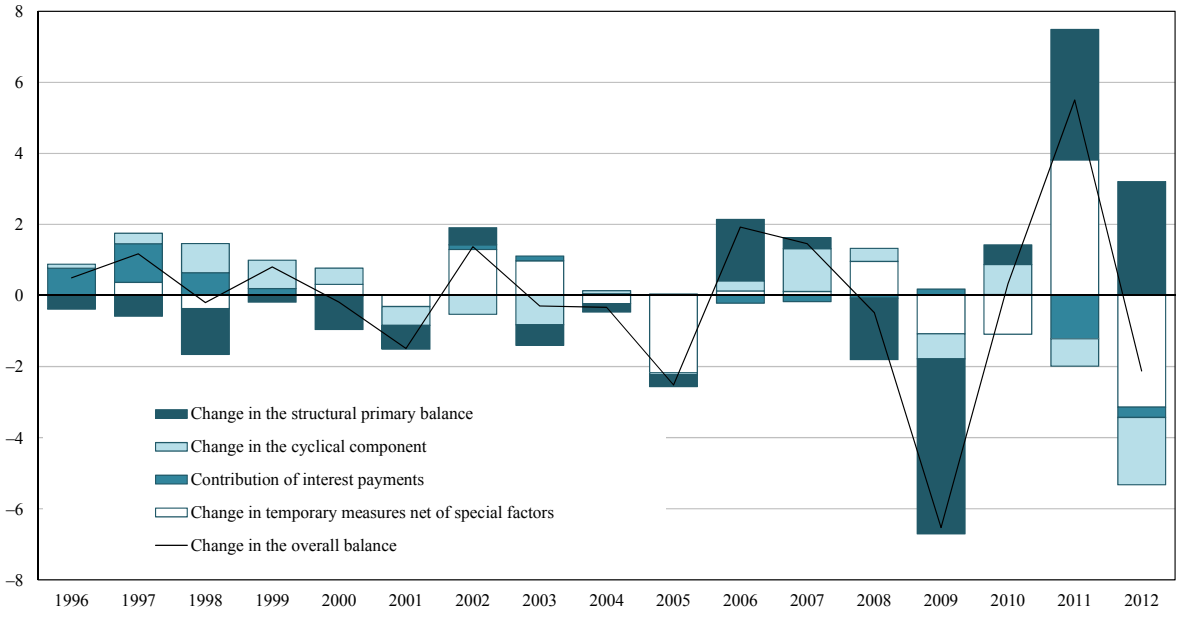
3.1 Main indicators

After the accession to the European Community (as in the preceding period) inadequate fiscal policies from the perspective of the sustainability of public finances contributed decisively to the vulnerability of the country in the context of the current economic and financial crisis. One of the main aspects of fiscal developments since 1986 is that the general government deficit in Portugal never stood durably below 3 per cent of GDP. However, the primary balance followed a downward trend from 1992 to 2005, posting consistently negative figures up to the present. This pattern, characterized by high and persistent fiscal imbalances, is illustrated in Figure 7.

The nineties were largely a missed opportunity to ensure the sustainability of Portuguese public finances. Indeed, the leeway created by the reduction in interest expenditure resulting from the process of nominal convergence and the rapid economic growth were not used to ensure a structural improvement in the fiscal position. Rather, it served to accommodate expansionary fiscal policies, while respecting the limit of 3 per cent for the deficit, according to the statistical rules then in force. Consequently, conditions were created for the occurrence of an excessive deficit, as soon as the macroeconomic environment became less favorable. The effect of the decrease in interest

Figure 8

Breakdown of the Change in the Overall Balance
(percent of GDP)



Sources: Statistics Portugal and Banco de Portugal.

expenditure and the expansionary stance of fiscal policy (measured by the change in the structural primary balance) in the period referred to, are shown in Figure 8, which breaks down the change in the total balance in its several components.

Since 2000, the debt ratio followed a rising trend in the context of an economy with a very low growth. As it is clear from Figure 9, this trend became more marked from 2008 up to the present.

Deficit-debt adjustments had a significant impact on the change in the debt ratio in some years. As can be seen in Figure 10, this impact reduced the debt ratio from 1996 to 1998 due to sizeable receipts from privatizations, and, on the contrary, increased the debt ratio in the 2010-12 period, mainly due to an accumulation of assets.

The primary current expenditure and the tax burden recorded in the decade and a half prior to the current financial and economic crisis growing trends, but much more pronounced on the expenditure side. As it appears clearly from Figure 11, with regard to primary current expenditure, the gap to the average of the euro area (as a ratio to GDP) was basically closed in 2005.

3.2 Expenditure developments

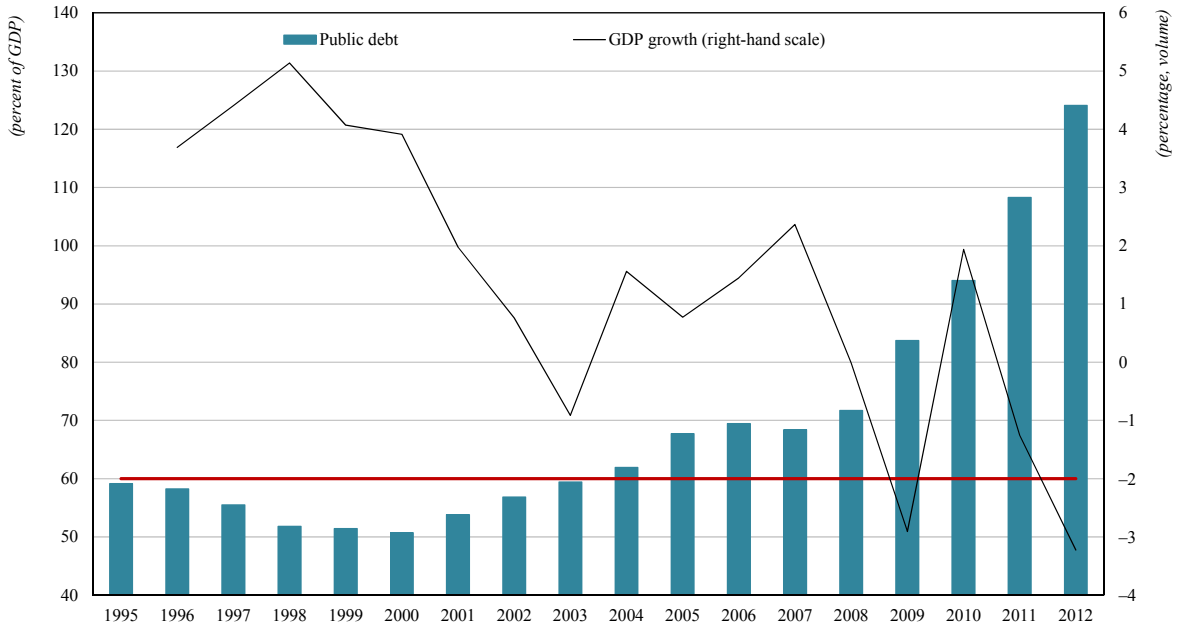
Regarding the economic classification of public expenditure in Portugal,[2] the two most important items are social benefits and compensation of employees. Indeed, in 2012, they represented 48 and 21 per cent of total spending, respectively.

---

[2] The analysis for Portugal carried out in the next paragraphs is based on expenditure values that exclude the effects of temporary measures and special factors.

Figure 9

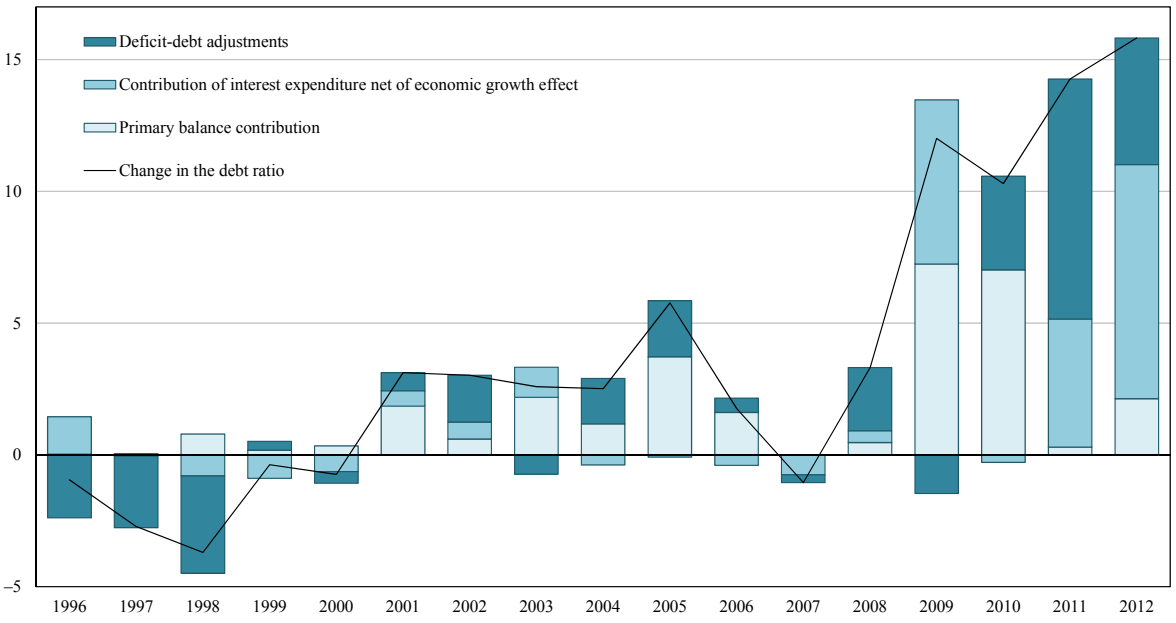
Public Debt Ratio and GDP Growth in Portugal



Sources: Banco de Portugal and Statistics Portugal.

Figure 10

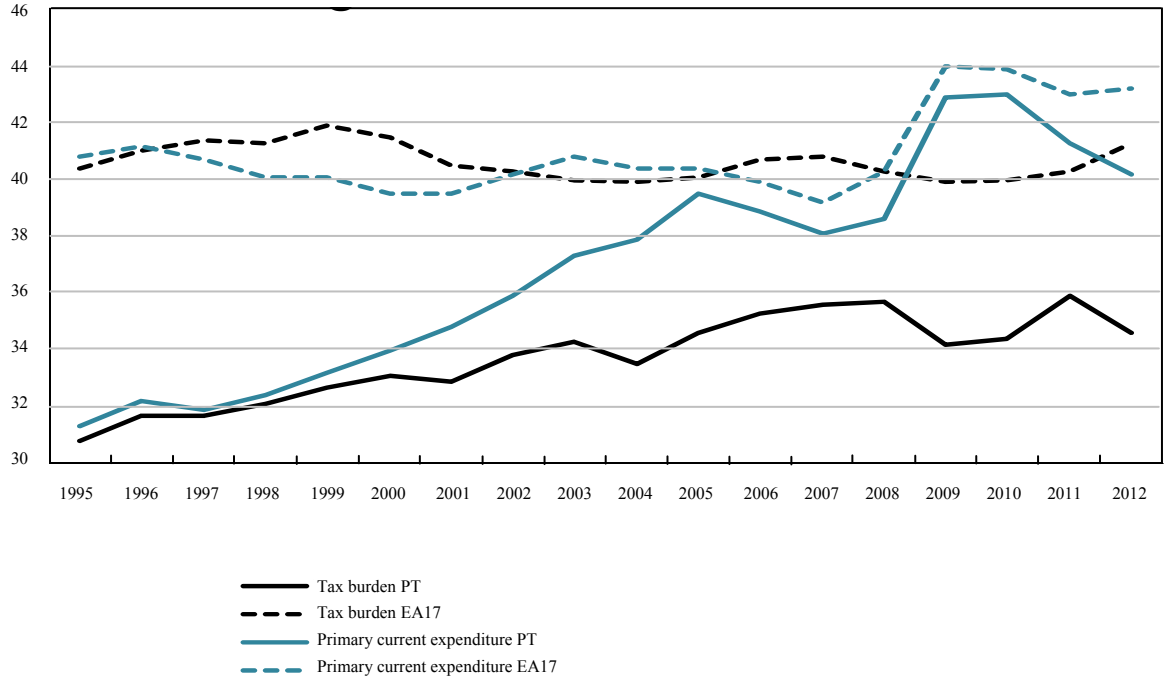
Breakdown of the Change in the Public Debt Ratio
(percent of GDP)



Sources: Statistics Portugal and Banco de Portugal.

Figure 11

Tax Burden and Primary Current Expenditure: Portugal *vis-à-vis* the Euro Area
(percent of GDP)



Sources: Statistics Portugal and Eurostat.
Note: Tax burden is defined as the ratio of revenue from taxes and social contributions to GDP.

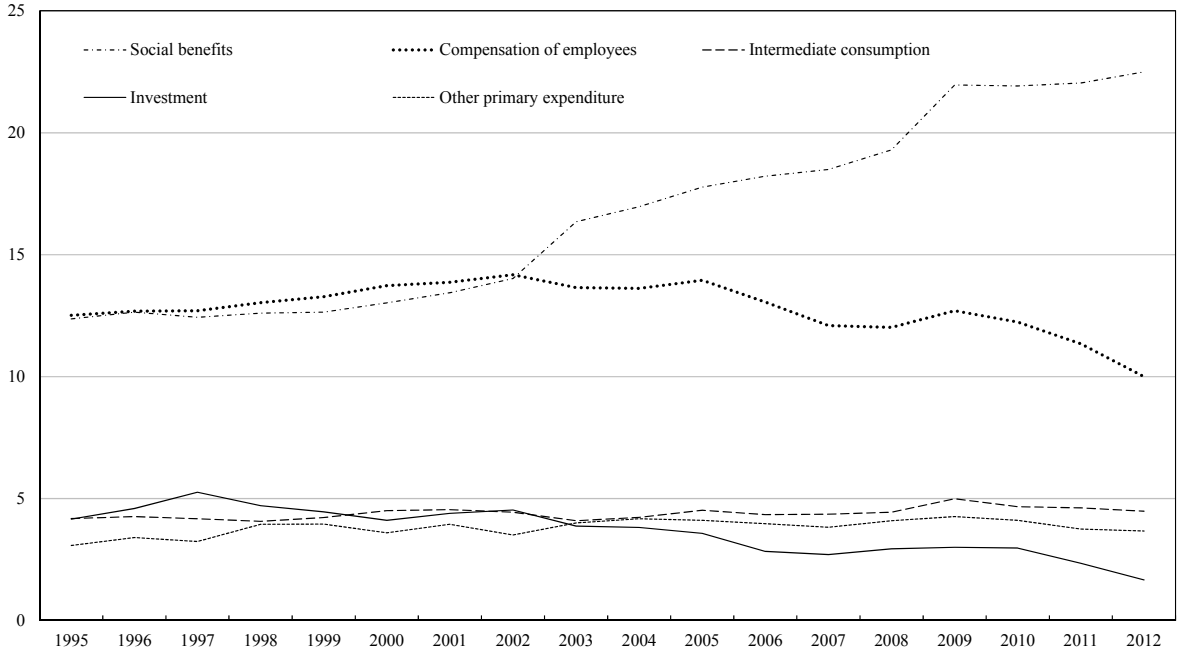
Between 1995 and 2012, social benefits increased by 7.9 p.p. of GDP,[3] of which more than 90 per cent resulting from the expansion of transfers to households in cash and the remainder associated with social benefits in kind (Figure 12 and Table 1). In the case of social benefits in cash, more than 75 per cent of the observed variation in the period (corresponding to 5.5 p.p. of GDP) stems from the evolution of pension expenditure. This is undoubtedly one of the main factors accounting for the strong growth in primary spending, particularly after 2000. Underlying its evolution there is a significant growth both in the number of pensioners and the average pension (excluding the annual update) (Figure 13). These developments are partly explained by the maturation of the Social Security subsystem. In terms of annual updates of pensions, in the period prior to the Social Security reform,[4] there were several years with discretionary increases above expected inflation, particularly in the general scheme. After 2008, a new pension indexation formula is in force, which relates the yearly update of pensions with inflation, real GDP growth and the level of pensions. It should be noted that the application of the formula was suspended in 2010 and since then the value of pensions has been frozen, with the exception of minimum pensions. The new Social Security Law also introduced a sustainability factor, changed the initial pension calculation formula and increased penalties for early retirement. This reform, whose effects will be mainly felt in the medium and long term, was an important step towards improving the sustainability of public finances. This result has naturally as a counterpart the reduction in the value

[3] Correcting for the structural breaks associated with the transformation of hospitals into public corporations.

[4] See Law No. 4/2007 of January 16 and Decree-law no. 187/2007 of May 10 for specific regulation.

Figure 12

Public Expenditure in Portugal: Economic Classification
(percent of GDP)



Sources: Statistics Portugal and Banco de Portugal.
Notes: The items are corrected by the effects of temporary measures and special factors. They reflect, however, the structural breaks associated with the transformation of hospitals into public corporations from 2002 onwards.

Table 1

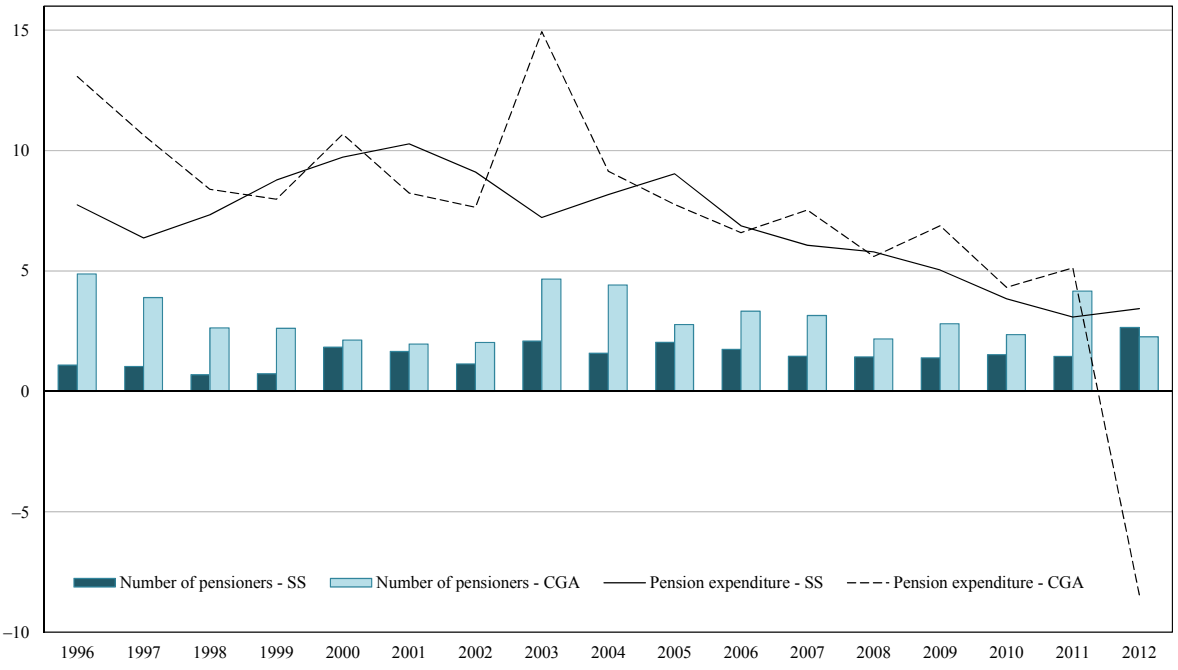
Evolution of the Main Expenditure Items
(percent of GDP)

	1995-2002	2002-12*	1995-2012
Social benefits	1.7	6.2	7.8
in cash	1.3	5.9	7.1
in kind	0.4	0.3	0.7
Wage bill	1.1	–2.7	–1.5
Intermediate consumption	0.3	1.1	1.4
Investment	0.4	–2.2	–1.8
Interest	–2.8	1.5	–1.3

* Correcting the structural breaks associated with the transformation of hospitals into public corporations.

Figure 13

Change in Pension Expenditure and in the Number of Pensioners
(percent)



Sources: Social Security and Caixa Geral de Aposentações.

of future pensions relative to what had been expected before the reform. Note that this decrease in replacement rates will also occur in the euro area as a whole.[5] As for the *Caixa Geral de Aposentações* subsystem, the very favourable rules are being changed since 2003, but in the meantime with some acceleration of the convergence to the rules of the general scheme.[6] Transfers of pension funds to the general government, by contrast, given its self-reversing nature,[7] have contributed to one-off increases in the level of pension expenditure in both public subsystems.[8] In 2012, pension expenditure decelerated sharply following the suspension of the summer and Christmas bonuses, but it is expected to return to a significant growth in 2013 as a result of the reintroduction of these bonuses. Altogether, the impact of policy measures largely explains the decrease in the growth rate of spending on pensions. The remaining social benefits in cash[9] also

---

5 See Economic Policy Committee and European Commission (2012).

6 The succession of changes in the rules of the Caixa Geral de Aposentações subsystem have led to a considerable increase in requests for retirement, an important part of which corresponds to early retirement, subject to penalties.

7 The transfers of pension funds to general government benefit the deficit in the year they occur, but increase pension expenditure of this institutional sector in the following years. In principle, the amount initially received should equal the present value of the additional pensions payable in the future. The calculation of this value is, however, dependent on several factors, in particular related to the discount rate and mortality tables, which involve some uncertainty.

8 The impact of these transfers in general government pension expenditure amounted to about 0.3 per cent of GDP in each of the subsystems in 2012. In terms of the number of pensioners, the effect on the Social Security subsystem reaches around 32,000 individuals, while in the Caixa Geral de Aposentações subsystem was close to 40,000 retirees.

9 This aggregate includes, among other benefits, unemployment benefits, subsidies for sickness, family allowances and social programmes for the support of the elderly and poor households.

increased gradually as a ratio to GDP, only having recorded a decline in the last three years as a result of control measures and changes in eligibility rules.

Developments in social benefits in kind should be analysed in conjunction with the evolution of compensation of employees and intermediate consumption. Indeed, the transformation of hospitals into public corporations that occurred since 2002, although fundamentally neutral for the deficit, led to an increase in social benefits in kind, through the payment of services to corporate hospitals, and a reduction in compensation of employees and intermediate consumption.[10] With regard to social benefits in kind, the increase reached 3.0 p.p. of GDP between 1995 and 2012 (0.7 p.p. of GDP excluding the amounts related to the payment of services to corporate hospitals). A substantial set of measures adopted in the health sector, with a particular focus on spending on medicines, has been contributing to mitigate the growth trend of this item.

Apart from the above-mentioned effect related to corporate hospitals, compensation of employees also reflects the treatment of *Caixa Geral de Aposentações* in National Accounts in the period prior to 2005.[11] The wage bill (which is not affected by the issue of the treatment of *Caixa Geral de Aposentações*) decreased by 3.2 p.p. of GDP between 1995 and 2012. If this evolution is adjusted by an estimate of the impact of the transformation of hospitals into public corporations, the reduction would amount to 1.7 p.p. of GDP. Indeed, the strong growth of this item, particularly until 2002 (which amounted to 1.1 p.p. of GDP), was associated with a very significant increase in the number of general government employees and extraordinary revisions of careers. These developments are illustrated in Figure 14 that shows the rates of change in expenditure on wages and the number of general government employees, as well as the difference between the two series. This difference essentially captures the effects of the updates of the wage scale, regular promotions and progressions, extraordinary revisions of careers and changes in the average wage due to inflows and outflows (mainly for retirement) of public employees. Note that, until 2002, the analysis is not affected by the creation of corporate hospitals, classified outside the general government sector. Thereafter, the two series represented in the Figure reflect the breaks associated with the corporatisation of hospitals, which implies that only the difference between them is relevant for the analysis.[12] Since 2002, several factors contributed to moderate and afterwards to revert the growth trend of this item. Firstly, the stricter control of admissions together with outflows for retirement.[13] Secondly, changes in the promotions and career progressions schemes.[14] Thirdly, some tightening in the annual update of the wage scale, with an almost freeze in 2003, 2004 and 2010, but far above inflation in 2009. Finally, in 2011, the 5 per cent average cut in salaries and in 2012 the suspension of the Christmas and summer bonuses (to be reversed in 2013). The wage reduction of 2011, as well as the suspension of the summer and Christmas bonuses in 2012, was made in progressive terms, contributing to the narrowing of the wage premium relatively to the private sector which, in 2005, was slightly positive for higher wages.[15] As for the number of

---

[10] See Banco de Portugal (2007), *Annual Report*, Box 6.1 Corporate hospitals and public expenditure.

[11] In the period prior to 2005, employer contributions related with general government employees who were subscribers of Caixa Geral de Aposentações were still calculated as the amount needed to balance the system in each year. As pension expenditure of this subsystem was growing substantially in this period, contributions and consequently compensation of employees increased on average at a higher rate than the wage bill.

[12] The difference itself may still be affected by the corporatisation of public hospitals as this also influences, beyond the number of workers, the average wage in the general government sector.

[13] As well as the reduction in the number of teachers and other personnel with term contracts in the recent period.

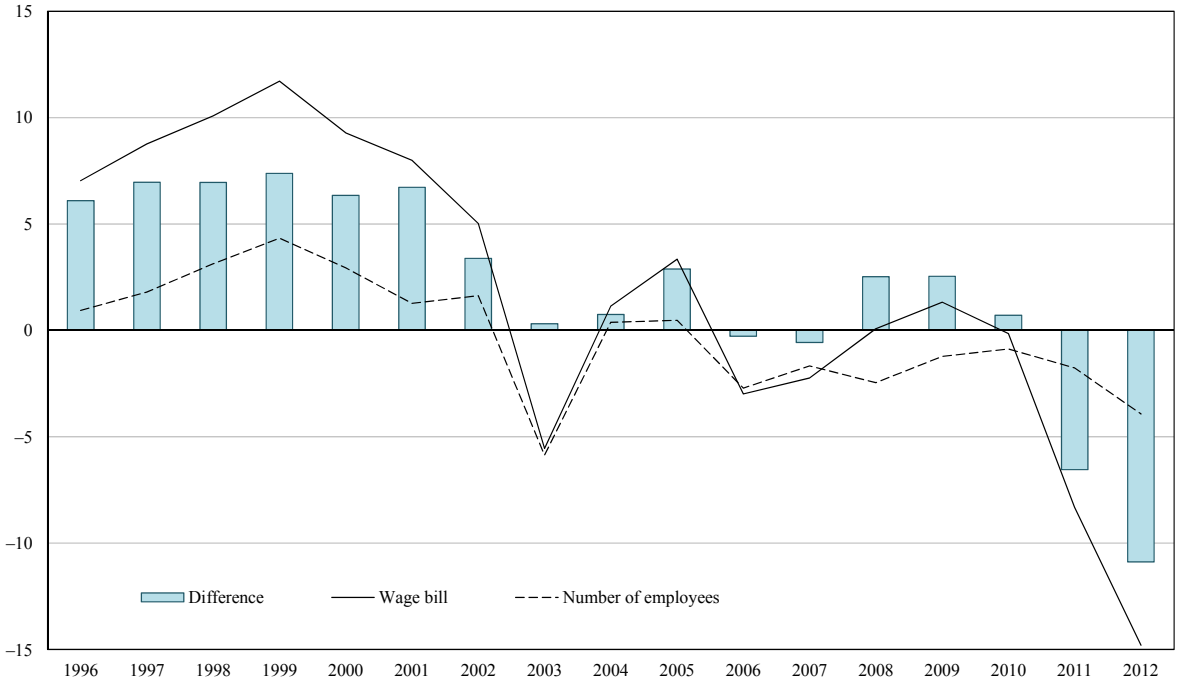
[14] The process began in 2004 and is currently ruled by Law No. 66-B/2007 of December 28, which established the integrated management and performance evaluation system for public administration (SIADAP). In practice, the progressions in careers are actually slower and linked to the performance of workers.

[15] In this regard see Campos and Pereira (2009). According to the authors, the wage premium (*i.e.*, the wage gap between general government and the private sector workers that remains after controlling for a set of observable characteristics) when evaluated at

(continues)

Figure 14

Change in the Wage Bill and in the Number of General Government Employees
(percent)



Sources: Statistics Portugal and authors' calculations.

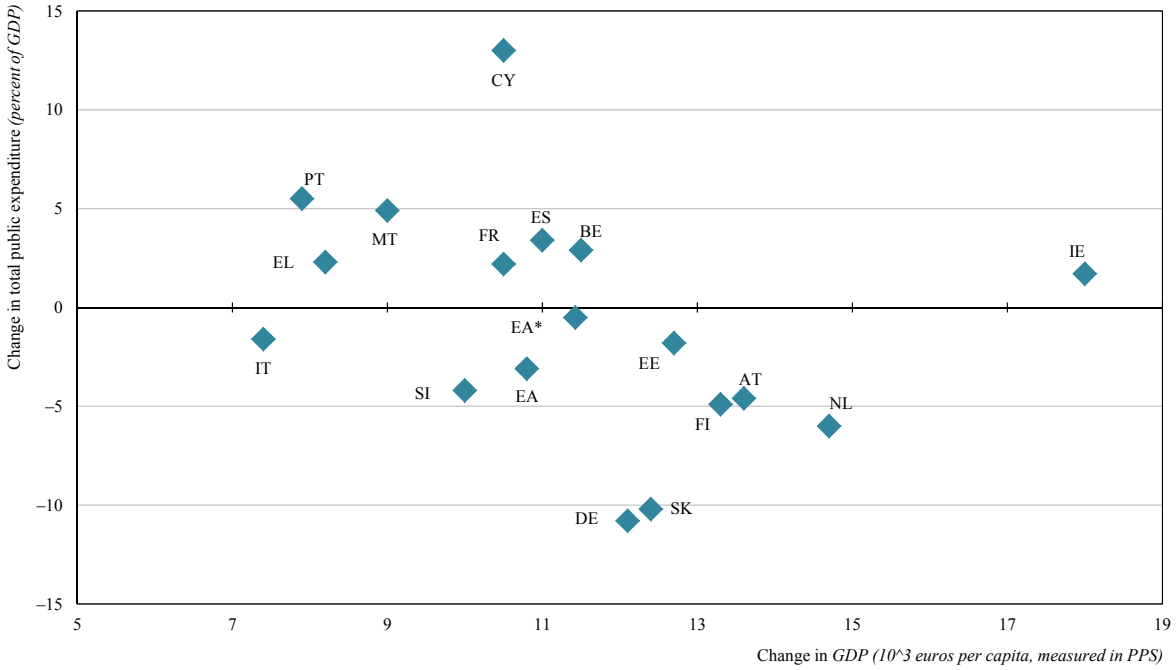
general government employees, an estimate of the authors that corrects the breaks due to the corporatisation of hospitals point to an increase by about 44,000 individuals (approximately 7 per cent) in the period from 1995 to 2012, which can be broken down in an increase of approximately 120,000 until 2002, and a reduction of around 76,000 afterwards. In this respect, in the current context of a significant number of retirements, the importance of avoiding that the reduction in the number of public employees undermines the materialization of the priorities established for the provision of public services should be highlighted.

Intermediate consumption as a percentage of GDP, corrected for the impact of the corporatisation of hospitals, shows an increase in almost every year until 2009, recording a decline only in the last two years of the period under analysis. As a consequence, the value of 2012 is about 1.5 p.p. of GDP higher than in 1995. The opposite occurred regarding public investment, which reduced its ratio to GDP from a peak of 5.3 per cent in 1997 to a historical low level of 1.8 per cent in 2012. Part of this trend is explained by the creation of public-private partnerships in this period and the fact that this item of expenditure is easier to cut in times of budgetary difficulties. It should be noted, however, that in economic terms the reduction of public investment does not necessarily corresponds to an unfavourable evolution, if it allows the elimination of projects with very low or even negative rates of return.

the mean of the distribution of wages amounted to about 17 per cent in 2005. However, it declined along the wage distribution, being particularly reduced in the last deciles.

Chart 15

Change Between 1995 and 2012 of Total Expenditure as a Ratio to GDP and GDP Per Capita Measured in PPS



Sources: Eurostat, Statistics Portugal and Banco de Portugal.
Notes: Luxembourg is not considered. The simple average of the euro area is represented by EA*.

Figure 15 shows the change in levels of total public expenditure as a ratio to GDP in each of the euro area countries[16] and its relation to the variation of the respective GDP *per capita*, measured in purchasing power standard (PPS), between 1995 and 2011. This analysis shows that Portugal was a Member-state of the euro area that, despite the negligible increase in GDP *per capita*, recorded one of the highest rises in public spending as a percentage of GDP.

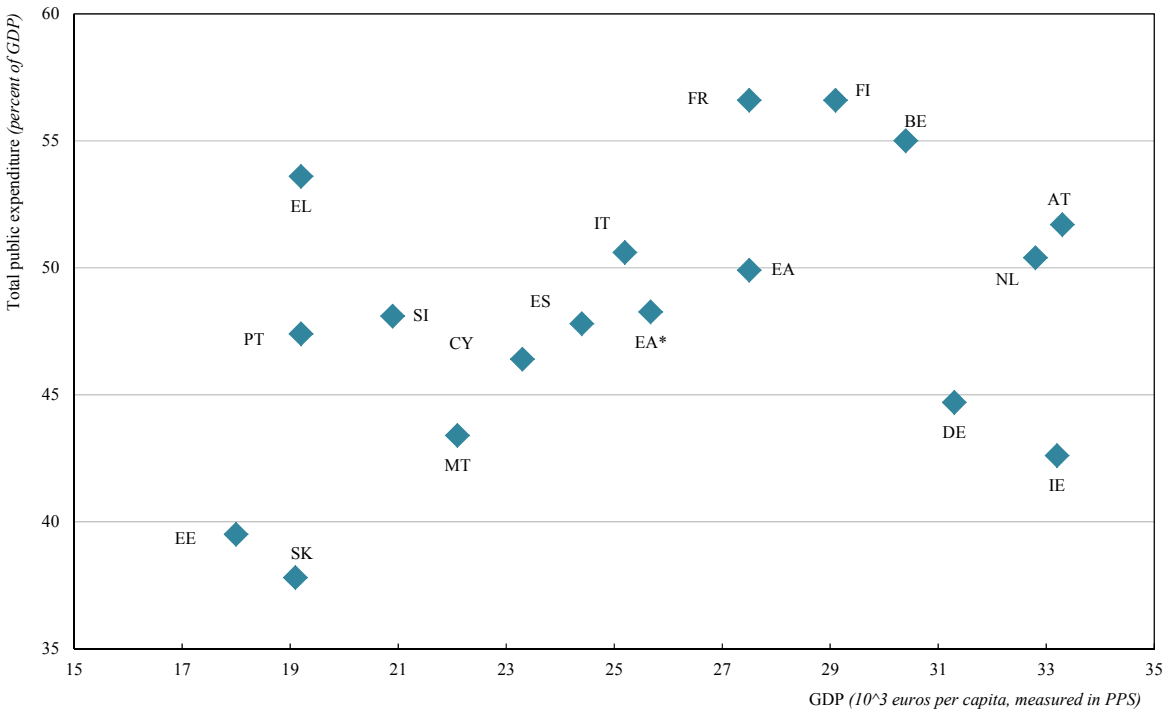
Figure 16 illustrates the international comparison between the level of public spending as a percentage of GDP and the level of GDP *per capita*, measured in PPS in 2011. As can be seen, Portugal appears with a level of total public expenditure as a ratio to GDP above that of many countries, including some with a substantially higher GDP *per capita*.

Figure 17 shows the results for a euro area country-by-country analysis of the relationship of expenditure and the respective GDP for the most relevant functions in 2011: defence and public order and safety, health, education and social protection. In this perspective, it is worth mentioning that Portugal had a level of expenditure as a percentage of GDP relatively high, even compared to countries with higher per capita income, particularly in defence, public order and safety and education. As for public spending on education, Portugal is often referred to in the literature as a country with a high proportion of staff costs. In this respect, it is worth mentioning that the difference in the share of compensation of employees in total expenditure on education compared to the euro area average peaked at about 11 p.p. in 2008, decreasing substantially in the following

[16] Luxembourg is not considered as it is clearly an outlier in this analysis.

Figure 16

Total Public Expenditure as a Ratio to GDP and GDP Per Capita Measured in PPS, 2012



Sources: Eurostat, Statistics Portugal and Banco de Portugal.
Notes: Luxembourg is not considered. The simple average of the euro area is represented by EA*.

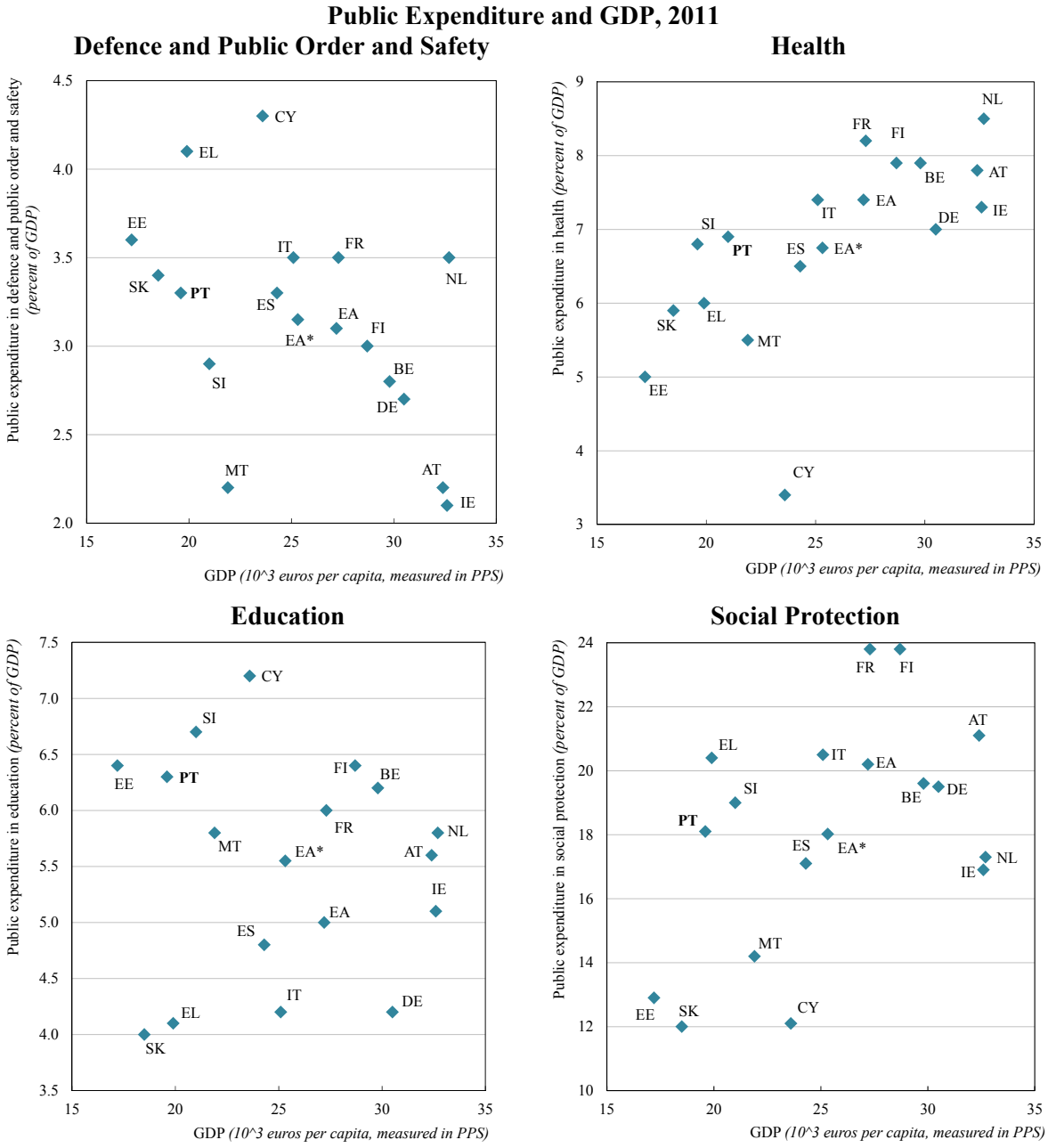
years (in 2011, the difference stood at 5.4 p.p.). This development is certainly explained to a large extent by both the general measures affecting the wages of general government workers, and the reduction of the number of teachers hired. In contrast, public spending on health and social protection in Portugal is below the euro area average, although pension expenditure as a ratio to GDP has already reached a value close to the euro area.

3.3 Revenue developments

As already highlighted, the increase in the tax burden was one of the driving forces of Portuguese public finances. In this context, it is worth mentioning that the basic structure of the current tax system as set down prior to the period under analysis. Indeed, both indirect and direct taxation were completely reshaped in the second half of the eighties. The first in 1986, with the introduction of VAT, and the latter in 1989, with the creation of the personal and corporate income taxes. Between 1995 and 2012, the tax burden in Portugal increased by 3.9 p.p. of GDP, reaching 34.8 per cent of GDP at the end of the period (Table 2). This evolution was due to all major categories of taxes and social contributions. In 2012, taking the euro area as a benchmark, Portugal recorded a lower tax burden as a ratio to GDP, with a higher level of receipts from indirect taxes, but lower as far as revenue from direct taxes and social contributions are concerned.

The drivers of the changes in the structural tax burden varied substantially along the years (Figure 18). Concerning legislation changes, the period up to 2001 witnessed discretionary measures aiming at the reduction of the tax burden, while from 2002 onwards this trend was

Figure 17



reversed. That change was closely related to the need to correct excessive deficits, in a first stage. In the two last years of the period under analysis, discretionary tax increases appeared as part of the fiscal consolidation measures adopted in the context of the Financial and Economic Assistance Programme. The fiscal drag and decoupling of the base from GDP did not have a major contribution to the change in the structural tax burden in most of the years. The magnitude of the residual was, however, important but it should be referred that its explanation may be related to some extent with the drawbacks of the cyclical adjustment methodology or an inaccurate quantification of policy measures. Additionally, the positive residuals in the period 2004-07 were

Table 2

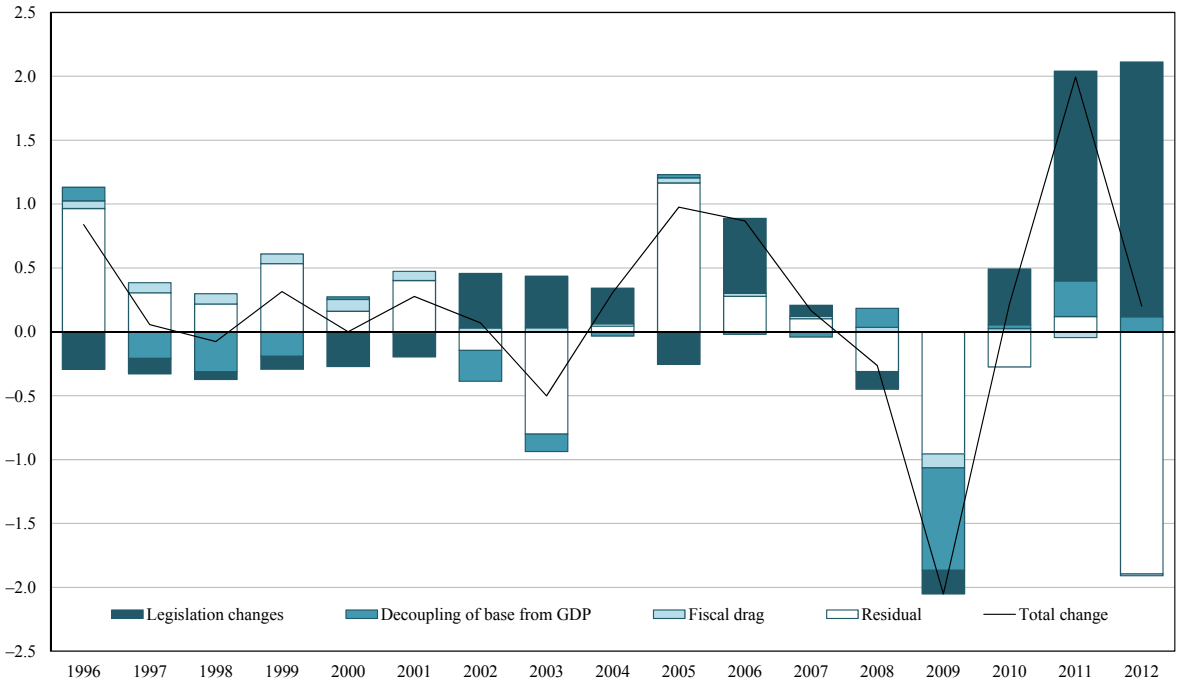
Evolution of the Tax Burden
(percent of GDP)

	Portugal			EA-17		
	1995	**2012**	**Change**	**1995**	**2012**	**Change**
Taxes on income and wealth	8.2	9.3	1.1	11.5	12.4	0.9
Taxes on production and imports	12.6	13.7	1.1	11.8	13.0	1.2
Capital taxes	0.1	0.2	0.1	0.3	0.3	0.0
Social contributions	10.0	11.6	1.6	17.1	15.9	–1.2
of which: imputed contributions	2.3	2.5	0.2	1.5	1.2	–0.3
Tax burden	**30.9**	**34.8**	**3.9**	**40.7**	**41.6**	**0.9**

Sources: Eurostat and Statistics Portugal.

Figure 18

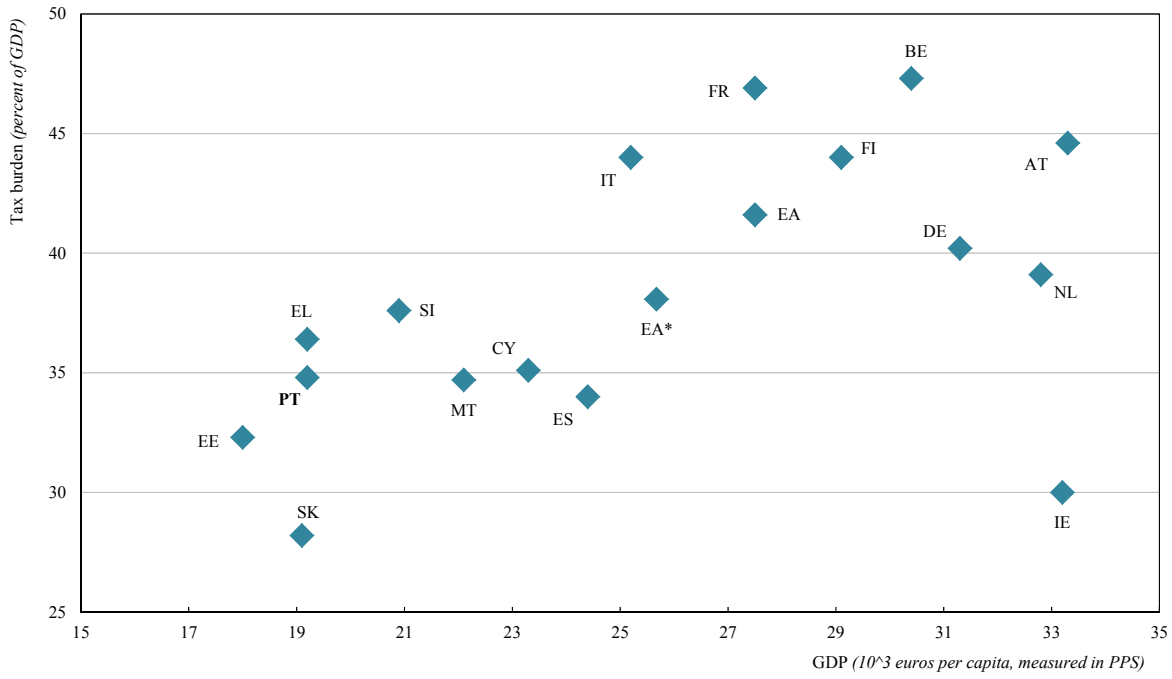
Breakdown of the Change in the Structural Tax Burden
(percent of trend GDP)



Sources: Authors' calculations.
Note: Excludes social contributions of the public employees subsystem.

Figure 19

Tax Burden as a Ratio to GDP and GDP Per Capita Measured in PPS, 2012



Sources: Eurostat, Statistics Portugal and Banco de Portugal.
Notes: Luxembourg is not considered. The simple average of the euro area is represented by EA*. The tax burden includes taxes on income and wealth, taxes on production and imports, capital taxes and social contributions.

mostly due to the enhancement of the effectiveness of tax administration, based on a wider use of information technology and stepped up human resources. The significant negative residuals in 2009 and 2012 were both strongly affected by VAT developments. In the first of these years, the performance of VAT collection below what could be expected given the evolution of the macroeconomic base still remains to be explained, while in the case of 2012 the situation occurred as a result of an overestimation of the impact of some measures.

Although the tax burden as a ratio to GDP in Portugal was significantly lower than in the euro area as a whole in 2012, when comparing with other countries individually, Portugal had a tax burden broadly in line with what would be expected given its level of GDP per capita measured in PPS (Figure 19). This situation differs significantly from the case of total expenditure mentioned before.

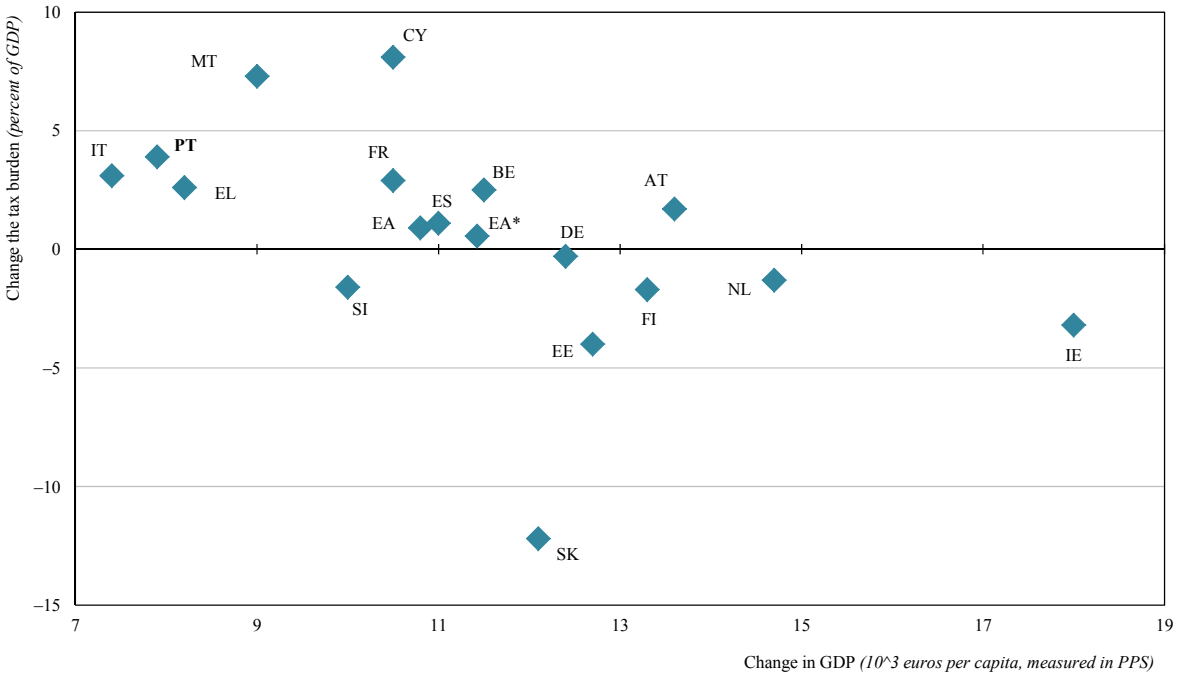
However, in terms of change, Portugal recorded one of the highest rises in its tax burden to GDP ratio among the euro area countries between 1995 and 2012, despite the negligible increase in GDP per capita (Figure 20).

4 Why was expenditure control so ineffective?

Portugal was officially the first country in the euro area to record an excessive deficit: it occurred in 2002 based on the 2001 fiscal developments. In 2005, for the second time, an excessive

Figure 20

Change Between 1995 and 2012 of the Tax Burden as a Ratio to GDP and GDP Per Capita Measured in PPS



Sources: Eurostat, Statistics Portugal and Banco de Portugal.
Notes: Luxembourg is not considered. The simple average of the euro area is represented by EA*. The tax burden includes taxes on income and wealth, taxes on production and imports, capital taxes and social contributions.

deficit situation was identified concerning the year itself. From 2002 to 2008 several packages of fiscal measures were approved aiming to correct or avoid excessive deficits. These packages involved: i) tax hikes, with particular emphasis on VAT (2002 and 2005), ii) increasing the efficiency/effectiveness of the tax administration, a process that started before 2005, but whose most visible effects emerged from 2005 to 2007; iii) temporary measures in the strict sense, mainly on the revenue side, iv) short-term measures on the expenditure side, possibly with a permanent impact on the level of spending, but only a transitory effect on its growth rate. In 2006 and 2007 were introduced some relevant structural reforms, but with a limited impact in the short term.

The March 2008 excessive deficit procedure notification confirmed that the deficit in 2007 had fallen short of 3 per cent of GDP, suggesting at first glance an optimistic assessment of the state of public finances in Portugal. It was understood then that there was room for stimulus measures, which indeed started to materialize. Firstly, the standard VAT rate was cut by 1 percentage point as early as April 2008. Shortly after, in July, a package of measures to protect vulnerable groups from the effects of a crisis that was expected to involve price and interest rates increases was implemented. In the last months of the year the budget for 2009 was approved, which included measures such as the increase of 2.9 per cent of the salaries of government workers, and the official package of stimulus measures, within the framework of an EU initiative. Throughout 2009 the control of public expenditure was effectively loosened. This set of measures, together with the effects of the international financial and economic crisis, led to an explosion of the deficit in 2009. The reluctance to accept the need for a fiscal adjustment of a considerable magnitude throughout 2010 and in the first months of 2011 worsened decisively the international investors'

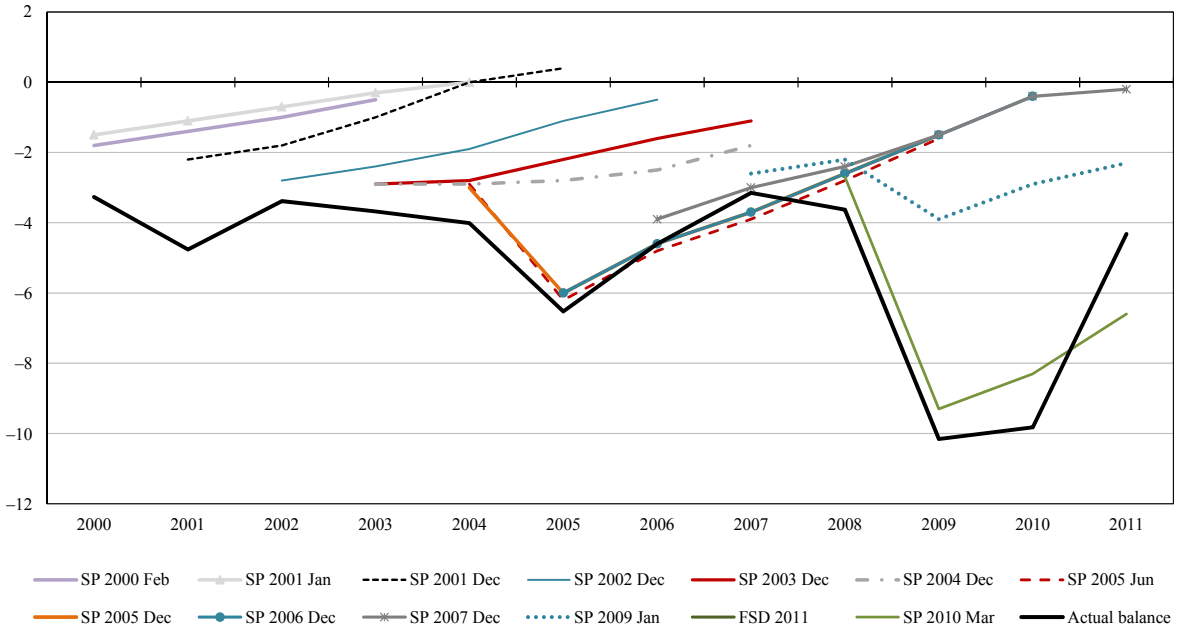
pressure about the Portuguese public debt, which culminated in the request for economic and financial assistance by Portugal, in April 2011.

Following the entry of Portugal into the European Community, it would be naturally expected a rapid expansion of public spending to reduce, at least partially, the difference between the levels of provision of public services and social protection relative to the other Member-states. But when the Portuguese economy slowed at the turn of the century, it would have been prudent to substantially adjust the pace of expansion of public expenditure. This did not happen due to a large number of factors. Below are highlighted some of the most relevant:

- The rights acquired as a result of past decisions, particularly generous, entailing a substantial rigidity in reducing expenditure. Among them are: i) the large wage increases resulting from the new salary system for civil servants and ii) the inability to dismiss civil servants; iii) automatic and rapid progression in their careers, in most areas of public administration, iv) the rules for setting the initial pensions in CGA.
- The delay in structural reforms, allowed by the use of very substantial temporary measures and measures that have only transitory impact on the rate of change in expenditure, as well as the reduction of government investment.
- The limitations of budgetary procedures, in particular: i) the absence of fiscal rules, in most of the relevant dimensions, ii) an emphasis on annual budgets, without a medium-term fiscal framework, iii) budgetary control focused on the use resources and not on the results, iv) the fragmentation of the budget, v) a system of accounts incomplete and, vi) the limited transparency of budgetary procedures. This framework allowed the politicians to ignore fundamental technical restrictions in making their decisions, did not induce a consistent behavior over the various areas and levels of government towards achieving the main budgetary objectives and hindered the evaluation of public policies by citizens in general and even by experts.
- The weaknesses of the system of multilateral fiscal surveillance in the EU, both before and after the reform of the Stability Pact, which limited their impact in countries such as Portugal, where budgetary best practices were not internalized by all political actors , the social partners and the public in general. At the root of these weaknesses has always been the fact that the most important decisions in terms of sanctions and even prevention were adopted with a high degree of discretion by the representatives of the Member-states, leading to the acceptance of medium-term programs often unrealistic and based on statistical information insufficiently controlled, as Figure 21 illustrates for the Portuguese case. Until the reform of the Pact, these problems were aggravated by excessive focus on the deficit, ignoring several important dimensions such as sustainability, efficiency of public spending and the quality of institutions nationwide.
- The long-term trend of population aging was also a factor of some importance in increasing spending. Note, however, that even in the areas that are the most affected by the demographic development, such as public pensions and health, aging alone explains a small part of expenditure growth: on average, close to a third of the rate of change of old age pensions of Social Security, as illustrated in Figure 7, and a little more than ten per cent of the growth rate of public expenditure on health. In the case of pension expenditure of the CGA, the relationship is difficult to establish, since the increase in the number of retirees reflects the demographic structure of specific employees of the public administrations, as well as being heavily influenced by successive waves of early retirements and transfers of pension funds.
- Finally, in terms of the context in which it operates fiscal policy, it must be stressed that some illusions about the potential growth of the Portuguese economy were retained, as evidenced by Figure 22. Indeed, the perception that growth based on domestic demand and easy access to credit would lead to stagnation of the economy took several years to become almost consensual.

Figure 21

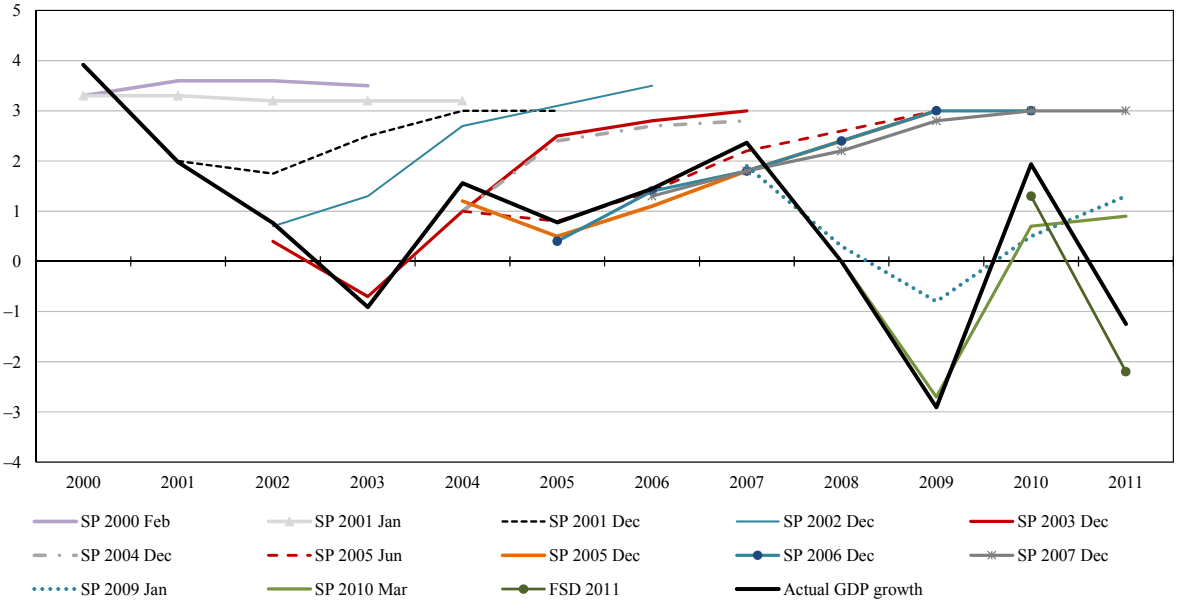
General Government Balance: Projections of the Stability Programmes and Actual Outcomes
(percent of GDP)



Sources: Updates of the Stability and Growth Programme and Statistics Portugal.
Notes: SP = Stability Programme; FSD = Fiscal Strategy Document.

Figure 22

GDP Growth Rate: Projections *vis-à-vis* Actual Outcomes
(percent)



Sources: Updates of the Stability and Growth Programme and Statistics Portugal.
Notes: SP = Stability Programme; FSD = Fiscal Strategy Document.

The poor assessment of the growth trajectory of the economy has been particularly relevant in the area of budgeting, determining a too optimistic prospect about the sustainability of public finances.

Despite the inability to ensure a clear sustainability of public finances in Portugal, since the turn of the century until the beginning of the current financial and economic crisis, several notable reforms or other changes in the budgetary domain occurred. Without trying to be exhaustive, the most important are highlighted below:

- The reform of public pension systems, which was, at the European level, considered a good example, with visible and immediate impact on the sustainability assessment.
- The public administration reform, involving a multiplicity of aspects, with relative success. In terms of control/quality of expenditure it should be highlighted the new rules for career progression, which became slower and more variable, more clearly linked to performance evaluation, and now subject to quotas in the upper categories.
- Rationalization of networks for the provision of public services. For its quantitative relevance, deserve special mention the closure of schools with a small number of students and the creation of school groups in non-tertiary education, and the restructuring of the networks of some health services more differentiated, for example, maternity and emergency services.
- Increased transparency and quality of budgetary information, both from the viewpoint of public accounting and of national accounting. In the first of these aspects it should be noted the publication in the bulletin of the Directorate-General of the Budget of monthly data on a cash basis, covering almost all of the entities that are included in the general government sector from the perspective of national accounts (only in 2012 began to be published monthly information on the reclassified public corporations). In the second, it should be noted the compilation of general government non-financial national accounts, annual and quarterly, by Statistics Portugal. At the institutional level it should be highlighted the strengthening of the role of the Bank of Portugal, which compiles financial accounts and public debt statistics, and of the Court of Auditors. At EU level reference should be made to the strengthening of the means and the powers of Eurostat, in particular in the context of the excessive deficit procedure.

5 The Economic and Financial Assistance Programme to Portugal: The fiscal pillar

In the first months of 2011, financial markets triggered an increase in sovereign risk, affecting the domestic banking system and the economy as a whole (Figure 23).

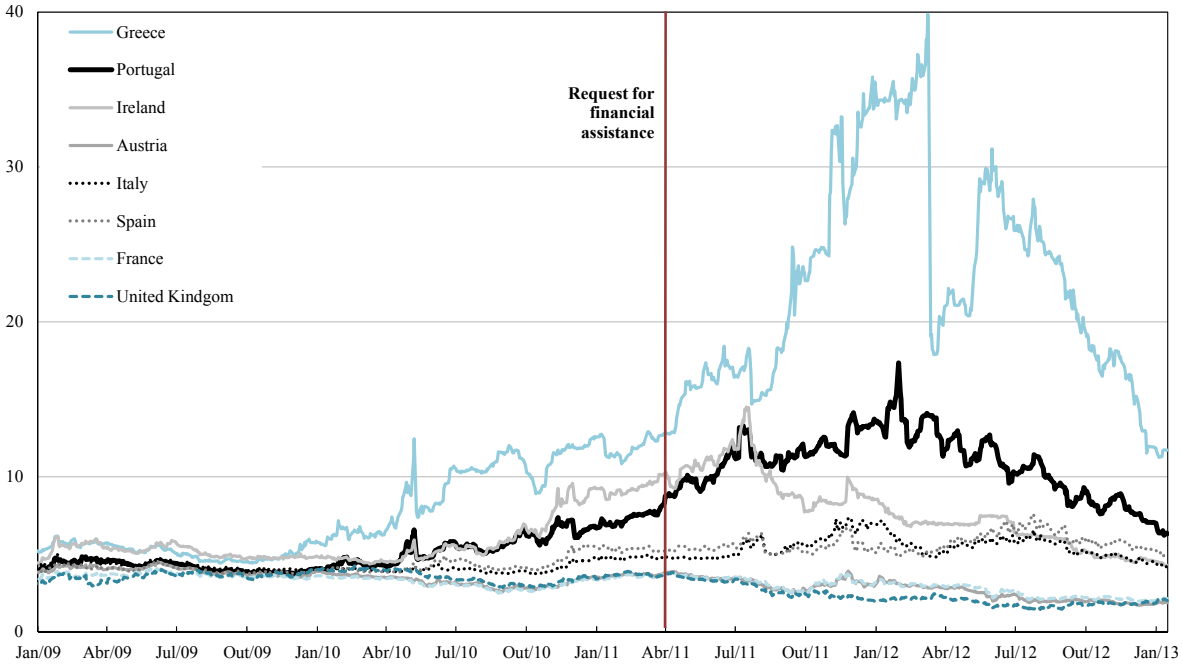
The Economic and Financial Assistance Programme to Portugal will last from mid-2011 to mid-2014 and focuses its intervention in three main areas:

- Structural reforms to increase potential growth, create jobs and improve the competitiveness of the economy.
- Credible strategy for fiscal consolidation:
- Orderly process of deleverage in the financial sector through market mechanisms and supported by specific funds to recapitalise banks.

In the public finances domain, the adjustment programme has as one of its main objectives the reduction of the general government deficit, according to the rules of the excessive deficit procedure to below 3 per cent of GDP. The rapid correction of budgetary imbalances, based on a broad set of measures on both the revenue and the expenditure side, together with substantial receipts from privatizations, should allow a reversal of the public debt ratio rising trend. The programme also includes the implementation of structural reforms in the budgetary area, in order to ensure a path for public spending in line with the potential growth of the economy.

Figure 23

Public Debt Yields, 10 Year
(percent)



Source: Thomson Reuters.

On the revenue side, the main measures already implemented under the programme are the following: i) increase in VAT rates and change of some goods and services subject to reduced rates to the standard rate, ii) reduction of tax benefits in particularly within the personal and corporate income taxes, iii) surcharges, both within the personal and corporate income taxes, iv) increase in the final withholding rates, both in the personal and corporate income taxes, v) changes in the rate structure of the personal income tax, with a substantial increase of marginal and average rates, vi) revaluation of equity value of urban buildings, significantly expanding the collection of the municipal tax on property, vii) increase in the contribution rates of workers to CGA and ADSE and, viii) transfer of banking sector pension funds. Note that not all of these measures were included in the initial version of the programme, having been adopted subsequently in order to ensure the fulfilment of the deficit targets.

On the expenditure side, the most relevant measures already implemented in the context of the programme are as follows: i) wage freeze and cuts in general government, public enterprises and public pension systems, ii) strict control of admissions and sharp decline in the number of workers with fixed-term contracts; iii) Total/partial suspension of the Christmas and summer bonuses to public sector workers and pensioners of public systems, iv) accession to non-contributory social benefits subject to means testing, v) reduction of prices of medicines and medical acts co-financed and change in the rules of prescription and reimbursement, promoting the use of generic drugs, vi) cuts in public investment and, vii) new legislation on the control of expenditure commitments. Similarly to what occurred on the revenue side, not all measures listed were included in the initial programme, only having been considered subsequently given the difficulty in reaching the objectives for the deficit.

Regardless of the greater or lesser success in meeting the goals for the deficit and creating effective conditions for the sustainability of public finances, the budgetary block of the programme has several merits that should be underlined. Firstly, it encompasses key improvements in terms of fiscal governance. Indeed, it facilitated the adoption of the amendments to the Budgetary Framework Law in May 2011, and contributed, moreover, to create a culture of effective control of expenditure. Secondly, it includes consolidation measures that would not be possible to implement in normal times, breaking somehow the taboo relating to acquired rights and tackling important issues like public-private partnership arrangements and state-owned enterprises. Finally, by imposing strict budgetary discipline, it helps the clarification of the tradeoffs between the choices on the expenditure and taxation sides, emphasizing the relevance of the efficiency/effectiveness of spending.

However, from the point of view of the efficient functioning of public administrations and companies, in particular as regards the provision of goods and services, and the effects of the public sector in the potential growth of the economy, the budgetary block of the programme has serious limitations. Firstly, despite the emphasis on reducing expenditure and important revenue shortfalls, the use of tax increases is obviously excessive. In turn, the measures on the expenditure side are predominantly horizontal, with potentially significant costs in the operation of general government and public enterprises. These effects are compounded, in terms of efficiency, by the fact that the correction of the public sector wage *premia* was not properly made and by the suspension of the incipient performance incentive scheme. Finally, it follows very centralized procedures, leaving little leeway for the management of sectoral programmes and of public services and corporations. These limitations can be seen as inevitable given the magnitude of the structural adjustment required in the short term. But the efficient functioning of the public sector in the long term implies, from now on, a different approach, more selective and based on a proper incentive framework.

In terms of the main results of the programme up to now, it is worth highlighting that the initial targets for the deficit were not realistic: they were based on a poor assessment of the underlying fiscal situation and on a very optimistic macroeconomic scenario. This led to the adoption of temporary measures and the revision of targets (Table 3).

6 Concluding remarks: Key lessons for the conduct of fiscal policy

A thorough analysis of the evolution of public finances in Portugal after the accession to the European Community suggests some key lessons for the conduct of fiscal policy in the coming decades:

- The strict functioning of the budgetary surveillance at the European level and in particular in the euro area, reinforced in the context of the current crisis, is important to avoid unsound policies in some Member-states, with a negative impact in the EU as a whole. Rigorous implementation of fiscal rules is of the utmost importance in order to ensure, ultimately, the sustainability of public finances in Europe.
- The disciplinary role of financial markets is uncertain, as is well demonstrated by developments in recent years. In principle it may contribute to the adoption of prudent macroeconomic, fiscal and financial policies, but there is a risk that its impact will only be felt when the imbalances are already very pronounced.
- The establishment of a national fiscal framework in accordance with international best practices is essential to ensure the sustainability of public finances, without incurring in the disciplinary counter-cyclical action of multilateral surveillance and/or markets. The changes to the Budgetary Framework Law, in 2011, and some structural fiscal reforms under the Programme

Table 3

General Government Deficit (National Accounts)
(percent of GDP)

	2011	**2012**	**2013**	**2014**	**2015**
Initial targets (May 2011)	5.9	4.5	3.0	2.3	1.9
1st revision (5th review, August 2012)		5.0	4.5	2.5	1.9
2nd revision (7th review, February 2013)			5.5	4.0	2.5
Outturn	4.3	6.4	4.9		
Outturn excluding temporary measures and special factors	7.1	6.0	5.2		

Sources: Ministry of Finance and Statistics Portugal.

were important steps in the right direction. Still, the improvement and implementation of the new rules are crucial to ensure that sound budgetary practices become a part of the political and social culture in Portugal.

- A well designed and stable system of taxation and public expenditure programmes, reducing uncertainty and providing a framework of proper incentives to all economic agents, are essential to increase the potential growth of the economy.
- The efficiency/effectiveness in the provision of public services can play an important role in achieving sound public finances, ensuring the best use of the resources made available to the general public through taxes, in terms of social welfare.
- The creation/strengthening of managerial and technical capacity in general government services and public enterprises are a fundamental prerequisite for the design and implementation of good public policy.

REFERENCES

Braz, C. (2006), "The Calculation of Cyclically-adjusted Balances at Banco de Portugal: An Update", Banco de Portugal, *Economic Bulletin*, winter issue.

Cunha, J. and C. Braz (2009), "The Main Trends in Public Finance Developments in Portugal: 1986-2008", Banco de Portugal, Occasional Paper, No. 1.

——————(2012), "The Evolution of Public Expenditure: Portugal in the Euro Area Context", Banco de Portugal, *Economic Bulletin*, winter issue.

Cunha, J. (2012), "As finanças públicas em Portugal: como chegámos aqui?", proceedings of the Conference *Towards a Comprehensive Reform of Public Governance*, Banco de Portugal, Conselho das Finanças Públicas, Fundação Calouste Gulbenkian.

Economics and Research Department (2009), *The Portuguese Economy in the Context of the Economic, Financial and Monetary Integration*, Chapter 6, Banco de Portugal.

Kremer, J., C. Rodrigues Braz, T. Brosens, G. Langenus, S. Momigliano and M. Spolander (2006), "A Disaggregated Framework for the Analysis of Structural Developments in Public Finances", ECB, Working Paper, No. 579.

FISCAL POLICY AND EXTERNAL IMBALANCES UNDER A DEBT CRISIS: THE SPANISH CASE

Pablo Hernández de Cos[*] *and Juan Francisco Jimeno Serrano*[*]

In this paper we reflect on the role that fiscal policy could play in the resolution of the crisis in Eurozone countries crippled by both public and private debt, and beset by growth and competitiveness problems. As an illustration, we revisit the Spanish case, a paradigmatic example of the economic difficulties created by high debt and internal and external imbalances. After describing the build-up of fiscal and macroeconomic imbalances in Spain during the period 1995-2007, we first discuss how the correction of macroeconomic imbalances conditions progress on the fiscal consolidation front and, secondly, how fiscal consolidation affects the correction of imbalances. We conclude that the role that national fiscal policies can play in these countries to expand demand and reduce the costs of solving external and internal imbalances seems limited. Also, overall, the best contribution that fiscal policy can achieve under these constraints is through a better targeting of government expenditures and tax reforms, aimed at introducing permanent measures to stabilise debt ratios. These could then be combined with productivity-enhancing structural reforms and with improvements in product market regulation to increase competition, so that the short-term costs of the internal devaluation required are reduced.

1 Introduction

We live in unprecedented times. The economic and financial crisis has brought public debt-GDP ratios to historically high levels in advanced countries, and population ageing is expected to lead to significant pressures to increase public spending in the near future. In parallel, private households remain highly indebted, which together with the large fiscal consolidation needs limit short-term growth prospects. With a more medium-term perspective, projections for potential growth are also subdued, due to a demographic scenario marked by low fertility rates and population ageing, and to the meagre possibility of intense productivity growth after the technological developments of the ICT revolution have been fully exploited.[1]

In the Eurozone, the situation is even more complex, as a significant part of these debts are mostly cross-border, intermediated by banking sectors that have been weakened by the financial crisis and, in some cases, by the bursting of housing bubbles. In addition to these events, the reaction of financial markets has led to a situation marked by financial fragmentation within the euro area with market participants reacting abruptly to weaknesses in the economic and financial positions of individual countries. Furthermore, persistent inflation differentials since the start of EMU, in a context of an appreciating euro, resulted in serious competitiveness losses in southern European countries. Hence, these countries are in a conundrum in which both public and private deleveraging and relative price adjustments have to take place against a backdrop of low (nominal and real) growth and very adverse financial conditions.

---

[*] DG Economics, Statistics and Research, Banco de España.

[1] Potential productivity growth in advanced countries is a highly contentious issue. Gordon (2012) argues that the rapid progress made over the past 250 years could well turn out to be a unique episode in human history and that most countries face six headwinds that are in the process of exerting a drag on long-term growth (demography, education, inequality, globalisation, energy/environment, and the overhang of consumer and government debt). Bartelsman (2012), on the contrary, argues that much higher growth is technologically feasible, but it requires a considerable amount of churn and reallocation across firms in the market sector, and that, conditional on the policy environment, labour productivity growth in the EU of 3 per cent per year for the next 20-30 years appears attainable.

The debate about what fiscal policy can and cannot achieve under these difficult macroeconomic conditions has gained relevance. The empirical literature on fiscal multipliers, which has expanded significantly by making use of new data sets and methodological approaches (see, for instance, Kraay, 2012; and Mian and Sufi, 2012), now provides a wide array of estimates, based on sample periods, macro covariates, identification procedures, and characteristics of the fiscal measures (Ilzetki, Mendoza and Vegh, 2011; Baum, Poplawski-Rivero and Weber, 2012). Some recent papers also look at how the values of the fiscal multiplier condition public debt dynamics (e.g., Boussard, de Castro and Salto, 2012).

Unfortunately, progress on the theoretical front has been scarce. There is burgeoning literature on optimal public debt in models with heterogeneous agents (Werning, 2007, Golosov, Tsyvinski and Werning, 2007), but these papers are more of a normative nature and have little to say about the current policy debate on how to deal with predetermined debt. Some papers have argued that the effects of stabilising fiscal policy are very powerful when monetary policy is constrained by the zero lower bound on nominal interest rates and there are agents whose borrowings are also constrained (Eggertsson and Krugman, 2012). To what extent this is relevant to guiding policy under the current deleveraging scenario is, however, highly controversial. Moreover, there are no reasons to expect symmetric effects of fiscal policies when debt is at such a high level that a different policy stance may have very significant effects on financing costs (Corsetti *et al.*, 2012). Finally, as Andrés *et al.* (2012) argue, less attention has been paid to the effect of households' financial conditions on the fiscal multiplier, which can also give rise to non-linear effects of fiscal policies (documented empirically, for instance, in Afonso, Baxa and Slavik, 2011). And, since the ultimate effects of fiscal expansions on the economy crucially depend on the reaction of employment – and southern European countries also have high unemployment rates – more evidence is needed on the effects of a government spending shock on vacancies, employment, and unemployment, including the persistence of unemployment and the possibility of it becoming structural (Brückner and Pappa, 2010, and Monacelli, Perotti and Trigari, 2010).

In this paper we first reflect on the role that fiscal policy could play in the resolution of the crisis in Eurozone countries crippled by both public and private debt and beset by growth and competitiveness problems. As an illustration, we revisit the Spanish case, a paradigmatic example of the economic difficulties created by high debt and internal and external imbalances.

2 Fiscal policy under a debt crisis

2.1 The current scenario

Most empirical papers about the output and employment effects of fiscal policy cited in the introduction have an Anglo-Saxon bias. Thus, when focusing on the situation of some country members of the euro-zone, it seems that some important considerations are neglected in this literature. First, a significant part of the recently accumulated debt in UEM countries that is now being deleveraged is external, not between savers and borrowers of the same closed economy (as in Eggertsson and Krugman, 2012). Hence, issues like real exchange rate misalignments, home bias in tradable goods and assets, and risk premia are relevant to the analysis of the potential impact of fiscal policy. Moreover, there is an excess of accumulated debt as a result of either overoptimistic expectations or a sudden permanent drop in potential growth over the long run , both phenomena neglected by rational expectations models and/or models without long-run trends (as usual in the DSGE camp). Thus, most recent papers on fiscal policy still consider risk-neutral households involved in smoothing income fluctuations under a debt constraint and analyze the consequence of the debt constraint becoming more binding. However, one may think that the current scenario in Southern Europe resembles, instead, one in which risk-averse households are in a deleveraging

process caused by a correction of overoptimistic expectations on potential growth, while the main source of demand has to come from abroad, and external funding is scarcer and more costly.

2.2 Asymmetric effects of fiscal policy

In this situation, the usual transmission mechanisms of fiscal measures need to be reconsidered. First, using expansionary fiscal policy to transfer resources to households so that their borrowing constraints are somehow relaxed, and, hence, increasing consumption, may not work if debt-constrained private agents are involved in a deleveraging process in which consumption is determined, not by current income, but by the new desired level of debt. On the contrary, reducing public expenditures may not have the well-known expansionary Ricardian effects if expectations about future income growth remain subdued. Moreover, at the current debt levels, it is very likely that fluctuations in public debt are associated with changes in financing costs, so that the negative short-run effects on output of reducing public debt may be compensated by lower interest payments, while increasing public debt may raise financing costs and, hence, produce smaller short-run positive output effects. Thus, "fiscal multipliers" seem, more than ever, very dependent on the fiscal measure implemented, on its impact on financing costs, and on expectations on future growth, so that it is very likely that using a single number to characterize the short-run impact of fiscal policies could be very misleading.

These considerations raise two types of asymmetries or non-linear effects of fiscal policy. One is the dependence of the value of the fiscal multiplier on the state of the economy or on the level of some particular macroeconomic and/or financial variable that, beyond some thresholds, exert strong influence on the effect of fiscal policies. This is a possibility that has been extensively researched in recent empirical work (see, for instance, Baum *et al.*, 2012 and Afonso *et al.*, 2011). The other type of asymmetry that has not received so much attention, in neither the empirical nor the theoretical literature, is the possibility that the effects of a positive fiscal shock may not be of the same magnitude, albeit different sign, than those of a negative shock, when those effects depends very much on the response of financing costs, the state of expectations about potential growth, and the ongoing deleverage process in the private sector.

2.3 Debt, external imbalances, internal and fiscal devaluations

Together with high public and private debt, Southern European countries have a competitiveness problem, which needs to be resolve by price adjustments that shift resources from non-tradable to tradable sectors and that depreciate their real exchange rates. Obviously, these adjustments are the less costly, the higher productivity growth and the increase in external demand are. It is often argued that depreciating the real exchange rate by means of an "internal devaluation", achieved by nominal wage reductions, is a non-starter since this would increase the private debt burden, lower public revenues and, hence, worsen the public debt dynamics, a way of thinking that is reminiscent of the Fisherian debt deflation dynamics (Fisher, 1933). This has led to some authors (Farhi *et al.*, 2012) to suggest an alternative route, namely, a "fiscal devaluation", consisting of reducing non-wage labor costs (e.g., social security contributions) and increasing consumption taxes, to cheapen the prices of domestically produced goods with respect to goods produced abroad.

Both arguments, the relevance of Fisherian debt deflation dynamics and the convenience of a fiscal devaluation, might not fit well with the current situation in Southern Europe. As for Fisherian debt deflation dynamics, it is based on a logic that applies to closed economies without unemployment, in which changes in real wages necessarily imply lower demand and disposable income. However, the impact of real wage cuts on demand and household disposable income in

open economies with unemployment depend on the implied real exchange rate depreciation and on the wage-elasticity of employment, which may be small in the short run, but surely it is non negligible, in particular if structural reforms to increase product market competition and enhance productivity are implemented simultaneously. Regarding a fiscal devaluation, while this proposal may deserve some consideration since in particular it might help in the transition to a new equilibrium, it should be taken into account that in the long run this type of measures are only neutral on employment. Moreover, to have a significant impact on the short run, the reduction in non-wage labor costs and the commensurate increase in consumption taxes may need to be large and it requires not to be translated into higher wages or margins. Finally, in countries where pension systems are under pressure and are mainly financed by social security contributions, their reduction will require a clear plan for either reducing pensions' expenditure or raising additional revenues.

Hence, it seems that the competitiveness adjustment has to come from the two usual channels: i) nominal wage cuts, in the short run, and ii) productivity growth, in the medium to long run. How in the current high debt/low growth context fiscal policy has to be designed to smooth this adjustment is a real challenge, more so if structural reforms are not also designed and implemented to make prices more flexible, eliminate barriers to the creation of new firms, and laying out a labor legislation that favors changes in work organization within firms and make job creation and job destruction patterns more conducive to productivity growth.

3 Fiscal policy and macroeconomic imbalances: The Spanish case

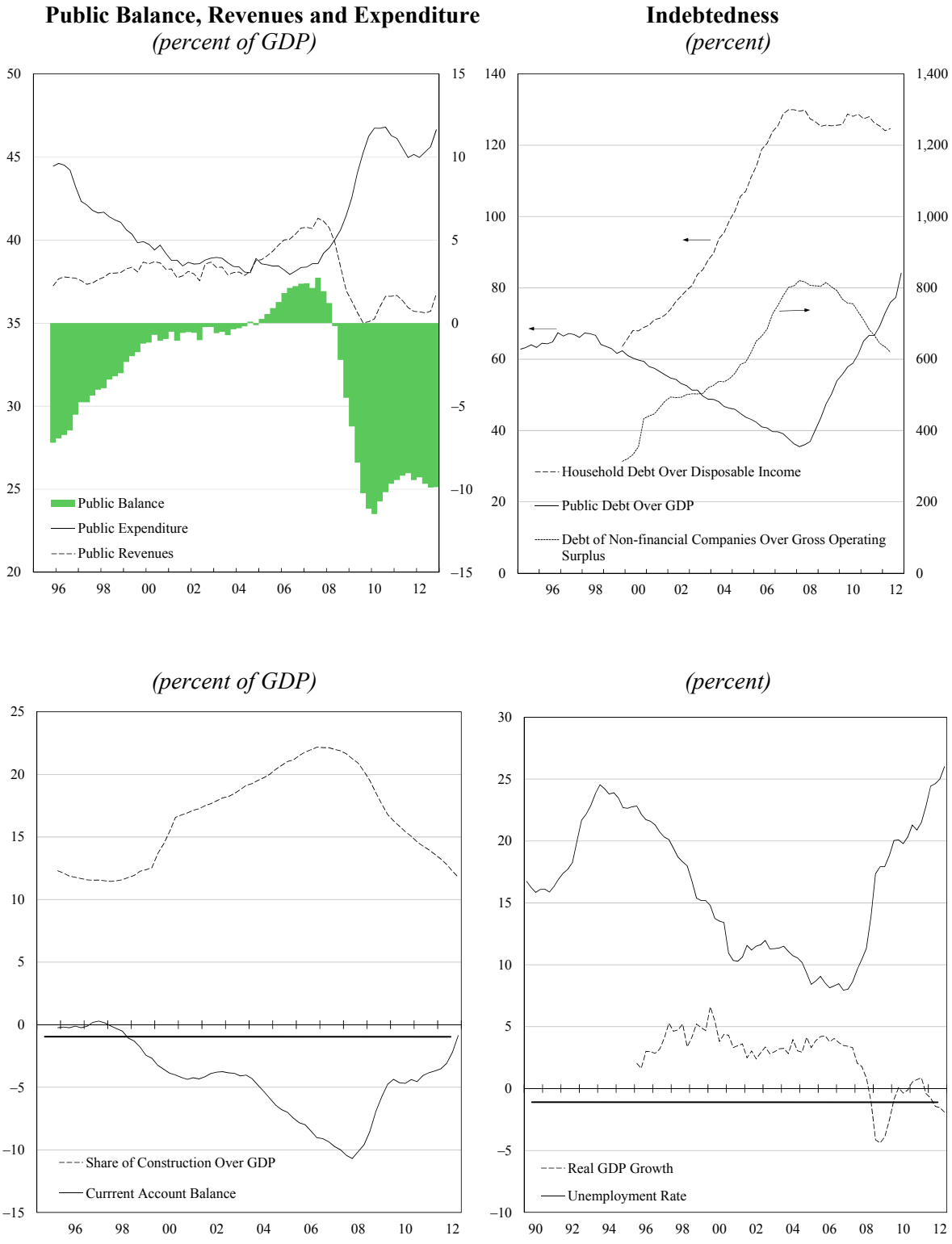
Spain is a perfect case study for analyzing fiscal policy under the constraints imposed by high debt – public, private – and macroeconomic imbalances – internal and external. The path to this weak current situation started from a positive apparently healthy fiscal position prior to the crisis; and continued with a rapid deterioration in the budget and debt dynamics, and a negative spill-over from the ongoing consolidation of public debt sustainability to the growth outlook in a context of long-term adjustment of the economy, and a mild adjustment of the imbalances (see Figure 1).

How macroeconomic imbalances were originated in the Spanish case has been documented in many papers (see, for instance, Gavilán *et al.*, 2011a and 2011b). Upon entry in the UEM, the fall in interest rates and the expansion of credit gave impulse to a large expansion in demand and to a housing bubble. Lack of a supply response, despite large immigration flows and because of low productivity growth, generated a real exchange rate appreciation, large current account deficits, and the build up of external debt.

As to the fiscal domain, in late 2007, after a long period of high growth, Spain had a fiscal surplus of close to 2 per cent and a public debt/GDP ratio of 36 per cent (against a deficit of 7 per cent and a debt to GDP ratio of 70 per cent in 1995). However, beneath this healthy position lay some worrying public revenue and spending dynamics. Of the total reduction in the deficit recorded between 1995 and 2007 (8.4 percentage points (pp) of GDP), almost 5 pp were attributable to the business cycle and to the decline in the interest burden, associated above all with the reduction in interest rates (see Figure 2). The rest of the adjustment was due to an exceptional increase in tax revenues – with a significant temporary component – linked largely to the excessive real estate expansion, which more than offset the reduction in revenue of approximately 3 pp of GDP arising from discretionary changes in the tax system, while primary public expenditure (excluding interest payments on public debt and net also of unemployment benefits), grew at an annual rate of more than 7 per cent, clearly above trend economic growth.

Figure 1

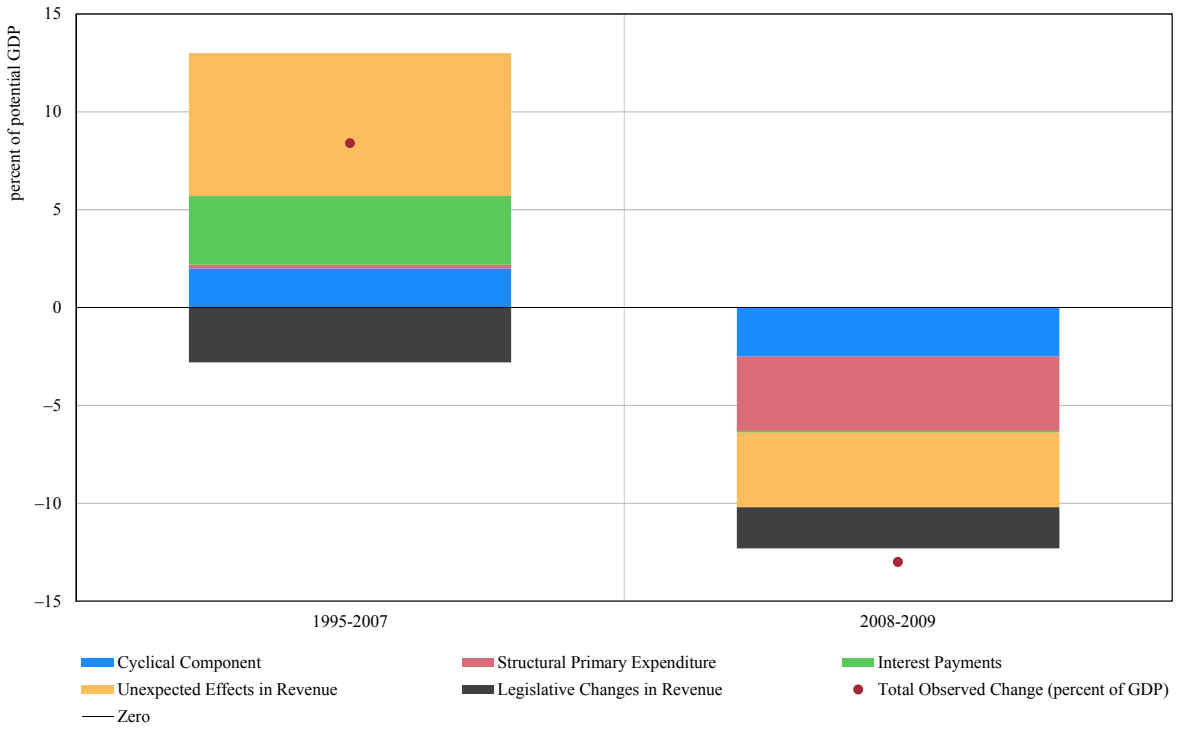
Main Macroeconomic Variables of the Spanish Economy



Source: INE and Banco de España.

Figure 2

Determinants of Changes in the Spanish General Government Balance
(cumulative percentages of GDP)



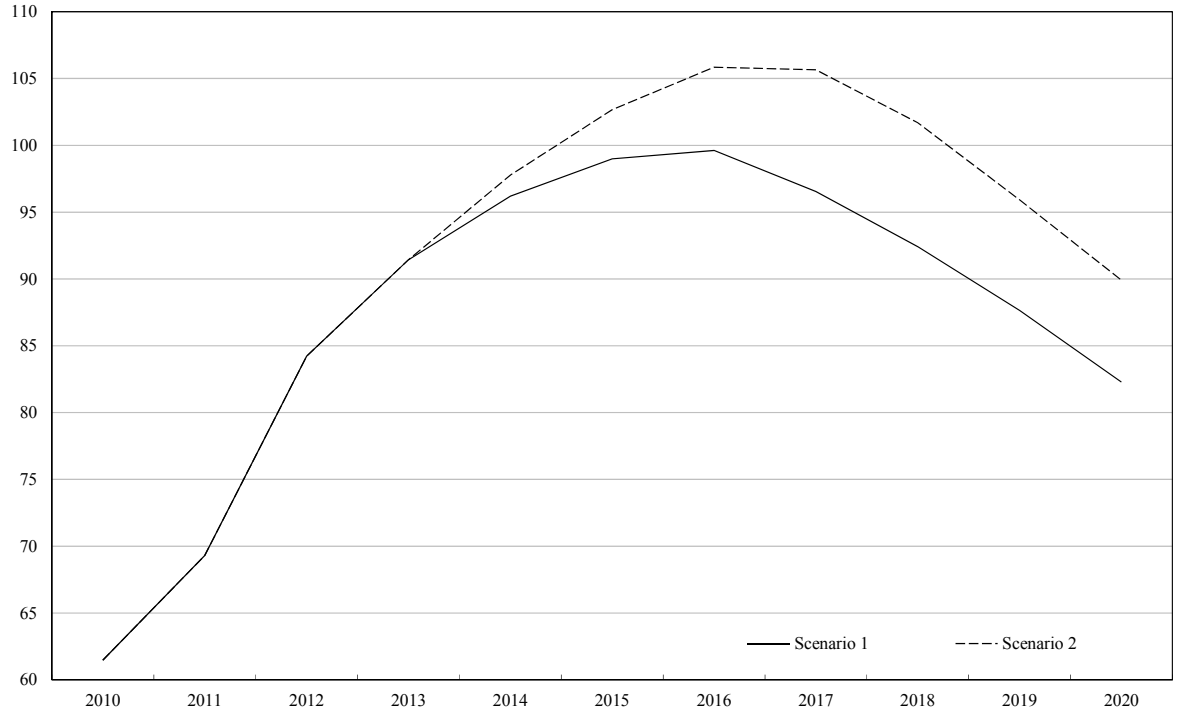
Sources: INE and Banco de España (2011).

The crisis revealed the latent risks in the public finances situation. During the economic crisis (with GDP falling by –3.8 per cent in 2009 after having increase only by 0.9 per cent in 2008), the budget deficit rose by more than 13 pp to a peak of 11.1 per cent of GDP at end-2009. Contributing to the deterioration from 2007 to 2009 was the adverse trend of the business cycle, which added around 2.5 pp of GDP, whereas close to 4 pp of GDP were associated with the drying-up during the crisis of extraordinary revenue. In addition, the measures applied in an attempt to alleviate the effects of the crisis amounted to 3.3 pp of GDP, although more than half of this effect was of a temporary nature. The rest of the increase in the deficit arises from trend growth in expenditure outpacing that of the economy. The rise in the deficit, therefore, had an eminently structural component.

In 2010 the consolidation process started to come up against the enormous difficulties associated with pursuing a reduction of the public deficit while simultaneously undertaking an adjustment of previous macroeconomic imbalances. Despite consolidation, public debt has continued increasing, while private deleveraging is progressing slowly, in a context of a double-dip recession with GDP falling again in 2012 at –1.6 per cent after an almost flat growth in 2010 and 2011 (–0.2 and 0.1 per cent, respectively). We turn to the discussion of these difficulties now. For this purpose, we divide the discussion into two blocks. First, we analyse how the correction of the imbalances is conditioning the fiscal consolidation process; then, we discuss the converse implication, how the fiscal consolidation process is conditioning the correction of the macro imbalances.

Figure 3

Medium-term Debt to GDP – Scenarios for Spain
(percent of GDP)



Source: Authors' calculations.

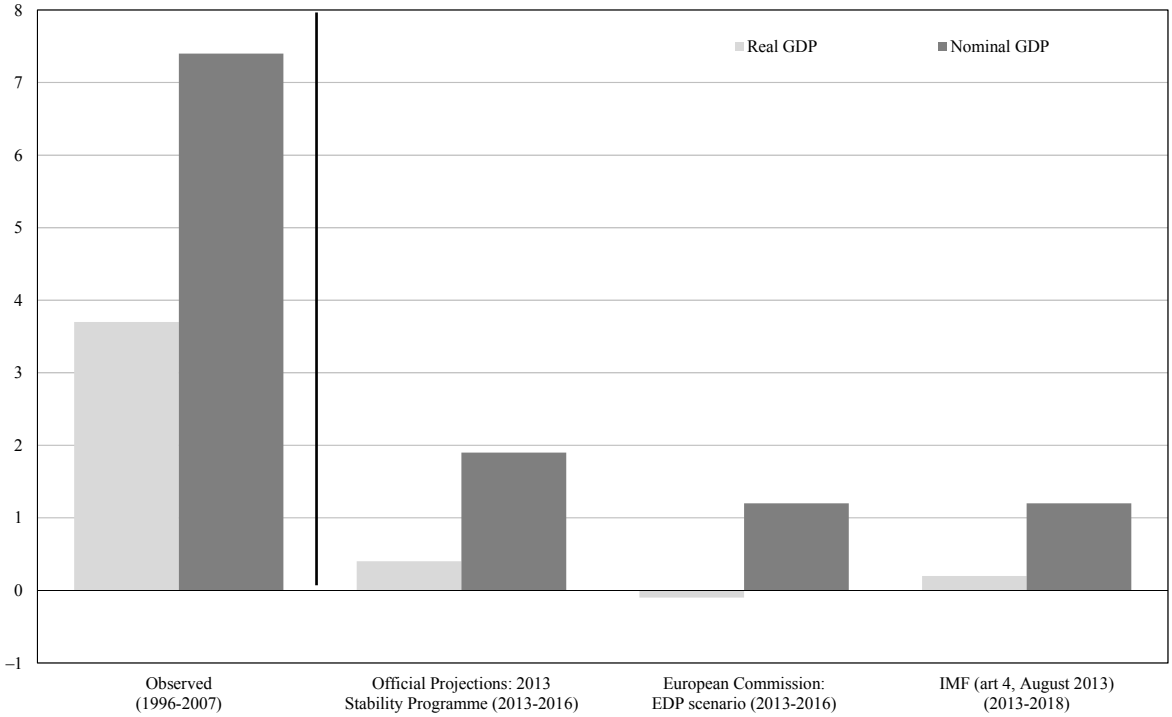
4 How the correction of macro imbalances conditions the fiscal consolidation process

A natural starting point for analysing the difficulties of the fiscal consolidation process in a context of correction of the previously accumulated imbalances is the debt dynamics equation. Figure 3 (scenario 1) plots the course of the public debt/GDP ratio over the coming years under specific assumptions of budget deficit, interest rates and growth rate. Specifically, on the current official estimates, the fiscal deficit stood at around 7 per cent at end-2012 (excluding an additional 3.7 pp due to costs associated to banking re-structuring). With this starting point, we use the growth scenario to 2016 included in the latest Stability Programme of the Spanish government, prolonged until 2020 to match an average nominal GDP growth of 3.5 per cent in the period 2013-20 (1.5 per cent real GDP growth +2 per cent GDP deflator growth), and the assumption of an average nominal interest rate of public debt in the same period of around 3.5 per cent, to show that the stabilisation of public debt at around 100 per cent of GDP in 2017 would require an adjustment in the primary balance of around 6,6 pp of GDP between 2013 and 2017 (see Figure 3).

Admittedly, part of the fiscal deficit observed in 2012 is of a cyclical nature (around 30 per cent of the observed deficit according to most estimates). However, the size of the pending adjustment needed to stabilise the debt ratio is very high by international standards, in particular if one takes into account that the primary deficit has already declined by 5.4 pp of GDP between 2009 and 2012. By way of comparison, in the consolidation period applied in Spain during the 1990s, stabilising the debt to GDP ratio at around 70 per cent required an adjustment of the primary deficit of "only" 3.6 pp of GDP in four years (between 1993 and 1996).

Figure 4

Average Real and Nominal GDP Growth Estimates for Spain
(percent)



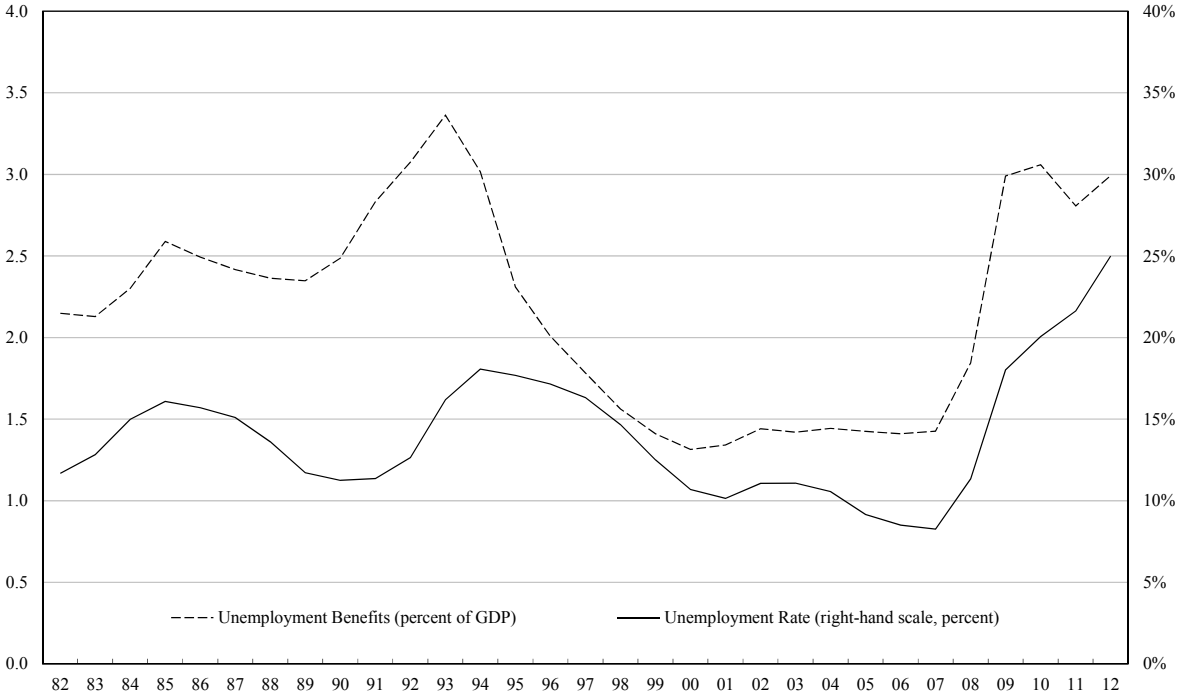
Sources: INE, Stability Programme of Spain (2013-2016), European Commission and IMF.

Moreover, the fact that the fiscal consolidation process is taking place in a macro environment characterised by correction of previously accumulated imbalances is making the fiscal adjustment more difficult. The most obvious consequence of the correction of these imbalances is its impact on growth, which is being negatively affected in particular by the deleveraging process under way in the private sector. Indeed, history suggests that recessions involving financial crises tend to be deeper and have slower recoveries that take twice as long, with deleveraging causing a prolonged period of low internal demand. This is already occurring in the Spanish case: real GDP growth in the Spanish economy was –0.8 per cent on average in the period 2008-12, against 3.8 per cent observed in the earlier 1998-2007 period. Moreover, all available medium-term scenarios for the Spanish economy draw a picture of a significant decline in growth prospects. The Spanish government projects average real GDP growth for the Spanish economy of around 0.4 per cent for the period 2013-16, while the EC scales this growth down to –0.1 per cent in the same period and the EC to 0.2 per cent in the period 2013-18 (see Figure 4). Of course, in our previous public debt dynamics example, if these more pessimistic growth scenarios were to materialize, in the form for example of a 1 pp lower real and nominal average GDP growth in the period 2013-2020 compared to our central scenario, the stabilization of the debt ratio would take place at a higher level and the fiscal effort needed to reach the same target for the debt to GDP ratio would be significantly higher (see Figure 3, Scenario 2).

A related issue refers to the impact of the lower growth prospects on unemployment and, in terms of the public accounts, on unemployment benefits. The unemployment rate has already

Figure 5

Unemployment Rate and Unemployment Benefits



Source: Labour Force Survey.

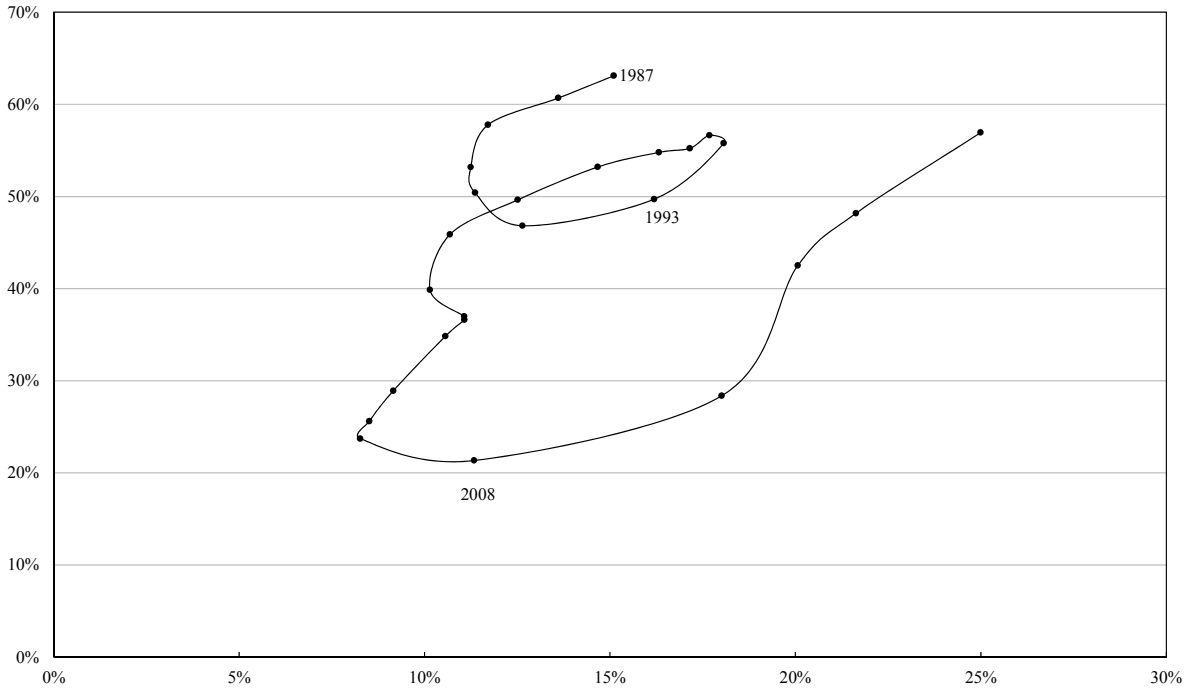
increased in Spain in the period 2007-12 by 17 pp and the related unemployment public expenditure by 1.6 pp of GDP in the same period (see Figure 5). This was also the case during the 1990s, when unemployment benefits increased significantly. However, unemployment declined swiftly in that period allowing for a positive contribution of unemployment benefits to the consolidation process, *i.e.*, this expenditure item declined by 2 pp of GDP between 1993 and 1999. The high unemployment rate is now significantly more persistent (see Figure 6), which, combined with low growth prospects, could lead to the persistence of unemployment benefits at a relatively high level for a longer period of time, unless average benefits and/or the coverage rate are reduced. As a result, the adjustment of other public revenues or expenditure items will have to compensate for these developments making the adjustment more costly.

Nevertheless, the correction of the macro imbalances may also have an adverse effect on developments in public revenues, deriving from the very nature of the adjustment and its impact on the composition of growth. The fact that during the period of adjustment the main source of improvement in economic activity is/will continue to be the external sector means that the prospect of buoyant public revenue is scant, since neither higher exports nor lower imports generate, *per se*, increases in tax revenue. This effect is compounded by the intensity of the real estate adjustment, a sector of the economy that generates significant public revenues both through transaction taxes and the taxation of capital gains. Moreover, the need to gain competitiveness through wage moderation also has an adverse effect (more than proportional) on revenues through income taxes, given the progressive nature of this type of taxation.

A way to illustrate this channel is through the residuals of the revenue equations that relate public tax revenues to the tax bases and discretionary changes in effective tax rates. Usually these

Figure 6

Unemployment Rate (x-axis) and Incidence of Long-term Unemployment (y-axis)
(percent)



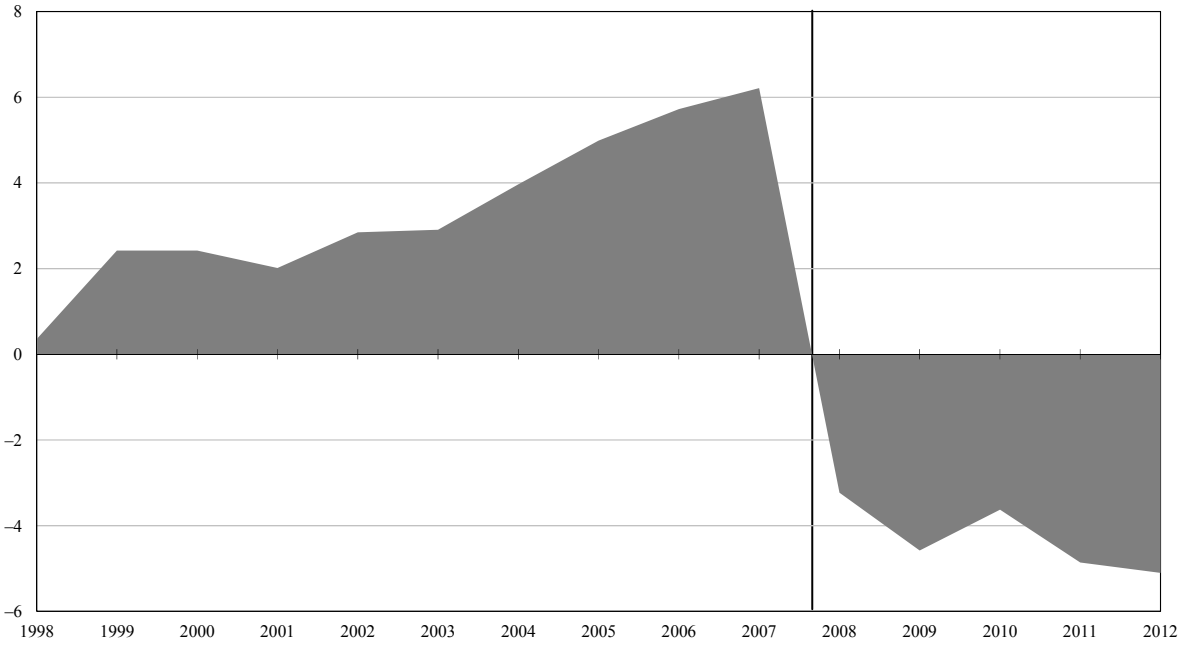
Source: Labour Force Survey.

equations assume a constant average elasticity of tax revenues to the tax bases. Moreover, aggregate measures of tax bases are not able to capture some of the specificities of the tax system. In particular, capital gains are not typically considered as part of the base but, however, they are effectively taxed. As a result, highly positive residuals are often observed in tax revenue equations in boom periods, while the opposite occurs in recessions. Figure 7 plots these residuals for the Spanish case in cumulative terms for two different periods: 1998-2007 and 2008-12. Indeed, the positive residuals during the expansionary period reached, in cumulative terms, more than 6 pp of GDP. The opposite has happened during the adjustment process, with negative accumulated residuals since 2008 of about 5 pp of GDP.

The composition of growth derived from the macro imbalance adjustment will include an additional element of complexity. This is in our view a crucial point that will condition the consolidation process. Figure 8 illustrates how a rule limiting public expenditure growth relative to potential nominal output growth would have worked in the 1998-2007 period. The rule is applied to total general government public spending less the interest burden on public debt and less social benefits (essentially relating to unemployment and pensions). Indeed, the growth of public spending in the 1998-2007 period was significantly higher in Spain than would have been the case with the application of the rule (7 per cent in annual average terms, compared with 4.4 per cent, respectively). Of course, in this context, the fact that public accounts reached a surplus at the end of this period was only possible because of the extraordinary revenue arising from the real estate boom mentioned above. In the same vein, this illustrates that, even once a sound fiscal position has been reached, if the composition of growth in the Spanish economy is going to remain tilted

Figure 7

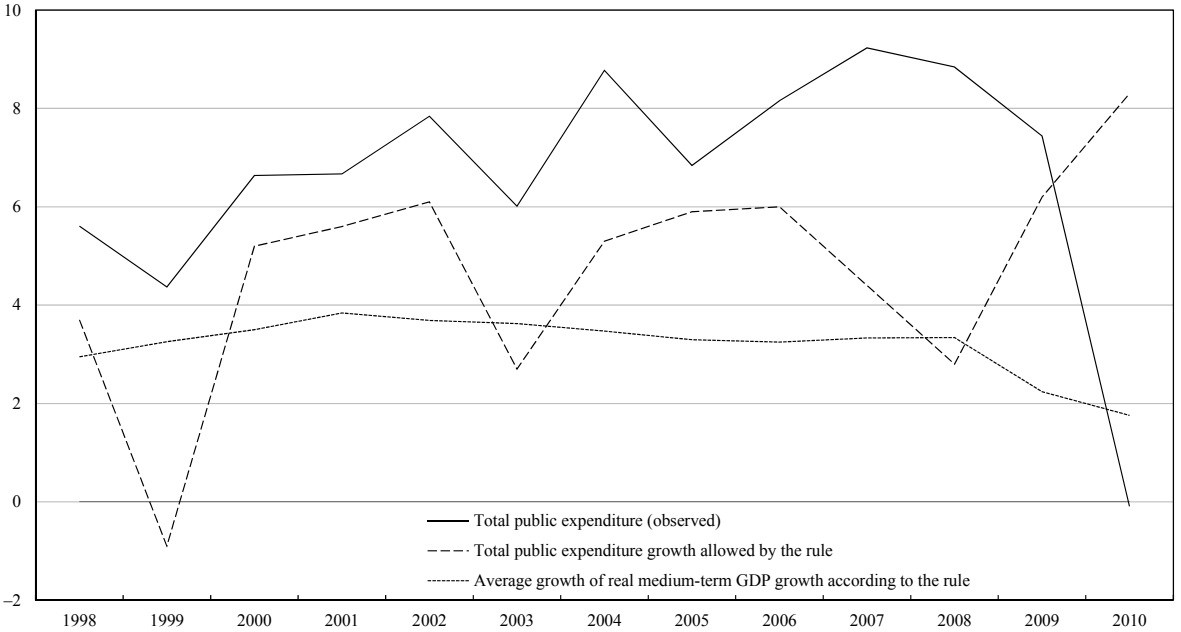
Residuals of Public Revenue Equations
(cumulative residuals for the periods 1998-2007 and 2008-12, percent of GDP)



Sources: IGAE and author's calculations.

Figure 8

Counterfactual Application of Spending Rule to the Period 1998-2010
(growth rate, percent)



Source: Hernández de Cos (2011).

towards the external sector, maintaining a healthy fiscal position will probably require growth of public expenditure that is below potential output growth for an extended period of time.

On the revenue side, however, there could be some scope for improvement. In particular, the level of the tax burden continues to be much lower (34 per cent of GDP in 2012) than the average of the EU (see Figure 9), even after the significant increases in tax rates approved in the last three years. This burden is significantly tilted towards labour taxes while taxes on consumption have a much lower share over total taxation. Moreover, the Spanish tax system continues to show a high level of the so-called "fiscal expenses", arising from the presence of deductions and exemptions on different taxes, representing a major cost in terms of revenue-raising, and adding complexity to the tax structure and in some cases exerting significant adverse effects on efficiency.

In this context, anything short of a fundamental tax reform may not be of much help. For instance, as previously mentioned, there is the recourse to fiscal devaluations (see Farhi *et al.*, 2011) whose main rationale is to achieve a real exchange rate depreciation by means of shifting taxes on labor (and, hence, only on domestic production) to taxes on consumption (which includes also foreign products). At the same time, if wages and firm margins do not react, there would be a reduction of labor costs and a gain in competitiveness that might jumpstart employment creation. Thus, fiscal devaluations may help to reduce the current account deficit at no cost for the public budget and, if successful in the employment front, with additional revenues. The condition of wage setting not reacting to the reduction of non-wage labor costs may be easier to be fulfilled in the current depressed labor market. However, labour and product market reforms should accompany such a measure so as to be certain that wages and margins do not react compensating the initial competitiveness gains obtained with the fiscal devaluation. In any case, such a policy measures would be helpful only in the transition to the new equilibrium of the economy since one would expect its impact to be transitory, so that in the long run the fiscal devaluation would be neutral on employment. Finally, it should be taken into account that in Spain the pension system is mainly financed through social security contributions, thus a significant cut of this type of taxation will require a parallel reduction of pension expenditures or raising additional sources of revenues.

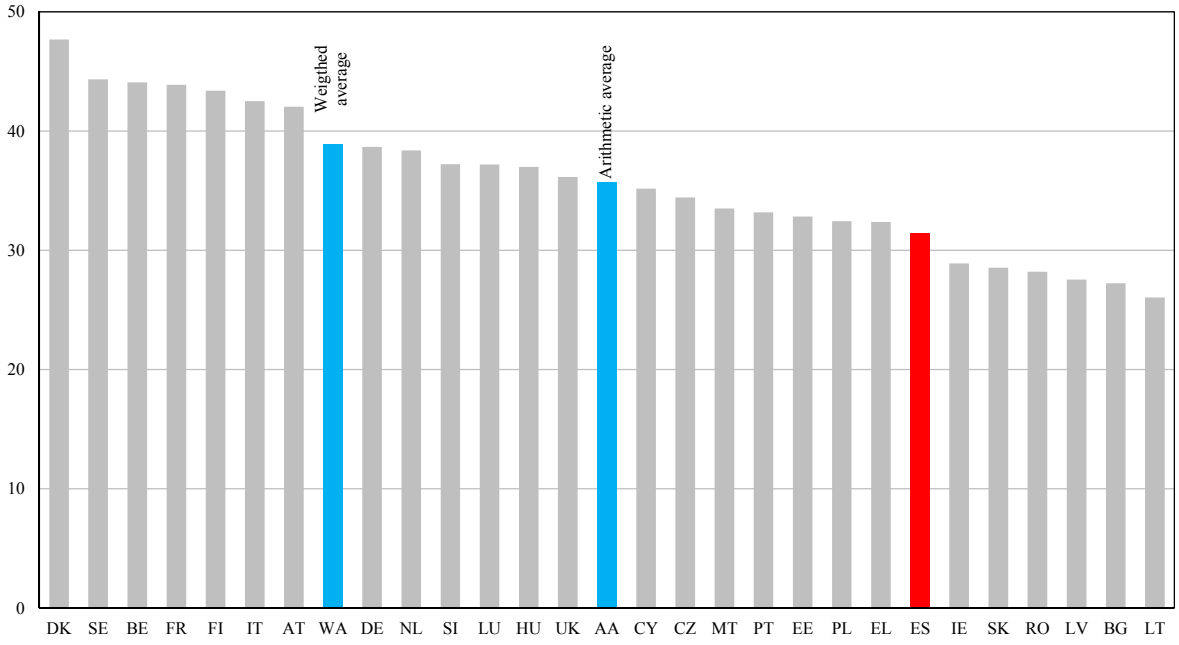
5 How fiscal consolidation conditions the correction of the macro imbalances

As mentioned previously, there are three main imbalances that are in the process of being corrected in the Spanish economy: excessive private and public debt, the current account deficit, and the excess of capacity in the construction sector. The process of fiscal consolidation can potentially affect the speed and the path of these adjustments through several channels.

Perhaps the most obvious one is the impact of fiscal consolidation on growth. While it is generally acknowledged that fiscal consolidation has a positive impact on growth at medium and the long-run horizons, it is also generally accepted that it may affect growth negatively in the short run, which, if confirmed, will complicate the aforementioned low-growth medium-term scenario associated with the correction of imbalances. The precise sign and size of this short-term negative impact, the so-called fiscal multiplier, remain, however, a challenge. The most recent empirical evidence on this issue points to the general conclusion that the value of the multiplier depends on country- and time-specific characteristics (see Baum *et al.*, 2012). In particular, this literature highlights that the value of the multiplier may be larger in recessions and in financial crises (see Auerbach *et al.*, 2012, Blanchard and Leigh, 2013 and Afonso *et al.*, 2011), while it tends to be lower in periods of fiscal stress, defined as periods of an overly high debt to GDP ratio (see Corsetti *et al.*, 2012). Table 1 presents some empirical evidence on these state-dependent multipliers for the Spanish case that tends to confirm the previous results. Our reading of the implications of these results is twofold. On the one hand, it is obvious that the fiscal effort needed

Figure 9

Total Taxation, EU-27, 2011
(percent of GDP)



Source: Eurostat.

Figure 10

Weights, 2011
(percent of total taxation)

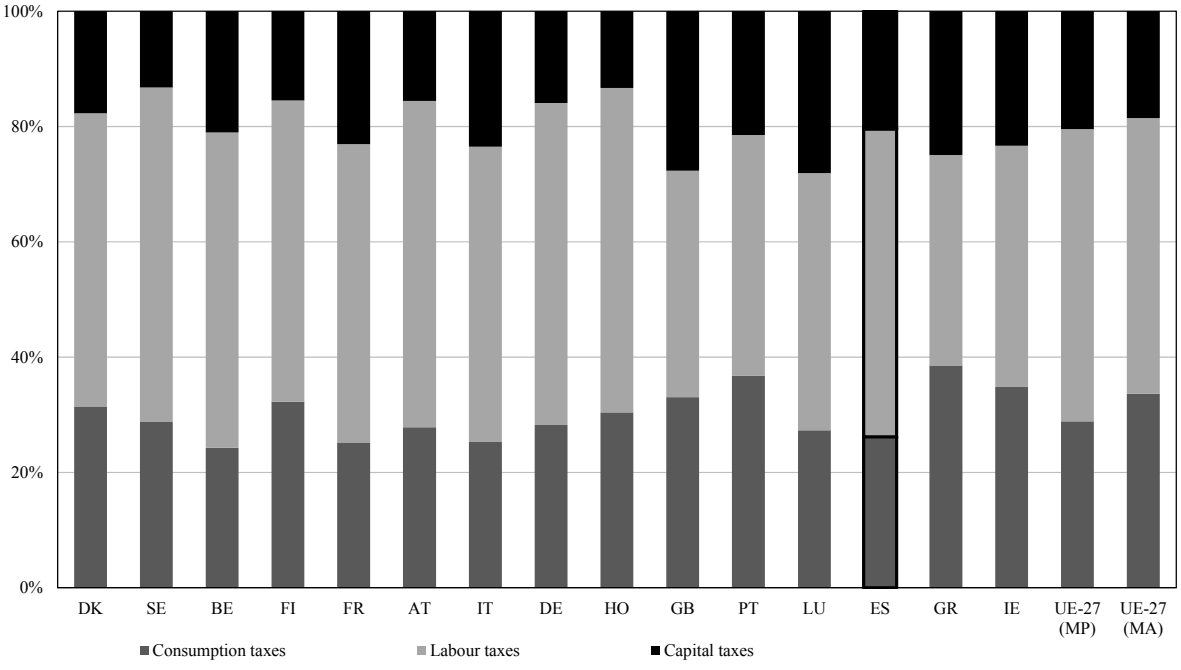


Table 1

Fiscal Multipliers – The Spanish Case
(mm euros)

Regime	Cumulative Multiplier to a Government Spending Shock	
	4 Quarters After the Shock	8 Quarters After the Shock
Expansion	0.47*	0.25*
Recession	1.15*	1.67*
Bad Fiscal Times	0.12	0.16
Good Fiscal Times	0.73*	0.31*
Banking crisis	0.96*	0.89*
No banking crisis	0.61*	0.06

Source: Hernández de Cos and Moral-Benito (2013).
Note: * denotes statistical significance at the 5 per cent level.

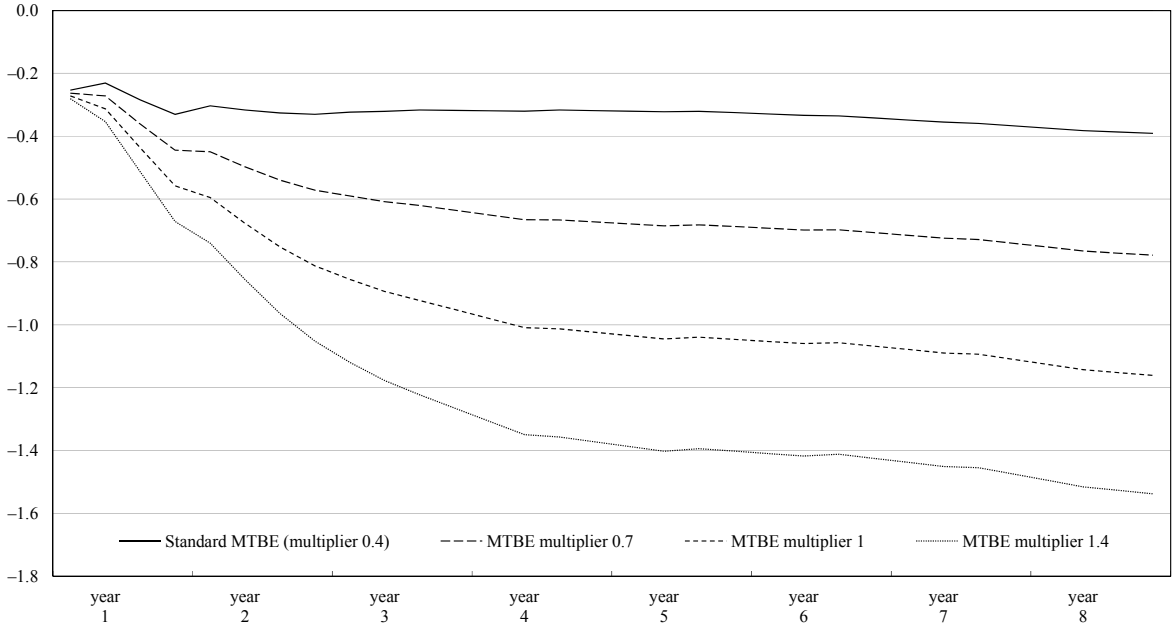
to meet a certain fiscal target is greater in an environment of correction of macro imbalances like that currently faced by the Spanish economy, given that this environment is characterised by low economic growth and a deleveraging process with low access to credit, and that the associated fiscal multiplier will be higher. Of course, if public indebtedness becomes too high, fiscal consolidation may even have a positive impact on growth through higher confidence facilitating the consolidation process. Therefore, the design of the fiscal adjustment strategy should take into account not only the behavior of economic activity, but also the costs of excessive delays in consolidation, in terms of risks to credibility and their impact on agents' confidence. In this respect, it is important to ask how high fiscal multipliers would need to be in order for fiscal consolidation to generate an increase in the public debt-to-GDP ratio, *i.e.*, to have the opposite impact to that intended (known as a "self-defeating consolidation"). For this purpose in Banco de España (2013) a simulation exercise was performed using the quarterly model of the Banco de España (MTBE), in order to analyse the effect of a fiscal adjustment with different assumptions for the values of fiscal multipliers (ranging from 0.4 to 1.5). The results showed that in all cases the debt-to-GDP ratio is reduced in the medium and long-term, although when the ex-ante multiplier reaches 1.5, the public debt ratio may temporarily rise in the short term (see Figure 11). The conclusion of this analysis is that, although multipliers are higher than on average in the past, they are still within reasonable ranges, so that in general self-defeating consolidations should not be expected in the case of Spain.

On the other hand, the negative spill-over of the fiscal consolidation process on growth may also complicate the correction of imbalances. In particular, and closely related to the above discussion on fiscal multipliers, fiscal consolidation programmes may complicate the efforts of the private sector to reduce the debt overhang. The logic follows closely the Fisherian debt deflation argument (Fisher, 1933). As fiscal consolidation has a negative short-run effect on output, depressing further wages and prices, the real burden of the debt increases, making it more difficult for households to reduce their debts, and for the public sector to meet their budget consolidation objectives. Notice, however, that this logic applies to a closed economy with fixed employment, where wages and households' disposable income are equivalent. This is not, of course, the current

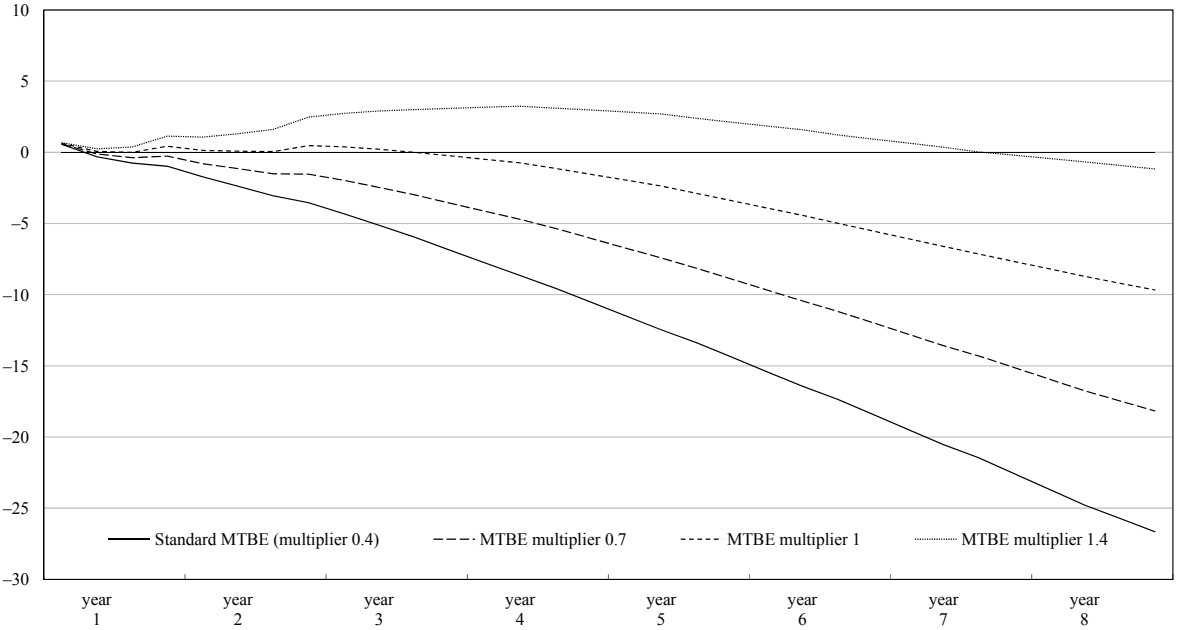
Figure 11

Fiscal Consolidation, Value of the Multipliers and Changes in Public Debt/GDP Ratio
The Spanish Case[(a)]

Multiplier
(GDP response to fiscal shock)



Public Debt Response to Fiscal Shock
(difference percent of GDP)



Source: Banco de España.
(a) Response by GDP and by the GDP/debt ratio to a fiscal shock based on tax increases and spending cuts, simulated with different values for the fiscal multiplier (MTBE standard is the value habitually used, while the remaining results are obtained by adding to this simulation a negative response – of differing intensity – by household and business confidence to the fiscal shock, which generates higher multipliers).

Table 2

Impact of Fiscal Consolidation on Nominal Disposable Income[(a)]

	Change in the Instrument	Percent of Change Compared to Baseline				
		t	*t*+1	*t*+2	*t*+3	*t*+4
Consumption taxes	1.75 pp	–0.32	0.00	–0.46	–0.39	–0.20
Wage taxes	2.18 pp	–1.83	–2.27	–2.89	–3.16	–3.23
Capital taxes	11.83 pp	–0.10	–0.36	–0.59	–0.84	–1.07
Government purchases	–13.23	–0.71	–0.95	–1.05	–1.11	–1.17
Public Wages	–13.52	–2.39	–3.38	–3.70	–3.62	–3.43
Public Employment	–13.52	–0.71	–1.62	–2.22	–2.53	–2.58

Source: MTBE simulations.
(a) Fiscal simulations using the MTBE model.

situation of highly indebted Southern European countries where depreciations are needed to improve external demand and, if employment were created, there is a large buffer of unemployment whose reduction may increase significantly households' disposable income even at lower wages.

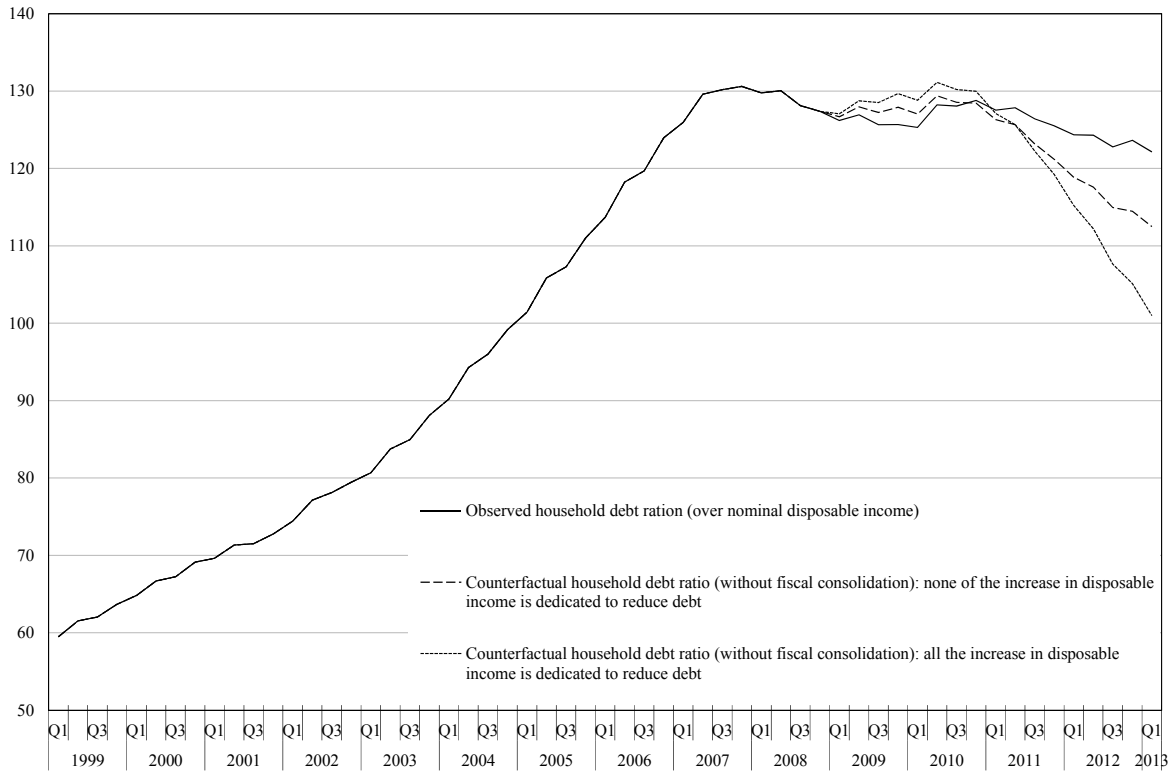
In any case, this potential trade-off between fiscal consolidations and deleveraging needs can be illustrated by means of simulations of different fiscal consolidation measures and by analysing its impact on household disposable income, the denominator of the household debt ratio. As seen in Table 2, the results of these simulations performed with a macroeconomic model estimated for the case of Spain (MTBE) show that in general all consolidation measures have a negative impact on disposable income, thus exerting in the short run a negative effect on the deleveraging process.

An additional way of illustrating this problem is shown in Figure 12, which plots three household debt ratios: the observed one, a second one in which the numerator (nominal debt) is the same but the denominator (disposable income) is obtained by simulating the impact of the consolidation measures applied during the period 2010-12 in Spain on disposable income under the previous model and adding this (negative) impact on disposable income to the observed series so as to a obtain a new (lower) series of household debt. Under this scenario no amount of the increase in disposable income under no fiscal consolidation is assumed to be devoted to pay debt. Finally, under the third scenario, we simulate the impact on the denominator (disposable income) of eliminating the consolidation but in addition the numerator (nominal debt) is also reduced because it's assumed that all the increase in disposable income is "spent" on reducing household debt. These two counterfactual scenarios can be taken as extreme examples of what would have really happened. The differences between the first series and the other two can be attributed to the (negative) impact of the consolidation process on the deleveraging process which, as can be seen from the figure, is not negligible.

Of course, the previous analysis is incomplete in that it does not incorporate the potential impact of fiscal consolidation on the asset side of the balance sheet of households (and firms), so that even if fiscal consolidation has a negative effect on the debt ratio in the short run, the impact on net debt is subject to a higher degree of uncertainty. An important channel through which fiscal

Figure 12

Impact of Fiscal Consolidation on Household Deleveraging



consolidation could affect the prices of financial and non-financial assets is interest rates. This channel may be particularly relevant in the current environment of financial instability which has prompted greater investor sensitivity to fiscal imbalances. In this regard, the estimates available show that an increase of 10 pp of GDP in the debt ratio gives rise to an increase of 50 basis points in long-term interest rates. These effects may, moreover, be greater if specific levels of public debt are exceeded. A sharp reduction in the budget deficit and the stabilisation of debt would therefore have a significant effect on interest rates with a similarly significant impact on asset prices.

Finally, fiscal consolidation can also have an effect on the current account, thus facilitating or hindering the necessary adjustment of this imbalance. There is, however, no clear consensus regarding the impact of fiscal consolidation on the current account. In general terms, a fiscal contraction could lead to a depreciation of the real exchange rate and an accompanying fall in the current account deficit. This is indeed the theoretical argument behind the so-called twin-deficit hypothesis. In this regard, several studies find that a 1 per cent of GDP fiscal consolidation reduces the current account deficit-to-GDP ratio by 0.1-0.3 percentage points, although there is also empirical evidence for twin-deficit divergence in the case of the US (Kim and Roubini, 2008). More recently, Bluedorn and Leight (2011) provide evidence that, using an action-based definition of fiscal shock, a 1 per cent of GDP fiscal consolidation raises the current account balance-to-GDP ratio by 0.6 percentage point within two years and the improvement is long lasting. They also find that the effect of fiscal consolidation on the current account has not declined for euro area countries since the adoption of the euro and that the improvement in the current account is both through a contraction in investment and through higher saving. Table 3 sets out the response of the current account to different fiscal consolidation measures using the aforementioned macroeconometric

Table 3

Impact of Fiscal Consolidation on Current Account Balance[(a)]

	Change in the Instrument	Percentage of Change of GDP Compared to Baseline				
		t	*t*+1	*t*+2	*t*+3	*t*+4
Consumption taxes	1.75 pp	0.16	0.46	0.7	0.83	0.87
Wage taxes	2.18 pp	0.08	0.41	0.71	0.84	0.82
Capital taxes	11.83 pp	0.02	0.11	0.22	0.31	0.37
Government purchases	–13.23	0.42	0.61	0.67	0.65	0.61
Public Wages	–13.52	0.02	0.37	0.64	0.71	0.63
Public Employment	–13.52	0.02	0.29	0.64	0.89	1.00

Source: MTBE simulations.
[(a)] Fiscal simulations using the MTBE model.

model estimated for the case of Spain. The results generally support the results given above. The current account generally improves after the fiscal consolidation shock. The size of this improvement is between 0.6 and 0.7 pp of GDP three years after a 1 pp of GDP fiscal consolidation measure, although the precise size differs depending on the composition of the adjustment.

6 Concluding remarks

Solving macroeconomic imbalances within the euro area requires instruments to shift aggregate demand from surplus countries to deficit countries, together with productivity-enhancing structural reforms in the latter to make the adjustment process less painful. However, the role that national fiscal policies can play in these countries to expand demand and reduce the costs of solving external and internal imbalances seems limited. First, given the high levels of private and public debt, there are doubts as to whether the traditional transmission mechanisms of government spending or tax reductions, either in Ricardian or Neokeynesian models, would operate as such, when households adjust consumption to appreciably lower their debt and public debt financing costs might respond significantly to changes in the fiscal stance. Secondly, asymmetric and non-linear effects of fiscal policy are very likely to arise in this context. However, changes in the composition of government expenditures and in tax structures would be very welcome to increase efficiency and redistribute the costs of the adjustment process more fairly, but they cannot meaningfully untie the knots between macro imbalances and fiscal policy that we have illustrated in this paper by looking at the Spanish situation. Overall, it seems that the best contribution that fiscal policy can achieve at the current juncture is through a better targeting of government expenditures and tax reforms, aimed at introducing permanent measures to stabilise debt ratios. These could then be combined with productivity-enhancing structural reforms and with improvements in product market regulation to increase competition, so that the short-term costs of internal devaluation are reduced.

REFERENCES

Afonso, A., J. Baxa and M. Slavik (2011), "Fiscal Developments and Financial Stress: A Threshold VAR Analysis", ECB, Working Paper, No. 1319.

Andrés, J., J.E. Boscá and J. Ferri (2012), "Household Leverage and Fiscal Multipliers", Banco de España, Working Paper, No. 1215.

Auerbach, A. and Y. Gorodnichenko (2012), "Measuring the Output Responses to Fiscal Policy", *American Economic Journal – Economic Policy*, Vol. 4, pp. 1-27.

Banco de España (2011), *2010 Annual Report*, available at: http://www.bde.es/f/webbde/SES/Secciones/Publicaciones/PublicacionesAnuales/InformesAnuales/10/Fich/cap2e.pdf

——— (2013), *2012 Annual Report*, available at: http://www.bde.es/f/webbde/SES/Secciones/Publicaciones/PublicacionesAnuales/InformesAnuales/12/Files/inf2012e.pdf

Bartelsman, E.J. (2012), "ICT, Reallocation and Productivity", mimeo.

Baum, A., M. Poplawski-Ribeiro and A. Weber (2012), "Fiscal Multipliers and the State of the Economy", IMF, Working Paper, No. 12/286.

Blanchard, O. and D. Leigh (2013), "Growth Forecast Errors and Fiscal Multipliers", IMF, Working Paper, No. 13/1, Washington (D.C.).

Bluedorn, J. and D. Leigh (2011), "Revisiting the Twin Deficits Hypothesis: The Effect of Fiscal Consolidation on the Current Account", IMF, *Economic Review*, Vol. 59, No. 4, pp. 582-602, Palgrave Macmillan, November.

Boussard, J., F. De Castro and M. Salto (2012), "Fiscal Multipliers and Public Debt Dynamics in Consolidations", *European Economy*, Economic Papers, No. 460.

Brückner, M. and E. Pappa (2010), "Fiscal Expansions Affect Unemployment, but They May Increase It", CEPR, Discussion Paper, No. 7766.

Corsetti, G., A. Meier and G.J. Müller (2012), "What Determines Government Spending Multipliers?", *Economic Policy*, No. 27, pp. 521-65.

Eggertsson, G. and P. Krugman (2012), "Debt, Deleveraging, and the Liquidity Trap: A Fisherian-Minsky Approach", *The Quarterly Journal of Economics*, pp. 1469-513, doi:10.1093/qje/qjs023.

Farhi, E., G. Gopinath and O. Itskhoki (2012), "Fiscal Devaluations", Princeton University, mimeo.

Fisher, I. (1933), "The Debt-deflation Theory of the Great Depression", *Econometrica*, Vol. 1, No. 4, pp. 337-57.

Gavilán, A., P. Hernández De Cos, J.F. Jimeno Serrano and J.A. Rojas Blaya (2011a), "The Crisis in Spain: Origins and Developments", in M. Beblavý, D. Cobham and L. Ódor (2011a), *The Euro Area and the Financial Crisis*, Cambridge University Press.

——— (2011b), "Fiscal Policy, Structural Reforms and External Imbalances: A Quantitative Evaluation for Spain", *Moneda y Crédito*, No. 232, pp. 49-109.

Golosov, M., A. Tsyvinski and I. Werning (2007), "New Dynamic Public Finance: A User's Guide", in NBER (ed.), *Macroeconomics Annual 2006*, Vol. 21, pp. 317-88.

Gordon, R.J. (2012), "Is U.S. Economic Growth Over? Faltering Innovation Confronts the Six Headwinds", NBER, Working Paper, No. 18315.

Hernández de Cos, P. (2011), "The Reform of the Budgetary Framework in Spain: Constitutional Limits and the New Rule for Public Expenditure Growth", Banco de España, *Economic Bulletin*, October.

Hernández de Cos, P. and E. Moral-Benito (2013), "Fiscal Multipliers in Turbulent Times: The Case of Spain", Banco de España, Working Paper, No. 1309.

Ilzetki, E., E. Mendoza and C.A. Vegh (2010), "How Big (Small) Are Fiscal Multipliers?", IMF, Working Paper, No. 11/52.

Kim, S. and N. Roubini (2008), "Twin Deficit or Twin Divergence? Fiscal Policy, Current Account, and Real Exchange Rate in the U.S.", *Journal of International Economics*, Vol. 74, No. 2, pp. 362-83, Elsevier, March.

Kraay, A. (2012), "How Large Is the Government Spending Multiplier? Evidence from World Bank Lending", *The Quarterly Journal of Economics*, Vol. 127, No. 2, pp. 829-87, May.

Mian, A. and A. Sufi (2012), "The Effects of Fiscal Stimulus: Evidence from the 2009 Cash for Clunkers Program", *The Quarterly Journal of Economics*, Vol. 127, No. 3, pp. 1107-42, August.

Monacelli, T., R. Perotti and A. Trigari (2010), "Unemployment Fiscal Multipliers", *Journal of Monetary Economics*, Vol. 57, No. 5, pp. 531-53, July.

Werning, I. (2007), "Optimal Fiscal Policy with Redistribution", *The Quarterly Journal of Economics*, Vol. 122, No. 3, pp. 925-77, August.

THE POLICY RESPONSE TO MACROECONOMIC AND FISCAL IMBALANCES IN ITALY IN THE LAST FIFTEEN YEARS

Antonio Bassanetti,[*] *Matteo Bugamelli,*[*] *Sandro Momigliano,*[*]
Roberto Sabbatini[*] *and Francesco Zollino*[*]

This paper reviews the main macroeconomic trends and the debate on policy priorities in Italy since the onset of EMU. It argues that, in the decade up to the outbreak of the global crisis (1998-2007), in Italy the reform process came to a virtual standstill and fiscal policy was inconsistent with the commitments taken at the European level. The paper suggests that the lack of resolute policy reactions to the serious institutional dysfunctions and macroeconomic imbalances was due to both the fragmentation of the political constituency and to a variety of favourable contingent factors masking the difficulties of the productive system and overshadowing the need to pursue structural reforms. Had Italy been better positioned in terms of both public finances and structural features in 2007, the adverse effects of the global and sovereign crises would have been partially avoided.

1 Introduction

Developments since the global crisis have brought to light a number of structural weaknesses of the Italian economy, which, though already identified, had by and large not been tackled in the first decade of European Monetary Union (EMU).

This paper reviews the main macroeconomic trends and the debate on policy priorities in Italy since the late 1990s, to shed light on the reasons why the pace of structural reform was so slow in Italy. It also provides a broad assessment of the costs associated with that inadequate pace, particularly the strains caused by the sovereign debt crisis in the euro area.

Section 2 briefly reviews the debate on the main policy issues at the start of the EMU. There was widespread awareness in Italy that membership of the currency union was not a risk-free strategy, and that substantial efforts were needed, among other, to improve weak productivity growth and significantly reduce the high public debt-to-GDP ratio.

Section 3 describes the disappointing performance of the Italian economy in the decade 1998-2007, the growing macroeconomic imbalances and the gap between fiscal outturns and both the targets consistent with European rules and official commitments.

The aim of Section 4 is twofold. In the first part, we examine the reasons why, notwithstanding the serious macroeconomic imbalances, the reforms that Italy needed were either not introduced or proved largely ineffective. It is argued that, together with more traditional explanations referring to the fragmentation of the political constituency, in the decade following the inception of EMU several factors masked the difficulties of the productive system and made the need to pursue structural reforms less pressing. In the second part of the section, we present simulations of the impact of fiscal policy on economic growth in the decade post-EMU (pre-crisis

---

[*] Bank of Italy, Economic Research and International Relations Department; A. Bassanetti is currently at the IMF.

We thank Silvia Giacomelli for helping us with the description of the structural reforms implemented in 2011-12; Davide Fantino, Massimiliano Pisani and Alessandro Notarpietro for carrying out the simulations described in Section 4.1; Marco Magnani, Stefano Siviero and Stefania Zotteri for their insightful comments on a preliminary version; Renzo Pin and Marco Chiurato for the editorial assistance; participants to the workshop "Macroeconomic imbalances and fiscal policy in Italy in the last 15 years" (Perugia, 4-5 April 2013) for their useful comments. The paper is based on data available up to March 2013.

decade); that impact is appraised by means of a counterfactual scenario in which European commitments are broadly respected.

Section 5 examines the macroeconomic and fiscal developments since 2008 and the structural reforms undertaken in recent years (mostly in 2012). It is argued that the lack of prudent fiscal policies and decisive structural reforms in the first decade of EMU led to sizeable welfare losses during the crisis. Some losses came from the limited room for manoeuvre to carry out countercyclical fiscal policies in 2009. However, the largest costs stemmed from the sovereign debt crisis, in which Italy was involved because of its structural weaknesses. The crisis had a large direct negative impact on economic activity through the credit channel. A more indirect effect came from the need to speed up and frontload the process of fiscal consolidation in the course of the sovereign crisis. This avoided more dramatic developments, but in the short run contributed to strengthening the consequences of the 2012 recession.

Section 6 summarises the main findings and concludes with a few policy remarks.

2 Policy issues and priorities at the start of EMU

EMU was introduced against a background of momentous changes in the world economy. The growing worldwide integration of real and financial markets (the so-called "globalization") and the shift in the technological paradigm with the large-scale adoption of information and communication technologies (ICT)[1] interplayed with the process of European integration. Broadly speaking, all those developments resulted in a steady increase in competitive pressure.

The more competitive external environment had adverse effects on Italy's growth, as the Italian economy experienced increasing difficulties of adjustment (Brandolini and Bugamelli, 2009; Boeri *et al.*, 2005). Already in the 1990s, especially following the currency crisis of 1992, efforts had been made to address key macroeconomic imbalances;[2] they were largely motivated by the aim to meet the criteria required by the Maastricth Treaty to join the EMU.[3] Measures had been taken to consolidate the public finances and change industrial relations in the hope of fostering labour market flexibility and productivity growth, in addition to eradicate inflation.[4] The reforms included the privatization of formerly public companies and the anti-trust and banking laws (Bianco *et al.*, 2012). However, although those policy actions partly enhanced the ability of Italian industry to seize the opportunities stemming from the changing international division of labour (Confindustria, 1997) and enabled Italy to join the EMU, they did not prevent the trend of Italian productivity to fall below the European average since the mid-1990s.

EMU membership significantly altered the room for manoeuvre of domestic economic policies. On the one hand, it offered the benefits of monetary and exchange rate stability and lower interest rates; on the other, it constrained fiscal policies and ruled out devaluations as a tool to restore competitiveness.

---

1 The widespread adoption of ICT aided integration by offering greater scope for the provision of distance services (Blinder, 2005) and reducing transport and communication costs (OECD, 2007a; WTO, 2008). Globalization fostered a reorganization of production worldwide by encouraging firms to locate phases of production in different countries in order either to exploit lower factor costs or to boost their ability to penetrate the new (emerging) markets.

2 For a discussion of these imbalances in an historical perspective, see Crafts and Magnani (2013).

3 The Maastricht criteria for admission in the EMU were (i) an inflation rate no more than 1.5 percentage points above the average of the three countries with the lowest inflation rates; (ii) nominal long-term interest rates not exceeding by more than 2 percentage points those of the three countries with the lowest inflation rates; (iii) no exchange rate realignment for at least two years; and (iv) a government budget deficit not exceeding 3 per cent of GDP and a gross debt-to-GDP ratio not above 60 per cent or "sufficiently diminishing and approaching the reference value at a satisfactory pace".

4 For a discussion, see Balassone *et al.* (2002) and Brandolini *et al.* (2007).

The economic debate at the end of the 1990s showed an increasing awareness of the challenges for Italy associated with the adoption of the single currency. The Governor's Concluding Remarks on 1998 (May 1999) argued that (the) "*Adoption of the single European currency sets a lasting seal on monetary stability. It can be a source of growth, employment and sound public finances if economic policies and the behaviour of the two sides of industry are compatible. Otherwise, it will lead to a loss of competitiveness, a weakening of the industrial fabric and an increase in unemployment.*" (p. 31). In its Economic Survey of Italy, the OECD (2000) listed a set of areas in need of a vast reform programme. In particular, it wrote that "*Notwithstanding the progress [made in the energy sector], the results achieved so far with regard to product market competition have been scattered. The private non-financial service sector is marked by a considerable degree of fragmentation and market inefficiencies, deriving from the presence of strong barriers, often arising from mutually reinforcing national and local regulations*".[5] While important structural issues were common to other European countries, they were more varied and intense for the Italian economy, as extensively argued in Visco (1996).

Since the inception of the EMU, the Bank of Italy stressed that a wide range of policy interventions were still needed for the Italian economy to fully exploit the benefits of having joined the euro area.

Concerning the factors directly relevant for firms' competitiveness, in Banca d'Italia (2002) the following points were emphasized (p. 39):

- *Italy's economic infrastructure is still significantly underdeveloped compared with the other major European countries. Besides sustaining economic growth in the short term, a substantial increase in the volume of resources allocated to public investment is indispensable to attenuate the logistical constraints on the expansion of trade and improve the provision of services essential to firms' growth. It is also necessary to eliminate the geographical disparities in the infrastructural endowment which – quite apart from considerations of fairness – threaten to engender systemic inefficiencies and make the whole of Italy less attractive for private investment.*
- *The process of redrawing the boundaries of public ownership and restructuring markets has encountered obstacles and delays. (…) Reform of regulation, tariffs, ownership structures and market boundaries in local public services remains of vital importance for the productive system, as does the resumption of liberalization in professional business services, retail trade, telecommunications, and energy generation and distribution.*[6]
- *The persistence of this phenomenon [small size of Italian firms in all branches of production] and the widening gap vis-à-vis the other European countries, even if compensated for by Italy's characteristic industrial districts, indicate that various cultural, institutional and economic factors impede the growth of firms. The consequences of a fragmented productive structure are seen in the opportunities that go unexploited because of a sub-optimal scale of production and in Italian firms' low propensity for innovation and, to a lesser extent, internationalization.*

Attention focused also on the need to enhance the skills of the workforce to provide the flexibility and competences required to seize the opportunities offered by the new technologies and to maintain a high level of efficiency in the changing global economy. "*…[in Italy] graduates in engineering and other scientific disciplines account for a smaller share of the total than in any*

---

[5] The OECD (2000) also wrote: "*Indeed, the fact that inflation in Italy is persistently above the EU average may point to a lack of contestability in certain markets"* and *"Future growth prospects are highly dependent upon creating the conditions in which smaller firms can expand (…) The [current] system may perpetuate Italy's trade specialisation in traditional, low R&D-intensive products…Unless their productive activities are highly specialised, small companies may encounter difficulties in exploiting economies of scale"*.

[6] In its recommendations to Italy, the OECD (2007b) suggested strengthening the liberalisation effort, in the light of increasing evidence that competition-restraining regulations may hamper TFP growth, and particularly the divesture programmes in the sectors of media, transportation and public utilities.

other leading industrial country. Investment in secondary and university education is indispensable if the technical and scientific training of the younger generation is to be improved with a view to reorganizing production processes in industry and especially in services." (The Governor's Concluding Remarks, 2003, p. 17).

Similar priorities were also addressed by a number of contributors to the public debate concerning the alleged "decline" of the Italian economy. In particular, Faini (2004) and Faini and Sapir (2005) claimed that neither the euro nor China's entry into the WTO could be blamed for the unsatisfactory performance of the Italian economy; rather "*the low supply of skilled labor nurtures an obsolete product specialization model. In turn, a size and sectoral structure biased toward small firms and traditional products depresses the demand for education, thus perpetuating the pattern of specialization*".

Subsequent empirical analyses confirmed that the factors identified at the beginning of the decade were the main ingredients for fostering competitiveness and growth, adding new elements to the debate. In particular, the *Report on Trends in the Italian Productive System* (Brandolini and Bugamelli, 2009)[7] showed that the performance of the Italian productive system was negatively affected by the small average size of firms, the inadequate endowment of economic infrastructures (see also Banca d'Italia, 2011a) and the insufficient degree of competition in some non-tradable sectors (see also Bianco *et al.*, 2012). The *Report* also stressed the key role of factors such as corporate governance, the tax system, the financial structure of Italian firms and specialized financial intermediaries in promoting economic growth and competitiveness.

Further analyses addressed the relationship between economic development and the weaknesses of the Italian civil justice system (Giacomelli and Menon, 2013). Investments in human capital and in the education system and their returns in terms of economic performance also received considerable attention; these investments are deemed complementary to those in ICT as they determine how far and how fast the introduction of new technologies at the firm level becomes fully beneficial to the user industries (Cipollone and Visco, 2007; Visco, 2009; OECD, 2009; Cipollone *et al.*, 2012).

Regarding public finances, Balassone *et al.* (2002) pointed out the need to make close-to-balance budgets a permanent feature of Italian fiscal policy, while shifting the focus of budgetary policy from short-term deficit control to the traditional functions of stabilization, allocation and distribution. In this view it was recognized the importance of: i) designing a set of fiscal rules for local governments consistent with the increasingly decentralized public activities; ii) improving the quality of public services while maintaining tight expenditure control; and iii) reducing the high tax burden. The study also indicated that the pension reforms had to be completed in order to fully eliminate the increase in the expenditure-to-GDP ratio that was projected for the following decades and to reduce the negative spillovers on the labour market and on employment. This assessment was largely shared by the OECD (2007b) in its *Economic Survey* of Italy.

3 The "lost decade": 1998-2007

In the period following the introduction of the euro, the performance of the Italian economy was disappointing, both from a historical perspective and compared with the main European countries, and Italy's public finances experienced a phase of steady deterioration; nevertheless, policy actions largely failed to tackle the structural problems of the country.

---

[7] The Report collected the results of empirical studies carried out in the decade, reorganized in a unitary framework various analyses of Italy's growth deficit and derived indications for economic policy.

3.1 Macroeconomic developments

Between 1998 and 2007, the growth of Italy's GDP averaged 1.5 per cent per year, against 2.3 in the euro area as a whole (Table 1). The annual growth rate of per capita GDP in Italy was half that of the previous 5 years and lagged behind the main advanced economies (Figure 1).

The weakness of the Italian economy was rather generalized across sectors, although it was particularly intense in manufacturing, more specifically in the production of transport equipment and in the traditional sectors where the country used to have a comparative advantage (textiles and clothing, leather products and footwear, and furniture; Accetturo *et al.*, 2013). In 2007, Italian industrial production was only 5 per cent higher than in 1998, with a cumulative growth gap of 14 and 22 percentage points compared with the euro area and Germany respectively. Only the energy sector recorded positive rates of change throughout the period. The rates of increase in the value added of the construction sector and, to a lesser extent, of services were also high compared with industry in those years (2.5 and 1.4 per cent per year respectively).

The difficulties of the Italian industry in the new global competitive environment may be better grasped by focusing on two factors: stagnant productivity and loss of competitiveness in international markets. The first allows us to characterize these weaknesses more precisely and to narrow the scope of our analysis to the determinants of productive efficiency. The second suggests that the lack of growth is not merely a reflection of sluggish domestic demand, but should also be attributed to supply side flaws.

The dismal performance of productivity in Italy compared with the other main advanced economies is evident. The upper graph of Figure 2 shows the trends of labour productivity (GDP per hour worked) from 1993 to 2011 for France, Germany, Italy, United Kingdom and United States: Italy remained roughly in line with the other countries until 1997-8; from then onwards, it followed a lonely path of stagnation. In the period 1998-2007 labour productivity growth in the total economy averaged only 0.4 per cent per year, as opposed to 1.7 and 1.9 per cent in France and Germany.

A growth accounting exercise shows that in Italy the contribution of capital intensity to labour productivity has been positive, albeit less so than in the past, as a result of the shift towards relatively more labour-intensive techniques driven by greater flexibility in the use of labour. By contrast, the dynamics of total factor productivity (TFP; see the lower graph of Figure 2) suggest that the overall efficiency did not improve.

According to the most recent estimates of the OECD, between 1998 and 2007 TFP in Italy declined on average by 0.3 per cent per year, while it expanded by 0.8 and 1.2 per cent in France and Germany (Table 1). The fall in Italy was more pronounced in the industrial sector than in private services (Bassanetti and Zollino, 2008). Despite the high degree of approximation that surrounds the measurement and interpretation of TFP, which is calculated as a residual, its dynamics clearly suggest the presence of structural weaknesses of the productive system and the need to analyse the factors affecting the technical and organizational progress.

Notwithstanding the low rate of growth of GDP, total employment grew by almost 15 per cent, or by around 3 million units, in the decade. The corresponding increase in the employment rate (6.9 percentage points) was the highest among the four largest European economies;[8] at the same time the unemployment rate declined progressively from about 11 to 6 per cent. The very positive performance of the Italian labour market was mostly due to the increased flexibility introduced in the 1990s; nevertheless, the widespread use of temporary

[8] In the same period, employment rates increased by 5.3, 4.3 and 1.3 percentage points respectively in Germany, France and the United Kingdom.

Table 1

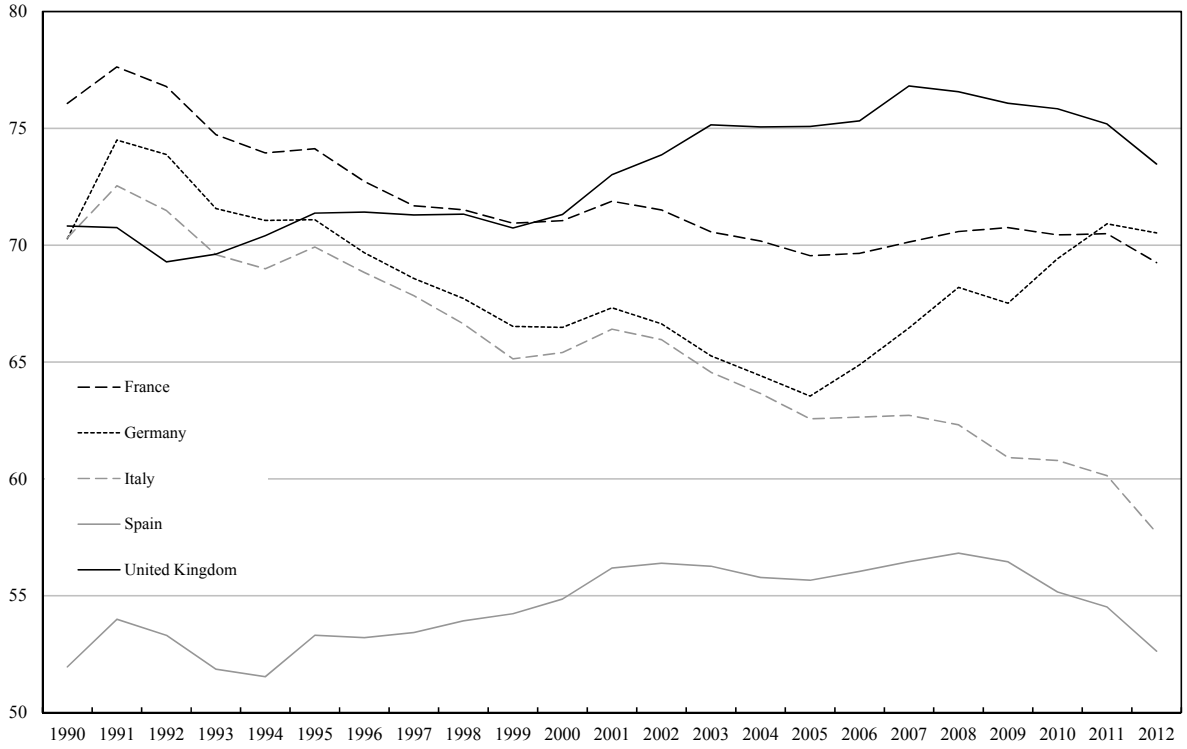
The Italian Economy 1991-2012
(average yearly growth rate in the periods)

	1997	1998-2007	2008-2012
Italy			
GDP	1.9	1.5	–1.4
Unit labour costs in total economy (1)	3.0	1.7	2.0
Total factor productivity (OECD) (2)	1.3	–0.3	–1.0
Competitiveness (1) (3)	–0.9	6.6	–3.2
Inflation (HICP)	1.9	2.3	3.0
Germany			
GDP	1.7	1.7	0.7
Unit labour costs in total economy (1)	–1.3	–0.4	2.0
Total factor productivity (OECD) (2)	1.5	1.2	–0.6
Competitiveness (1) (3)	–6.1	–1.2	–5.7
Inflation (HICP)	1.5	1.5	2.2
France			
GDP	2.2	2.3	0.0
Unit labour costs in total economy (1)	0.0	1.6	2.2
Total factor productivity (OECD) (2)	1.4	0.8	–1.6
Competitiveness (1) (3)	–5.1	1.9	–4.4
Inflation (HICP)	1.3	1.7	2.4
Euro Area			
GDP	2.6	2.3	–0.3
Unit labour costs in total economy (4)	n.a.	1.3	1.9
Total factor productivity (OECD)	n.a.	n.a.	n.a.
Competitiveness (1) (3)	–7.6	6.0	–7.1
Inflation (HICP)	1.6	2.0	2.6

Sources: Based on Istat, Eurostat, Bank of Italy and OECD data.
(1) 2008-11. (2) 2008-10. (3) Cumulative change in the index of overall competitiveness based on producer prices; a positive value indicates a loss of competitiveness; 2008-11. (4) 2001-07 and 2008-11.

Figure 1

GDP Per Capita in Main European Countries
(index number: GDP per capita in US =100;
1990 prices; international dollars; purchasing power parity)



Source: based on Eurostat data.

contracts might have had a negative impact on productivity growth owing to lower human capital accumulation, itself a result of shorter and unstable job matches (Lotti and Viviano, 2012).

The relatively poor performance of productivity led to a worsening of Italy's price competitiveness. Examining producer prices of manufactures, between 1998 and 2007 the deterioration of Italian competitiveness amounted, in cumulative terms, to 6.6 per cent, against a loss of about 2 per cent in France and a moderate gain in Germany (Figure 3 and Table 1).[9]

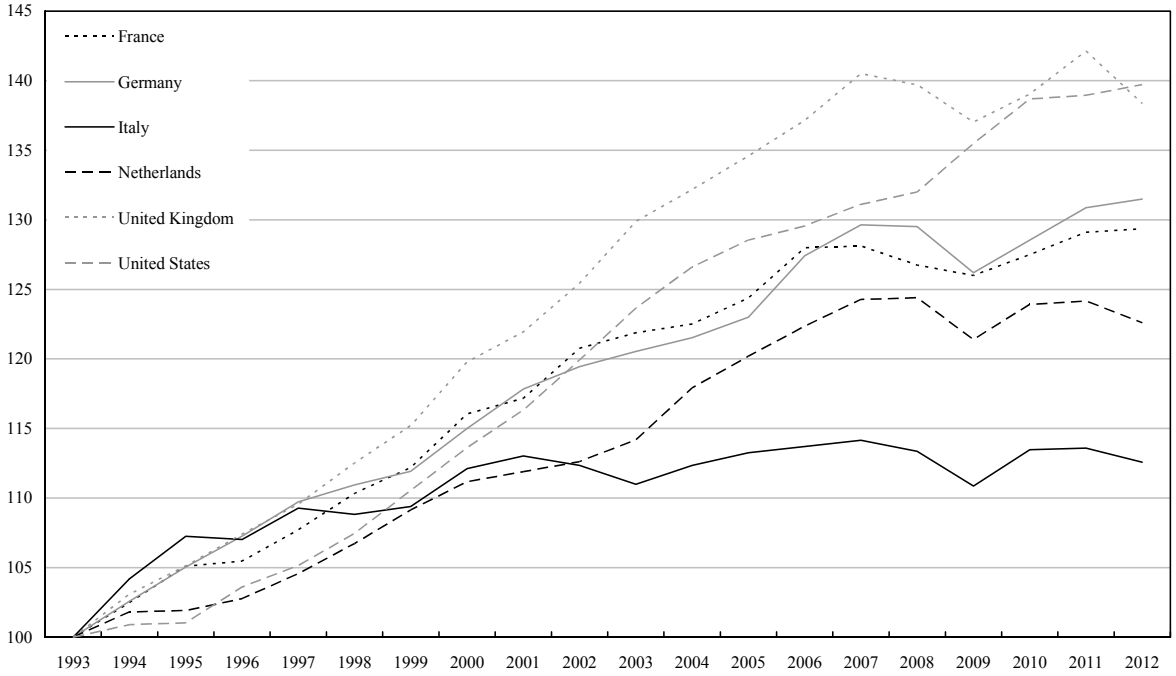
The surplus on the current account of Italy's balance of payments, which had peaked at about 4-5 per cent of GDP in the mid-1990s thanks to the depreciation of the currency and the weakness of domestic demand, was rapidly dissipated; in 2007 the current account recorded a deficit of about 1 per cent of GDP (Figure 4). This trend largely mirrored developments in merchandise trade, whose deterioration was led by the increasing deficit in the energy component; on the contrary, the trade of non-energy goods continued to record a rather stable surplus (about 3 per cent of GDP; see Cappariello *et al.*, 2012).

[9] An alternative measure of competitiveness is based on unit labour costs (ULC) which, however, offer a partial and misleading description as they fail to take into account any information on mark-ups and other sources of costs (Giordano and Zollino, 2013). In the years before the global recession, the average rise in the ULC-based indicator reached 2.6 per cent per year (up from 1.1 during the 1990s), compared with 1.9 in France; on the contrary, Germany experienced a decrease in ULC (–0.7 per cent) thanks in part to the significant moderation of labour costs.

Figure 2

Productivity in the Main Advanced Economies – Total Economy
(index: 1993=100)

GDP per Hour Worked

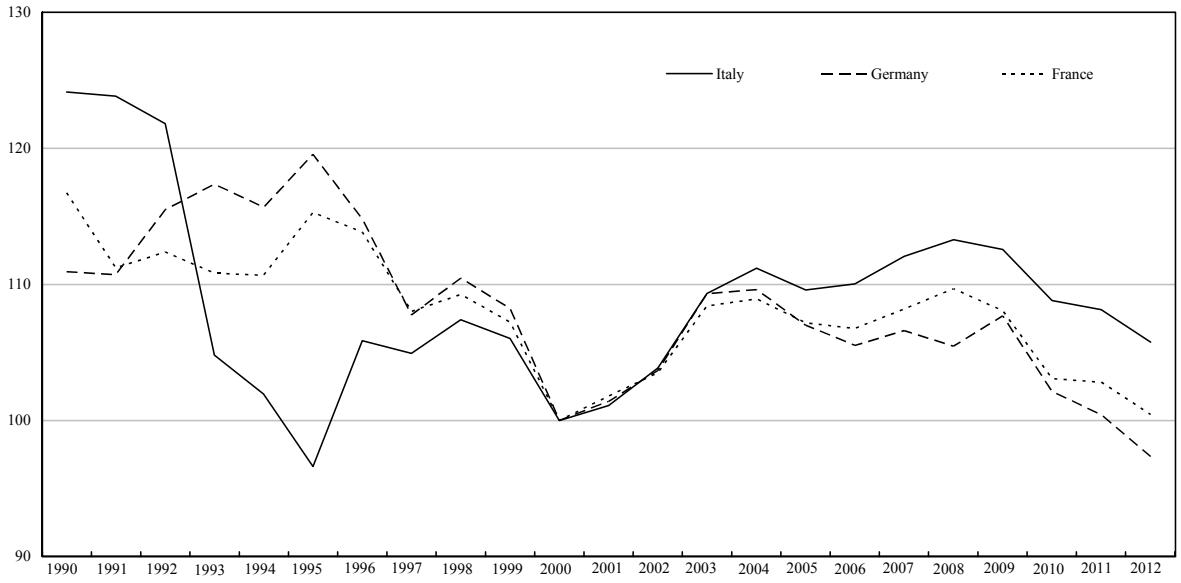


Total Factor Productivity

Source: Based on OECD data, available at: http://stats.oecd.org/Index.asp

Figure 3

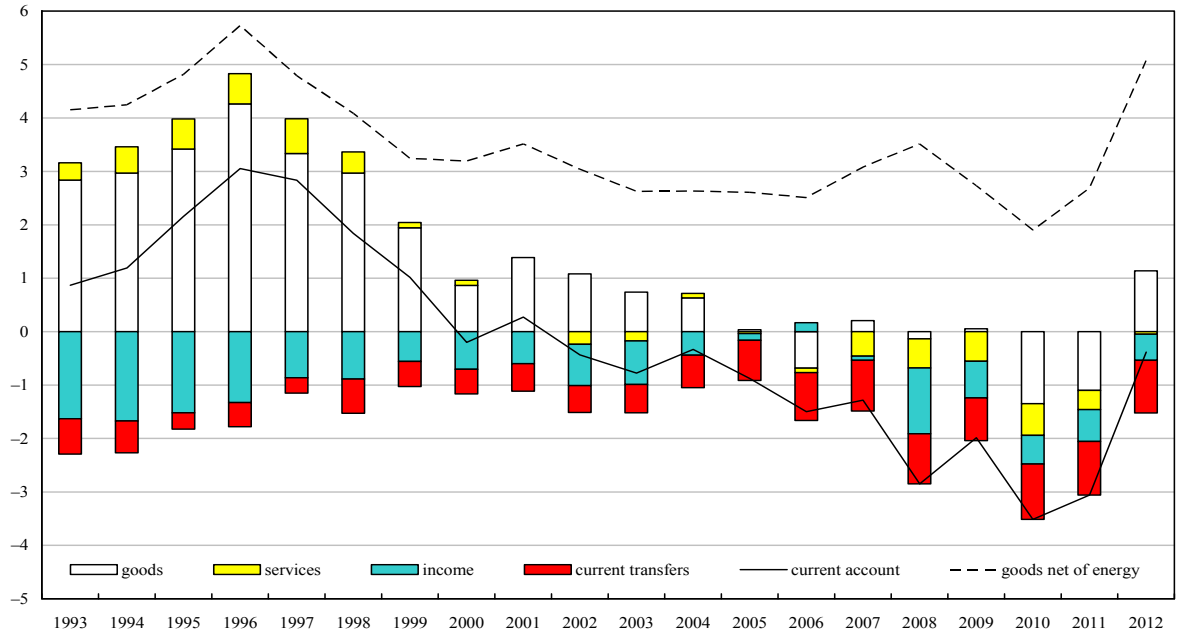
Price Competition in the Main Euro-area Countries (PPI-based Indicators)
(indices: 2000=100)



Source: Banca d'Italia. An increase indicates a loss of competitiveness.

Figure 4

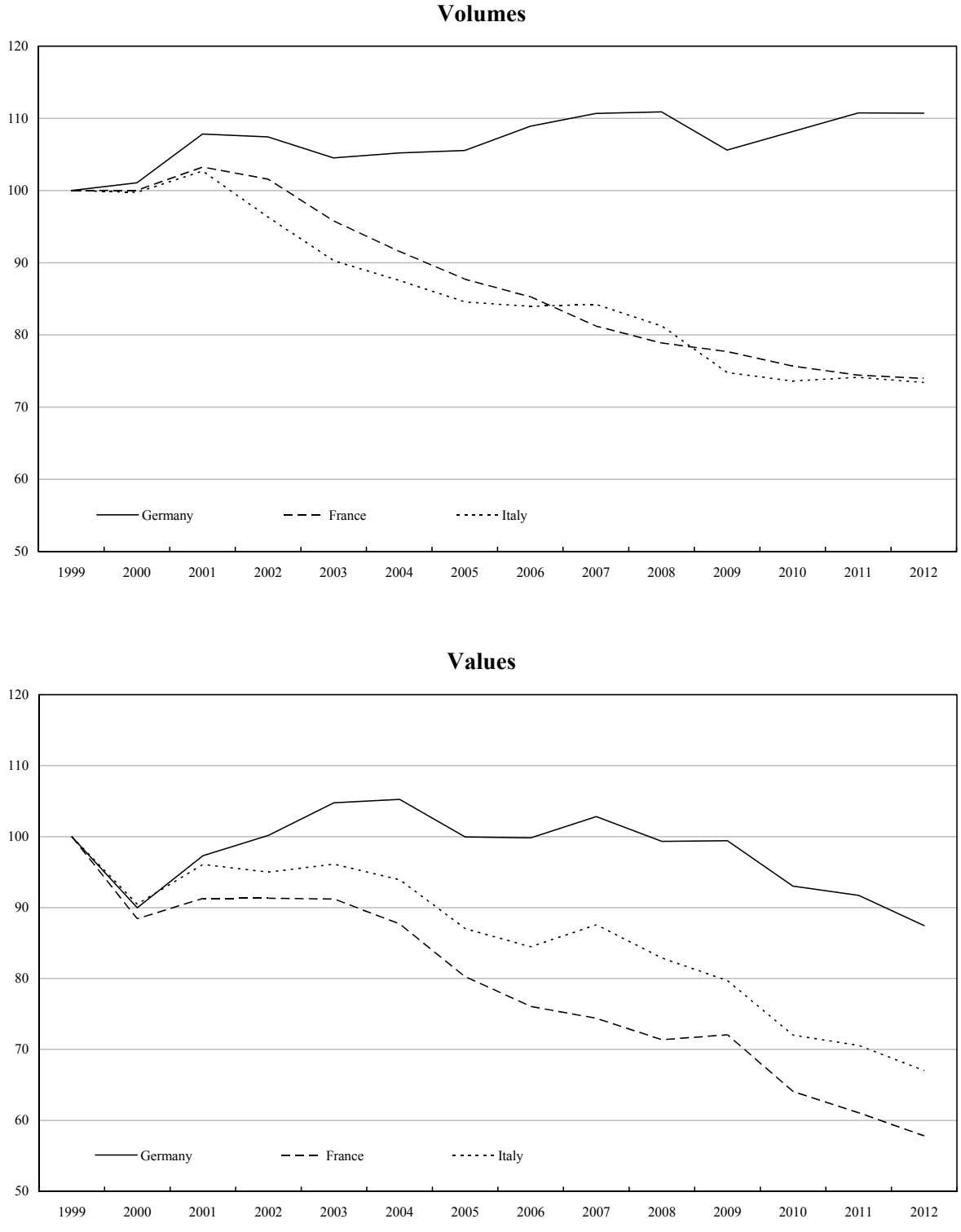
Italy's Current Account Balance
(percent of GDP)[1]



Source: Banca d'Italia and Istat. [1] For 2012, average of the first three quarters.

Figure 5

World Export Market Shares (Goods)
(index 1999=100)



Source: Based on IMF data and National statistics.

Table 2

World Export Market Shares
(percentages)

Year	Value				Volume (1)			
	Italy	Germany	France	Euro area (2)	Italy	Germany	France	Euro area (2)
1996-2000	4.2	9.2	5.2	30.8	4.5	8.8	4.8	30.1
2001-05	3.8	9.6	4.7	30.2	3.9	9.5	4.6	30.2
2006-10	3.3	9.3	3.8	27.5	3.3	9.7	3.9	28.1
2005	3.6	9.4	4.3	28.9	3.6	9.4	4.3	28.9
2006	3.5	9.4	4.0	28.2	3.5	9.7	4.1	28.9
2007	3.6	9.7	3.9	28.7	3.5	9.9	3.9	28.8
2008	3.4	9.3	3.8	27.6	3.4	9.9	3.8	28.3
2009	3.3	9.4	3.8	27.6	3.1	9.4	3.7	27.3
2010	2.9	8.6	3.4	25.2	3.1	9.5	3.7	27.1
2011	2.9	8.5	3.2	24.6	3.1	9.7	3.6	27.4

Sources: based on ECB, National Statistical Institutes and World Economic Outlook (WEO) data.
(1) At constant prices and exchange rates, 2005. (2) Intra euro area trade is included.

The performance of Italian exports can be better assessed by considering the trend of their share in world trade in goods (Figure 5 and Table 2). Estimated to average about 4.5 per cent in the second half of the 1990s, it has been declining since 1999, falling to 3 per cent by 2011. This trend was similar to that in France, but certainly worse than in Germany, whose exports have performed exceptionally well in the last ten years.[10] The loss of competitiveness of Italian industry has affected its performance not only in foreign markets, but also in the domestic one, in particular in traditional sectors like textiles, clothing, shoes and leather products. Between 1999 and 2007, import penetration increased more rapidly than in France and German (Bassanetti *et al.*, 2012a).

In the years leading up to the global crisis, the health of the Italian economy showed moderate signs of improvement: TFP stopped declining in the middle of the last decade; tentative positive signals for export and GDP growth emerged, even if modest compared with Italy's main partners.

3.2 Fiscal developments

After 1997, Italy's public finances entered a phase of rapid and continuous deterioration, partly masked by the decline in interest payments, the "dividend" of participation in EMU. The primary surplus, which stood at 6.6 per cent of GDP in 1997, was virtually nil in 2005. In 2006-7,

[10] The disadvantage of Italy and France with respect to Germany is mainly due to the poorer ability to penetrate new dynamic emerging markets (mostly Asian ones, in particular China). In the case of Italy, this can be reconnected to the predominance of small firms that are incapable of paying the fixed costs required to enter such markets (Barba Navaretti *et al.*, 2011).

following the opening in 2005 of the Excessive Deficit procedure for Italy, fiscal policy turned restrictive again and in 2007 the primary surplus reached 3.4 per cent of GDP, benefiting from the cyclical upturn.

It has been pointed out that the decrease in the primary balance, particularly in the initial years of EMU, can be better understood taking into account the legacy of the fiscal consolidation of the 1990s (Marino *et al.*, 2008). In the initial years 1998-2005, more than half of the fall in the primary surplus was due to the reduction in revenue (which had increased sharply in the pre-EMU consolidation years); moreover, the growth in the expenditure-to-GDP ratio was concentrated in the areas on which the adjustment process of the 1990s relied most heavily, namely healthcare and capital expenditure, and where savings were achieved largely with spending ceilings and not with structural reforms.

As the adjustment in the years 2006-7 was predominantly revenue-based, more than two-thirds of the deterioration in the primary balance in the decade 1998-07 is accounted for by the increase in primary expenditure as a share of GDP. The fast growth of primary expenditure in the decade contrasts starkly with the experience of Germany, where expenditure dynamics were extremely subdued throughout the decade. Figure 6 compares the primary expenditure ratio in the two countries. While in 1997 that ratio was 4.1 percentage points higher in Germany than in Italy, at the end of the decade it became higher in Italy by 2.1 percentage points.

Over the same period, the Italian public debt declined by 14.2 percentage points, to 103.3 per cent of GDP. Given the very high starting level, the modest reduction in the debt ratio did not meet the Treaty provision that it be "*sufficiently diminishing and approaching the reference value at a satisfactory pace*". Moreover, approximately two-thirds of the reduction stemmed from extraordinary operations (including sales of assets and the conversion in 2002 of the bonds assigned to the Bank of Italy in 1994 to replace the overdraft on the Treasury's current account with the Bank), which left the public sector net wealth unchanged (Momigliano and Rizza, 2007).

The decline in the primary surplus over the years 1998-2005 contrasts with the objectives set out in the medium-term official fiscal plans (Economic and Financial Planning Documents, EFPD) for those years: in all the plans published between 1998 and 2002, the primary surplus was targeted to remain constant at around 5 per cent of GDP and from 2003 it was set to gradually reach the same objective (Figure 7). It also contrasts with the provision embedded in the preventive arm of the Stability and Growth Pact to bring the budget close to balance in the medium term.

Balassone *et al.* (2011) examine the reasons for the large deviations of fiscal outturns from plans over the period (and in the previous decade). They point to three main factors. First, insufficient control of expenditure, as most slippage came from spending overruns. Second, various weaknesses in the institutional framework, among which the lack of mechanisms to ensure that slippages in one year were promptly compensated for in the subsequent years. Third, government macroeconomic forecasts proved rather optimistic, though other forecasters also tended to overestimate growth.[11]

3.3 The policy response

Notwithstanding the unsatisfactory performance of the Italian economy, during the "lost decade" policy actions in Italy largely failed to tackle the country's structural problems.

---

[11] The cumulative growth forecast over t+1 and t+2 in the Economic and Financial Planning Documents presented by the government in the years 1998-2005 was, on average, 0.9 percentage points higher than in the European Commission autumn forecasts, which, in turn, was 1.3 points higher than the outturns.

Figure 6

Primary Expenditure in Italy and in Germany
(percent of GDP)

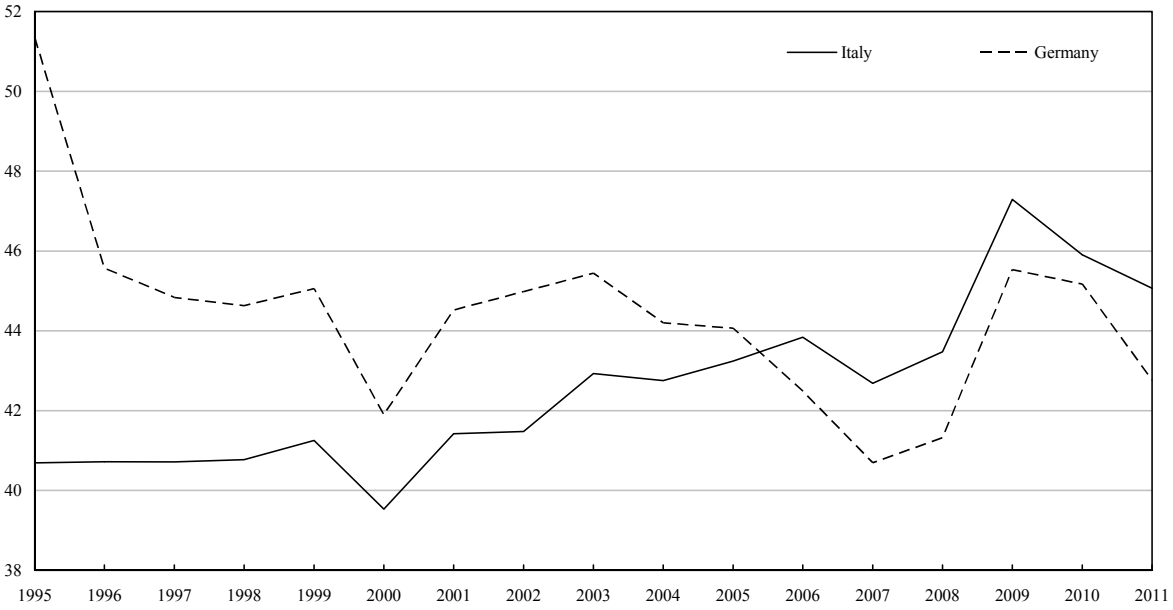
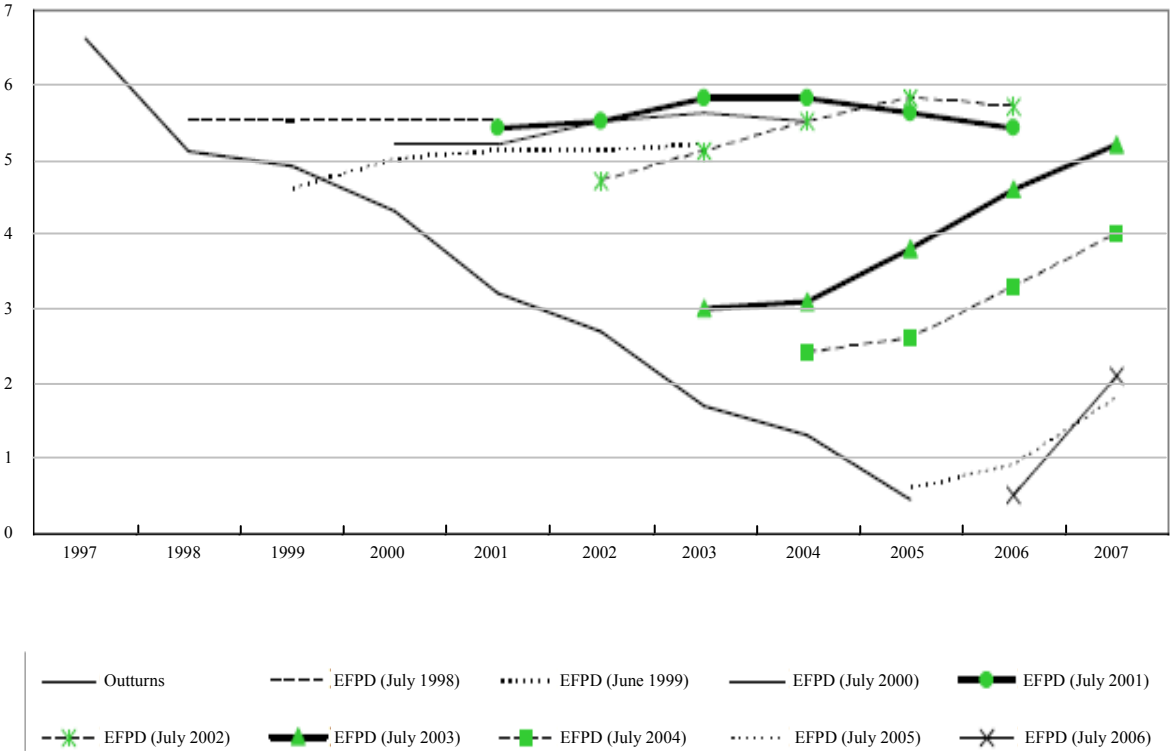


Figure 7

Primary Surplus: Objectives and Results
(percent of GDP)



In the area of education, despite a steady increase Italy continued to lag behind its main European partners in terms of human capital accumulation, both in quantitative and qualitative terms. In the early 2000s, the proportion of the Italian population aged 25 to 64 with post-secondary education was 12 per cent, less than half the average figure for the OECD countries. Graduates in engineering and other scientific disciplines accounted for a smaller share of the total than in any other leading industrial country. More generally, the Italian education system was characterized by a difficult transition from high school to university; high university drop-out rates; and large geographical discrepancies in students' achievements. The educational system was progressively less able to provide the skills required in a quickly changing environment. At the upper secondary level, inefficient allocation mechanisms of teachers were compounded by increasingly weak standards. Comprehensive reforms, albeit hotly debated, remained pending for a long time; the evolution of the Italian educational system was the result of a patchwork of partial changes, sometimes reversed and whose targets were not fully spelled out, lacking regular monitoring and an evaluation of the actual effects (Bertola and Sestito, 2012; Cipollone *et al.*, 2012).

Concerning the labour market, as mentioned above, its positive performance in the decade reflected major changes in the institutional framework, largely introduced in the 1990s, which contributed to wage growth moderation.[12] Further actions increased the degree of flexibility in labour utilization but were not part of a comprehensive labour market reform. Law 196/1997 (which entered into force in 1998) abolished the ban on agency work, promoted the spread of part-time work and apprenticeship, and liberalized private employment services. Law 30/2003 introduced new flexible contracts (job on call, work-sharing, staff leasing), further liberalizing the use of apprenticeship contracts and increasing the flexibility of part-time work.

These reforms were effective in promoting flexible forms of employment (Brandolini and Bugamelli, 2009): fixed-term work made up about two-fifths of the 2.65 million additional salaried jobs created between 1998 and 2007. However, the increase of labour flexibility was the result of widespread use of atypical contracts, while employment protection on open-ended ones was not modified. As a consequence, workers on temporary contracts had to bear the brunt of the adjustment during economic downturns.

The welfare system was not modified to accommodate the greater flexibility: the coverage of ordinary unemployment benefit schemes remained low both in terms of replacement rates and duration, with workers on atypical contracts often failing to meet the entitlement criteria (Bobbio *et al.*, 2011). As a consequence, workers more likely to experience job losses were also less protected by income stabilizers. The lack of effectiveness of active labour market policies at local level, and the poor integration between these and the centrally-operated income support schemes also prevented smooth transitions into and out of employment, efficient job matching, and the rigorous application of conditionality criteria which should force unemployed workers to actively look for a job when receiving unemployment benefits.

Lower social security contributions for some categories of atypical contracts – such as quasi-employees[13] and apprentices – and, in general, greater job instability exposed the workers to the risk of not contributing enough to their pension funds, thus building up a long-term problem of inadequate pension entitlements.

---

[12] The reform of the collective bargaining system that took place in 1992-3 had abolished the wage indexation mechanism, by which a substantial fraction of past inflation was transferred to wages, and introduced a forward-looking mechanism in which pay rises were set according to the government's expected inflation rate, thus preventing wage-price spirals (see Brandolini *et al.*, 2007).

[13] "Quasi-employees" (*para-subordinati*) are defined as formally self-employed workers actually working for a single contractor at his premises and during pre-determined hours.

All in all, the lack of a comprehensive reform tackling the growing labour market duality and the fragmentation of unemployment benefits contributed to a build up of structural problems that were partially addressed only by the recent Law 92/2012.

As for the "doing business environment", lack of competition in various sectors, stifling regulations, high administrative burdens and inadequate contract enforcement remained important negative features of Italy throughout the decade (Bianco, Giacomelli and Rodano, 2012). Despite the measures taken, the overall reform effort in these area was largely inadequate.

In particular, in a number of sectors the level of competition failed to increase significantly (Bianco, Giacomelli and Rodano, 2012). This lack of improvement was caused by an inadequate regulatory design and by the frequent changes in legislation, together with often insufficiently independent regulatory authorities. Some progress was made in the regulation of retail and professional services with the removal of a few barriers; however, the reform was largely incomplete, so that regulation in professional services remained far more stringent than in the leading European economies. In local public services, partly because of the uncertainty of the national legislative framework, the transformation that started in the mid-1990s did not produce any effective modernization. In particular, southern regions clearly lag behind the others in terms of both management and quality of the services supplied.

Despite repeated corrective measures, the working of the civil justice system remained, and remains, inadequate. The excessive length of proceedings hinders the effective resolution of disputes, with serious repercussions for the efficient functioning of the markets. The problems stem primarily from shortcomings in the management of resources, whose amount is not lower than in the other European countries, and from excessive litigation (Banca d'Italia, 2007).

No major steps forward were made in reducing the administrative burdens for firms, or simplifying the procedures for starting business activities. In 2005 the European Commission estimated the costs of administrative burdens at 4.6 per cent of GDP in Italy, compared with the EU average of 3.5 per cent.

In the area of public finances, the decade 1998-2007 witnessed further – but not conclusive – reforms to the pension system. In particular, requirements for seniority pensions were gradually tightened, though new rules did still allow workers to retire relatively early compared with other European countries. The large problem posed by the excessive length of the transition to the new rules introduced by the 1992-5 reforms, far less generous to retirees than the previous system, was not tackled (Fornero, 2008).[14] Overall, the actions taken in this area had the effect of delaying – but not significantly lowering – the expected increase in the pension expenditure to GDP ratio in the decades to come (Morcaldo, 2007).

In the health sector, expenditure overruns remained frequent at the beginning of the decade (in particular, in the Centre and South of the country) and the central government repeatedly transferred ex post additional resources to finance deficits (on this "soft budget constraint" see Caroppo and Turati, 2007, and references therein, and Bordignon and Turati, 2009). In 2006 a strong link between spending and financing responsibilities was established with the introduction of automatic mechanisms that raised local taxation and increased central control over the regional decision process in the event of spending overruns. However, significant spending gaps between regions, not ascribable to the characteristics of the population, persisted. Overall, the actions taken helped to keep spending dynamics under control, but the challenge of increasing efficiency in the weak-performance regions remained.

---

[14] Until 2015 (2033), initial pensions at retirement will be entirely (partially) calculated on the basis of the system in place before the reforms.

A constitutional reform in 2001 conferred some pronounced federalist features on Italy's institutional system: the matters falling within central government legislative power were explicitly listed and all unmentioned functions were left to the sole jurisdiction of the Regions. However, it was not until 2009 that a framework law laid down the fundamental principles of Italian fiscal federalism and the constitutional change was actually implemented. The reform created substantial institutional uncertainty, as testified by the surge in controversies opposing different layers of government brought to the Constitutional Court.

Concerning revenues, most of the 1998-2007 decade was characterized by a reduction of the tax burden. Nevertheless, in 2006-7 the process was reversed and eventually the 2007 tax burden (at 42.7 per cent of GDP) was only 0.7 percentage points lower than that of 1997. Then, as now, the Italian system featured a high fiscal burden on labour.

4 Why were no reforms introduced?

As argued in the previous section, notwithstanding the serious and documented dysfunctions in several areas, the much-needed reforms were either not introduced or were largely ineffective.

A comprehensive explanation of the difficulties involved in undertaking radical reforms in Italy in recent decades is put forward in Craft and Magnani (2013). The authors identify the main culprit as a long-standing feature of Italian society, *i.e.*, the existence and severity of conflicts between opposing groups and parties, and the associated lack of a policy vision that went beyond them to look at the country as a whole.[15] They conjecture that the lack of political leadership and the stronger influence of interest groups also had a negative influence on the effectiveness of the public administration and the quality of public services, both essential elements for growth.[16] Moreover, they argue that Italian firms were unable to react to the new challenges partly because of the closed corporate governance structures centred on family-controlled and pyramidal groups. Indeed, it is a widely shared view that there is a historically-rooted relative lack of large private firms in Italy compared with other major European countries (Amatori, Bugamelli and Colli, 2013); this, in turn, creates a greater need for supply-side policy reforms than elsewhere.[17]

In addition to the limited contendibility of firms, it can be argued that the persistence of blocks of vested interests was aided by a persistently scarce social mobility. As for education achievements, in the early 2000s the probability of obtaining a university degree was still much greater for students with graduate parents than for those whose parents had only completed lower secondary school (Checchi and Zollino, 2001). Social stratification and lack of meritocracy ranked high in Italy also with regard to occupations and earnings (Schizzerotto and Marzadaro, 2008; OECD, 2010).

In the following we argue that several factors masked the difficulties of the productive system: the greater availability of low cost of credit to Italian households, as well as the rapid increase in their wealth, which sustained consumption; the growth in employment, which presumably mitigated the perceived urgency of reforms; the good performance of the construction sector and the relatively relaxed fiscal policy, which supported economic activity; the concomitant

---

[15] The demise of ideologies, after the fall of the Berlin Wall, paradoxically worsened the situation, as many consolidated interest groups emerged and proliferated, each seeking to gain rents at the expense of the others.

[16] The relationship between political institutions and the working of the economy has a sound tradition in economic literature (Persson and Tabellini, 2004); the evidence for Italy suggests that easy solutions in terms of institutional engineering do not exist. An example is provided by the first-past-the-post voting system introduced in 1993, in force until 2005, which was not successful in guaranteeing the stability and effectiveness of governments.

[17] The importance of state-owned enterprises between the 1930s and the 1990s – a unique case in Western Europe – indirectly reflects this fact.

slow growth in Germany, which alleviated concerns about the performance of Italian economy ("two in distress make sorrow less"); and the lack of concern on the part of the financial markets over the structural deficiencies of the Italian economy and the continuing high public debt, not substituted by effective European rules. We discuss these factors in detail below.

The start of EMU brought Italian households a swift decline in the cost of borrowing and further integration in capital markets. Between 1998 and 2007, the stock of consumer credit more than doubled, reaching 12 per cent of total household expenditure in 2007. This marked an important break with respect to the past, when the imperfection of capital markets had long contributed to high saving levels (Bassanetti *et al.*, 2012b). At the same time, the total stock of mortgages rose from about 5 to 32 per cent of total consumption. The propensity to save, which was still slightly above 18 per cent of households' disposable income in 1997, stood at around 13 per cent in the mid-2000s (Figure 8). As a consequence, consumption expenditure in the decade increased notwithstanding the virtual stagnation of per capita disposable income.

In 1998-2007, the value of the Italian households' wealth progressively rose from 6.2 to 7.4 times disposable income, among the highest ratios of the advanced economies. The positive trend was largely concentrated in real property, whose value increased in the period from 3.3 to 4.4 times disposable income. In turn, the largest contribution came from dwelling re-evaluation, spurred by buoyant housing markets (Figure 9): between 1999 and 2007, house prices surged cumulatively by 36 per cent in real terms.[18]

The higher wealth-to-income ratio could have, on one side, further reduced the need for savings at the aggregate level, and on the other contributed to a broad perception of improved welfare, considering that house ownership rates progressively increased, reaching almost 75 per cent in 2008. According to recent estimates of the propensity to consume out of housing wealth in Italy (Bassanetti and Zollino, 2010), this would have provided a significant support to private consumption, leading to a positive contribution to GDP of around 0.1 percentage points per year.

Moreover, the increasing demand for housing, together with the fiscal incentives to promote the renovation of old buildings in force since late 1990s, prompted a cyclical upturn in construction activity at the inception of EMU, inverting the declining trend of the previous decade. Between 1999 and 2007, the volume of residential investments grew on average by 3.4 per cent per year. The prolonged expansion of the building sector made the slowdown of the Italian economy somewhat less severe, as it contributed 0.3 percentage points per year to GDP growth.

It can be estimated that fiscal policy (assessed against a counterfactual simulation in which European rules were broadly respected) also had an average positive impact on growth of about 0.2 percentage points per year over the decade (see Section 4.1 below), against the background, until recently, of lack of feedback from fiscal outcomes to the cost of financing. As mentioned above, the primary surplus declined sharply despite the commitment taken at the ECOFIN Council in March 1998 to hold it equal to or above 5 per cent of GDP.[19] Notwithstanding the fall in interest payments resulting from lower borrowing rates, net borrowing exceeded the 3 per cent threshold for six years in a row between 2001 and 2006.[20] It is worth remembering in this connection that European rules not only prohibit any overshooting of that threshold, but also require a balanced budget to be reached and maintained in the medium term.

---

[18] The sharp rise in house prices during the period mostly mirrored the development of fundamentals, including greater credit availability and population growth, with no evidence of misalignments (Nobili and Zollino, 2012).

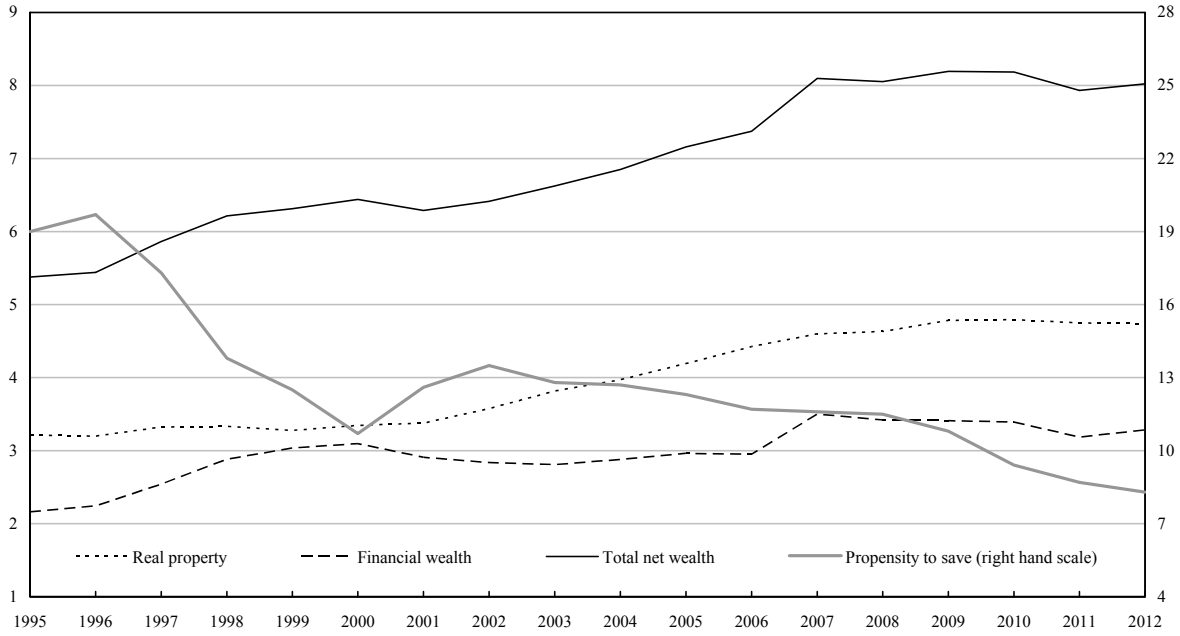
[19] *Corriere della Sera*, March 22, 1998.

[20] The Excessive Deficit Procedure only started for Italy in 2005 because the excess deficit in the initial years emerged only some time afterwards, on the basis of statistical revisions.

Figure 8

Italian Households Wealth and Propensity to Save

(ratio to disposable income; percentage values for the propensity to save)

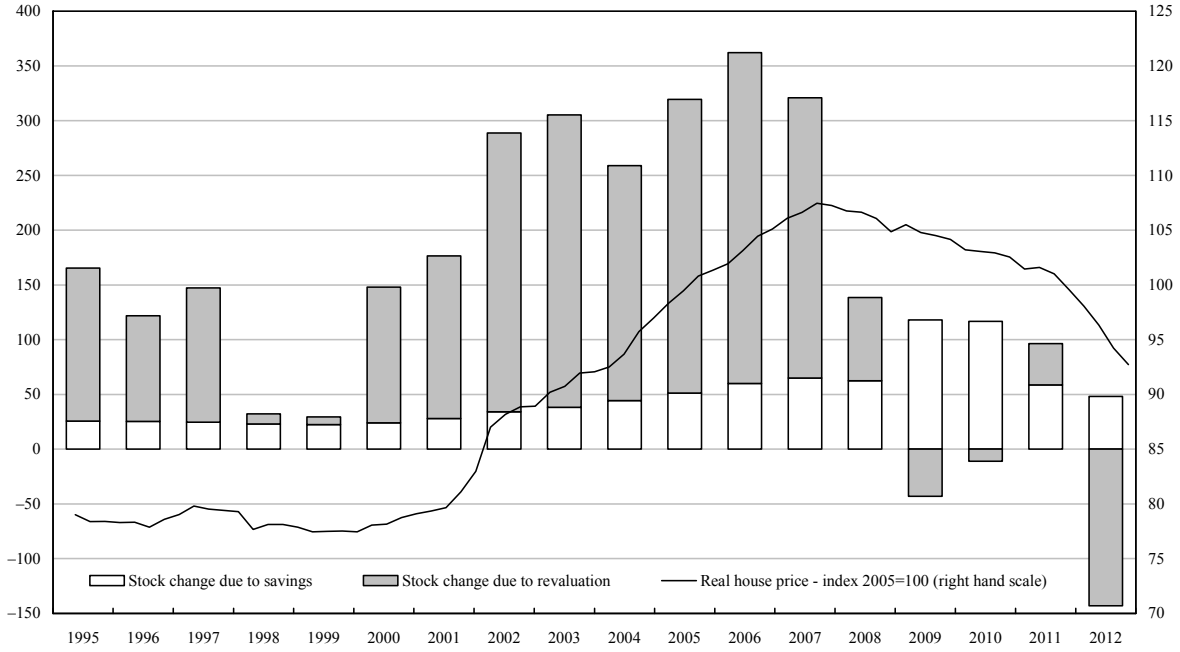


Source: based on Banca d'Italia and Istat data.

Figure 9

Italy – Housing Wealth and Prices

(millions of euro; prices 2005=100)



Source: based on Banca d'Italia and Istat data.

Figure 10

GDP in Italy and Germany
(levels; 1997=100)

Source: Eurostat.

Between 1998 and 2007 the overall effect of contingent factors, primarily the upturn in construction and the somewhat relaxed fiscal policy, was to support economic growth by 0.6 percentage points per year; without this stimulus GDP growth would have been below 1 per cent.

The steady improvements in labour market conditions probably helped to conceal the urgent need for reforms from policy-makers and the general public, overshadowing the increasing disparities across classes of workers, with a possibly negative impact on human capital accumulation and activity growth in a medium-term perspective.

Germany has traditionally been viewed as a sort of benchmark for Italy because of the size of the industrial sector and the export vocation common to the two economies. From the launch of monetary union to the eve of the global crisis, average GDP growth in Germany was broadly in line with that recorded in Italy and much lower than the euro-area average (Sabbatini and Zollino, 2010; Figure 10). However, the driving forces underlying such relatively low growth in the two countries were rather different. In Germany the subdued growth largely reflected the measures taken to correct the fiscal imbalances generated by national unification and the efforts to modernize the economy through the introduction of deep structural reforms; the resulting sluggishness in domestic demand was partly mitigated by the robust expansion of exports, at much higher rates than in the euro area as a whole. The reform process undertaken in Germany in those years put the country in a more favourable position to react to the global crisis.

Moreover, since Germany is the largest foreign destination market of Italian products and its productive system is strongly integrated with that of Italy, sluggish domestic demand in Germany seemed to provide a reasonable explanation for the relatively slow growth of Italian exports.

At the start of EMU, financial market pressure to correct macroeconomic and fiscal imbalances – the so-called "market discipline" – lost strength. For Italy and other EMU members,

financial markets seemed to ignore fundamentals (Giordano *et al.*, 2013); in the case of Italy, in particular, they appeared not to take notice of the persistently dismal outlook for economic growth and the sluggish reduction of the debt from the very high level reached in the mid-1990s. The yield spread between Italian ten-year government bonds and German Bunds barely moved during the mild recession of the early-2000s and never exceeded 50 basis points until Spring 2008.

At the same time, the European fiscal rules, which were designed precisely to address this failure of the markets (already in 1989 the Delors Committee acknowledged that "constraints imposed by market forces might either be too slow and weak or too sudden and disruptive"), proved ineffective not only for Italy. Particularly significant for a high debt country like Italy was the lack of enforcement of the debt rule. Moreover, the absence of adequate incentive mechanisms (based on penalties and rewards) in the preventive arm of the SGP did not encourage countries to build up adequate buffers in good times.

Finally, one additional factor may have weighed on the (un-)willingness to undertake the necessary reforms. There was a widespread and unwarranted belief among Italian households that the introduction of the euro in January 2002 was the cause of a substantial loss of purchasing power and of the perceived increasing risk of impoverishment (Del Giovane and Sabbatini, 2008). This belief contributed to a misperception of the gravity of the structural problems of the Italian economy.

4.1 The effects of fiscal policy on growth in the decade 1998-2007

To make an approximate quantitative assessment of the boost to economic activity coming from fiscal policy in the decade 1998-2007 we design a mechanical counterfactual simulation in which public finances broadly comply with European rules while the other features of the economy remain unchanged.

In the simulation, carried out using the quarterly econometric model of the Bank of Italy (BIQM),[21] we assume a permanent fiscal adjustment in the years 2001-3 equal *ex ante* to 1 per cent of GDP each year.[22] The correction is evenly split between revenue and expenditure, largely undoing some major reductions (increases) in specific components of revenue (expenditure) that occurred during those years.[23]

In the simulation, the average fiscal stance in the decade can be described as slightly expansionary: the tax burden remains broadly constant between 1997 and 2007, while there is still a sizeable increase in the ratio to GDP of primary spending (a result which stays if the historical values of GDP are used in the ratio, instead of the simulated ones).

---

[21] The long-term properties of BIQM (see Busetti, Locarno and Monteforte, 2005) are consistent with a neoclassical model postulating exogenous growth, in which full employment of factors is accompanied by a constant rate of inflation, hence by constant relative prices. The levels of output and of employment of capital and labour are consistent with the parameters of the aggregate production function and with relative factor costs. The steady-state growth path of the model, stemming from technical progress and the accumulation of real and financial wealth, interacts with the dynamics of the adjustment process to determine short-term characteristics. The adjustment processes essentially reflect three factors: the stickiness of prices and wages, which prevents their immediate adaptation to the situation of full resource utilization; the non-malleability of installed physical capital, which hampers the short-term changes of the relative composition of productive factors; and the possibility that expectations and outcomes may not coincide. In the short run (and to some extent also in the medium term), therefore, given these rigidities, the characteristics of the model fit the Keynesian framework in which the level of output is determined by the trend in aggregate demand, in a situation of oversupply in both the goods and the labour market.

[22] We impose that the adjustment starts in 2001 because the primary surplus remains close to 5 per cent of GDP until 2000.

[23] In particular, we increase indirect taxes in 2001 (offsetting their fall of 0.5 percentage points of GDP in that year) and direct taxes in 2002 (excluding their dip by 0.9 percentage points of GDP); as for expenditure, we permanently reduce both purchases of goods and personnel costs by 0.1 percentage points of GDP every year of the 2001-03 period; the remaining adjustment is on monetary transfers.

We assume unchanged historical values for the (nominal) exchange rate and nominal short-term interest rates. These assumptions are broadly justified by the presence of the monetary union and by the fact that in the course of the decade sovereign risk premiums failed to react to national macroeconomic and public finance conditions.

As a consequence of the fiscal correction in 2001-3, the deficit does not exceed 3 per cent of GDP in any year of the simulation period, although in 2005 it comes close to the threshold (2.3 per cent). At the end of the period, the two commitments taken by Italy with the Stability and Growth Pact and at the ECOFIN Council in March 1998 are both met: a balanced budget (more exactly, a surplus of 0.3 per cent of GDP) is achieved and the primary surplus again reaches approximately 5 per cent of GDP. The Italian public debt also declines at almost double the rate seen at any time in the past and reaches 93.3 per cent of GDP in 2007; the reduction of more than 2 percentage points per year would have been broadly consistent with the "satisfactory pace" towards the reference value of the debt ratio required by the Treaty on the Functioning of the European Union.

The simulation points to sizeable output costs of the fiscal correction: in 2007 real GDP would have been 2.6 per cent below its historical value (Table 3).[24] The negative impact on internal demand is stronger, with a cumulative effect of about 4.3 per cent for private consumption and 3.3 per cent for investment. In 2007 the current account of the balance of payments would have been approximately balanced, against a historical deficit close to 1 per cent of GDP. The more subdued dynamics of output explain why, at the end of the decade, the primary surplus turns out to be only 1.6 percentage points of GDP higher than in the past (5.0 against 3.4 per cent) after the permanent correction of 3 points of GDP: the *ex ante* effects are approximately halved by the feedback to the budget from the economy. On the other hand, there are savings on interest expenditure due to the lower debt level; overall, net borrowing is 1.9 points below the historical outturn.

Carrying out the same counterfactual simulation with the DSGE model also currently used for policy evaluation at the Bank of Italy,[25] the output costs of the assumed fiscal correction are slightly smaller, at 1.6 per cent of GDP in 2007.[26] Largely as a consequence of this difference, in 2007 the primary surplus is 2.3 percentage points of GDP above the level it actually reached (instead of 1.6 points), while net borrowing is lower by 2.7 points (1.9): a surplus of approximately 1 per cent of GDP is achieved. Finally, the debt ratio falls more rapidly, to below 90 per cent of GDP in 2007.

5 The double-dip recession: 2008-13

The encouraging signals of structural adjustment in the Italian economy present since the middle of the last decade, and attributable mostly to the reactions of some firms to the new

---

[24] Given the consumption-smoothing behaviour of the households incorporated in the model, there are lagged effects on output of the consolidation which exceed the horizon of the simulation. Cumulatively, they can be quantified at approximately 0.3-0.4 percentage points.

[25] This is a three-country model of Italy, the rest of the euro area and the rest of the world. The first two regions share the same monetary policy and currency. On top of the usual New Keynesian features, the model of each region has been augmented with tradable and non-tradable goods, non-Ricardian consumers and a very detailed fiscal sector. In particular, the model features distortionary taxes (on labour income, capital income and consumption), public expenditure and public debt (Forni, Gerali and Pisani, 2010; Locarno, Notarpietro and Pisani, 2013).

[26] The values of fiscal multipliers in the BIQM and in the DSGE currently used at the Bank of Italy vary depending on the budget item, the time horizon and the persistence of the shock. In the BIQM and in the case of purchases of goods and services, the multiplier slightly exceeds 1 in the first years of the shock; in the case of monetary transfers, taxes and social contributions, the multipliers tend to be close to 0.2 in the first year and increase over time. These values are broadly consistent with the estimate in the October 2008 IMF *World Economic Outlook* of an average multiplier of 0.5 within three years for changes in primary balance.

Table 3

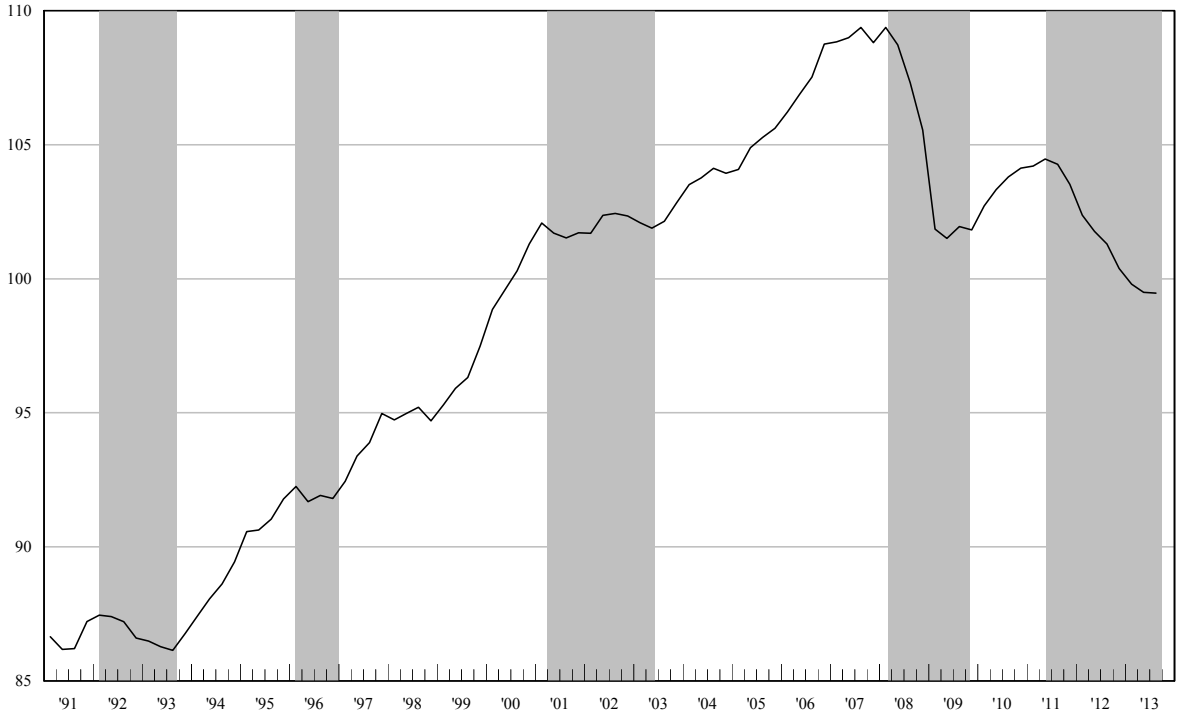
If Fiscal Policy Had Been Broadly Compliant with European Rules: A Counterfactual Simulation with the BIQM

(deviations from baseline)

Item	2001	2002	2003	2004	2005	2006	2007	2008
Net borrowing *(ratio to GDP)*								
Historical data	3.1	3.1	3.6	3.5	4.4	3.4	1.6	2.7
Deviation from baseline	–1.0	–1.8	–2.6	–2.3	–2.2	–2.1	–1.9	–1.9
Primary balance *(ratio to GDP)*								
Historical data	3.1	2.5	1.5	1.2	0.2	1.2	3.4	2.5
Deviation from baseline	1.0	1.7	2.5	2.1	1.9	1.85	1.6	1.5
Public debt *(ratio to GDP)*								
Historical data	108.3	105.4	104.1	103.7	105.7	106.3	103.3	106.1
Deviation from baseline	–1.2	–2.5	–4.2	–5.9	–7.4	–8.7	–10.0	–11.3
GDP growth *(percent)*								
Historical data	1.9	0.5	0.0	1.7	0.9	2.2	1.7	–1.2
Deviation from baseline	–0.3	–0.5	–0.6	–0.4	–0.4	–0.3	–0.2	–0.1
GDP nominal growth *(percent)*								
Historical data	4.8	3.7	3.1	4.2	2.8	3.9	4.1	1.3
Deviation from baseline	0.2	–0.5	–0.8	–0.6	–0.5	–0.4	–0.4	–0.4
Private consumption growth *(percent)*								
Historical data	0.7	0.1	0.9	0.8	1.2	1.3	1.1	–0.8
Deviation from baseline	–0.4	–0.6	–0.9	–0.8	–0.7	–0.5	–0.4	–0.3
Private investments growth *(percent)*								
Historical data	2.4	3.3	–1.0	1.2	1.9	3.7	1.3	–3.8
Deviation from baseline	–0.2	–0.5	–0.6	–0.7	–0.6	–0.5	–0.4	–0.3
BOP current account surplus *(ratio to GDP)*								
Historical data	0.3	–0.4	–0.8	–0.3	–0.9	–1.5	–1.3	–2.9
Deviation from baseline	0.2	0.4	0.6	0.8	0.9	1.0	1.1	1.0
Unemployment rate *(percent)*								
Historical data	9.0	8.5	8.4	8.0	7.7	6.8	6.1	6.7
Deviation from baseline	0.0	0.0	0.1	0.2	0.2	0.2	0.3	0.4

Figure 11

Italian GDP
(chain values. seasonal adjusted; index 2000=100)



Source: Istat.

competitive environment (Brandolini and Bugamelli, 2009), were abruptly interrupted by the global crisis, which lead to a double-dip recession (Figure 11).

In 2008-9, Italy's GDP contracted cumulatively by about 7 per cent, the largest fall since World War II, followed by a temporary recovery in 2010 (by 1.7 per cent). Caivano *et al.* (2010) analyse the different channels through which economic activity was affected by the global crisis. In particular, they find that in 2008-10 the exceptional collapse of international trade, worse financing conditions of firms and households, the depreciation of households' assets and the overall loss of confidence curtailed GDP by about 10 percentage points (roughly three-quarters attributable to the unprecedented collapse of exports). Economic policies partially offset the recessionary impulses, containing the fall in GDP by an estimated 3.5 percentage points thanks to the combined effects of an expansionary monetary policy, the action of automatic stabilizers and the changes in the composition of revenues and expenditures enacted by the government.

The global crisis hit Italian public finances at a time when they were far from sound. The debt exceeded 100 per cent of GDP. Notwithstanding two years of relatively strong growth, net borrowing stood at 1.6 per cent of GDP in 2007 and almost reached the Maastricht threshold the following year. In the last months of 2008 the spread between the interest rates on Italian BTPs and those on German Bunds started to widen, sending a warning signal that expansionary fiscal action in Italy would result in higher financing costs. In this context, in addition to the working of automatic stabilizers, the fiscal stimulus for 2009 was based only on changes in the composition of the budget, leaving the balance broadly unchanged (Hamburg *et al.*, 2011); the stance of fiscal policy became restrictive already in 2010.

Starting in the Summer of 2011, the abrupt and unexpected worsening of the outlook for the world economy heightened investors' risk aversion and accentuated fears over the soundness of heavily indebted borrowers. In Europe, fears about the sustainability of sovereign debt were triggered not only by the worsening outlook for growth but also by the hesitant policy reaction of the countries in greatest difficulty, as well as by the shortcomings of EU governance in managing systemic risks. Increasing attention was drawn to the worsening of Greece's financial situation and the fears caused by the announcement of private sector involvement in reducing the country's public debt. Doubts mounted regarding the ability of the European Financial Stability Facility (EFSF) to cope effectively with a deepening of the crisis. The incomplete construction of the Union's institutions due to the lack of agreement among national authorities and the slowness of the decision-making process also impacted on the market's judgement.[27] The risk premiums on government securities, measured as the yield spread over German Bunds, increased in particular in countries with high public or private debt and uncertain growth prospects, such as Italy, Spain and, to a lesser extent, Belgium.

In investors' assessments, Italy was penalized by its high public debt and slow growth, which largely reflected the steady loss of competitiveness. These problems overshadowed the numerous strengths of the Italian economy, such as the prudent conduct of fiscal policy since the start of the global crisis, the solid financial situation of households and firms, the low level of foreign debt, the absence of imbalances in the real estate sector, and the soundness of the banking system (Banca d'Italia, 2011b).

The sovereign debt crisis forced the Italian government to enact – in three rapid steps – a massive fiscal adjustment in the second half of 2011. On top of two packages introduced in July and August, in December a further consolidation was approved, aiming to reassure the financial markets. Overall, the correction amounted to about 3.0 per cent of GDP for 2012, 4.7 per cent for 2013 and 4.9 per cent for 2014. The December package included a far-reaching pension reform, which set more stringent requirements for retirement, thereby immediately strengthening the financial sustainability of the system. The measures virtually completed the lengthy process of adjusting the system to the changed socio-demographic situation and economic growth prospects that had started in the early 1990s. The extension of the contribution-based system to all workers reduced disparity of treatment and linked benefits received more closely to the contributions paid, thereby reducing distortions in the supply of labour. The increases in revenue focused on levies on assets and consumption. Stepping-up taxation of real estate was consistent with government decentralization, as it tightened the link between taxes paid and public services.[28]

The adverse effects of the sovereign crisis hitting Italy brought the moderate recovery of the economy that had started early in 2010 to a sudden stop. The deterioration of financing conditions (both the increase in the cost of credit and its reduced availability), the impact of the measures enacted to consolidate public finances and the rising economic uncertainty severely curbed domestic demand, which contracted by 7.7 per cent between the third quarter of 2011 and the fourth quarter of 2012. Over the same period, GDP accumulated a loss of 3.7 per cent, implying a fall of over 8 per cent since its peak in early-2008. The most recent forecasts point to a further fall in 2013 (–1.7 per cent according to private analysts' projections collected in September by Consensus Economics).

Notwithstanding the downturn, the outlook for public finance in Italy has improved considerably thanks to the fiscal correction. In 2012, net borrowing fell to the 3 per cent threshold,

---

[27] See Franco and Zollino (2013) for a review of the evolution of EU governance.

[28] The entry into force of the municipal tax (IMP) was brought forward from 2014 to 2012 and the related tax base was significantly modified by including owner-occupied houses and applying higher adjustment factors to upwardly-revised cadastral income, especially for residential buildings.

Table 4

Italian Public Finances Aggregates
(percentages)

Item	2011	2012	2013 (1)
Primary surplus/GDP	1.2	2.5	2.4
Net borrowing/GDP	3.8	3.0	3.0
Debt/GDP	120.8	127.0	132.9
GDP growth rate	0.4	–2.4	–1.7

Sources: for the final figures, Istat (Consolidated general government account and Gross domestic product) and Banca d'Italia (General government debt). (1) Fiscal targets included in the *Update to the Economic and Finance Document* published by the Italian government in September 2013; they include the planned payment of general government trade debt.

Table 5

Value Added and Labour Productivity by Sector
(percent; annual averages)

	Percentage of Total Gross Value Added, 2011 (1)	**Gross Value Added** (2)				**Productivity** (3)			
		2000-7	**2000-9**	**2010**	**2011**	**2000-7**	**2000-9**	**2010**	**2011**
Industry excluding construction	18.6	0.8	–9.2	7.0	1.2	0.8	–3.9	10.4	0.5
of which:									
- *manufacturing*	15.9	0.8	–10.3	7.0	0.6	0.8	–4.7	10.8	–0.2
- *supply of electricity gas, steam and air conditioning*	1.5	1.8	–0.6	6.9	3.8	4.3	1.6	8.6	5.6
Construction	6.0	2.5	–5.6	–3.0	–3.5	–0.4	–4.9	–0.8	–0.4
Services	73.4	1.4	–1.6	1.4	0.8	0.1	–1.1	1.6	0.3
Total	**100.0**	**1.3**	**–3.4**	**2.1**	**0.6**	**0.2**	**–1.9**	**3.1**	**0.4**

Source: Based on Istat data (national accounts).
(1) At base prices, current value. (2) At base prices, chain-linking value. (3) Value added at base prices per standard labour unit; chain-linking value.

fulfilling Italy's European commitments (Table 4). The primary surplus was 2.5 per cent of GDP (against 1.2 per cent in 2011); it is expected remain broadly stable in 2013.

Overall, the tax burden continued to increase over the period 2008-12 as consolidation measures involved significant action on the revenue side. At present, the tax burden is high both historically and by international comparison: in 2012 it reached 44.0 per cent of GDP, 2.9 percentage points higher than the value for other euro-area countries (European Commission, 2013). In 2011 the fiscal burden on employee income was higher than that of other euro-area countries by more than 5 percentage points (in the case of an unmarried employee; 8 percentage points in the case of a married employee with two dependent children). The 2012 statutory rate on business income exceeded by about 5 percentage points the euro-area average (Eurostat, 2012).

5.1 The reform process

The fiscal consolidation packages were accompanied by a vast programme of structural reforms aimed at fostering growth and productivity.

Starting in the second half of 2011, measures were approved to overhaul the main labour market institutions, to strengthen the education system and private and public research, development and innovation, to foster competition in key services sectors (such as professional services, energy, gas, retail trade and public transportation), to simplify bureaucratic procedures and controls for firms, to improve the efficiency of the judiciary system and to reduce tax evasion.

The wide-ranging labour market reform moved in two major directions: (a) re-establishing a socially efficient balance between differently flexible types of labour contract by reducing employment protection on the open-end contract and curbing abuses in the recourse to other, more flexible arrangements; (b) revising the systems of unemployment insurance and wage supplementation fund to make them better suited to an increasingly dynamic labour market.

As for the education system, provisions for a national evaluation system were introduced which, among other things, envisaged for the first time a self-assessment by each school as well as an evaluation of the school managers' performance.

Renewed attention was given to the need to support research, development and innovation by both the private sector and the universities. A specific law was dedicated to improving conditions for the development and financing of innovative start-up firms.

A set of liberalizations in crucial service sectors (professional services, gas and retail among others) was approved. The measures included strengthening the powers of the antitrust authority, creating an independent authority in charge of regulating access to network infrastructures, and setting tariffs as well as quality standards in the transport sector. The procedure to set up a business activity was streamlined and unnecessary authorizations and *ex ante* controls were eliminated.

Significant cuts in administrative burdens for firms relating to environmental, labour, public procurement and privacy regulations were provided for.

A wide set of measures was adopted to improve the working of the civil courts and to speed up judicial proceedings. They included the reorganization of judicial districts; the creation of specialized courts dealing with company law disputes; the introduction of compulsory conciliation procedures; and plans to reduce the courts' backlogs.

The economic impact of these reforms is hard to evaluate as they enhance potential output growth in the medium term and the boost to actual growth may take some time to emerge. According to simulations run by the OECD (2013a), full implementation of the measures already approved would stimulate GDP growth by about 5 percentage points in a ten-year horizon; the order of magnitude

of the estimate by Lusinyan and Muir (2013) is similar although on a five-year horizon.[29]

Further action is required, however, both to speed up the enactment of secondary legislation for the approved measures to fully enter into force and to enlarge the scope of the reform strategy (Visco, 2013).

5.2 What if?

According to the mechanical counterfactual exercises described in paragraph 3.1, a timely implementation of the fiscal adjustment at the turn of the century would have guaranteed the achievement of a small budget surplus in 2007 and the reduction of the public debt to around 90 per cent of GDP (against the actual level of 103.3 per cent); the cumulative output loss determined by the fiscal correction would have been of the order of 2 percentage points. This loss, according to the aforementioned estimates, would at least have been offset by the effects of the structural reforms introduced in 2011-2 had they been implemented at the onset of EMU.

In Italy the output losses stemming from the global and the sovereign crisis have proved extremely high, amounting so far to more than 8 percentage points. It is difficult to gauge precisely to what extent being better prepared in 2007 in terms of public finances and structural features would have reduced them. However, a better starting position would probably have avoided the welfare costs generated by the constraints on the size of the countercyclical fiscal policy in 2009. As for the sovereign debt crisis, a better starting position would have limited its impact on Italy and, consequently, the dimension of pro-cyclical budget policies which had to be introduced in 2012-13. Therefore, the negative effects of the deterioration in the credit market and confidence loss would have been partially avoided.

On this point, Cova and Busetti (2013) estimate, on the basis of the quarterly econometric model of the Bank of Italy (BIQM), that the output loss in 2012-13 due to the direct effects of the increase in sovereign spreads and the fiscal consolidation measures amounted to, respectively, 1.3 and 2.3 percentage points (with an additional 1 percentage point being attributed to "uncertainty and confidence of households and firms" which could have been partly caused by the two factors).[30]

It should be noted that the latter estimate and that concerning the output loss of the fiscal correction simulated in the years 2001-03 use broadly the same values for the fiscal multipliers, as in the BIQM they are largely independent of the state of the economy. It is a standard Keynesian argument that the effects of fiscal policy may instead be stronger when the cyclical conditions are unfavourable, as in 2012-13. The issue has been recently examined in a number of studies (e.g., Auerbach and Gorodnichencko (2012), Blanchard and Leigh (2013), Baum *et al.* (2012)) which have pointed out that the difference in multipliers compared to those of "normal times" could be very large. This strand of literature is discussed in Cozzi (2013) and Locarno, Notarpietro and Pisani (2013). The analysis of Cova and Busetti (2013) does not support the view that the values of multipliers in Italy in 2012-13 have been much higher than those embedded in the BIQM, while Caprioli and Momigliano (2013) bring some, but not conclusive, empirical evidence for Italy of multipliers being higher in recessions. To the extent that the multipliers in 2012-13 have been higher than in 2001-03, the case for consolidating in 2001-03 to be better prepared in 2007 would be stronger.

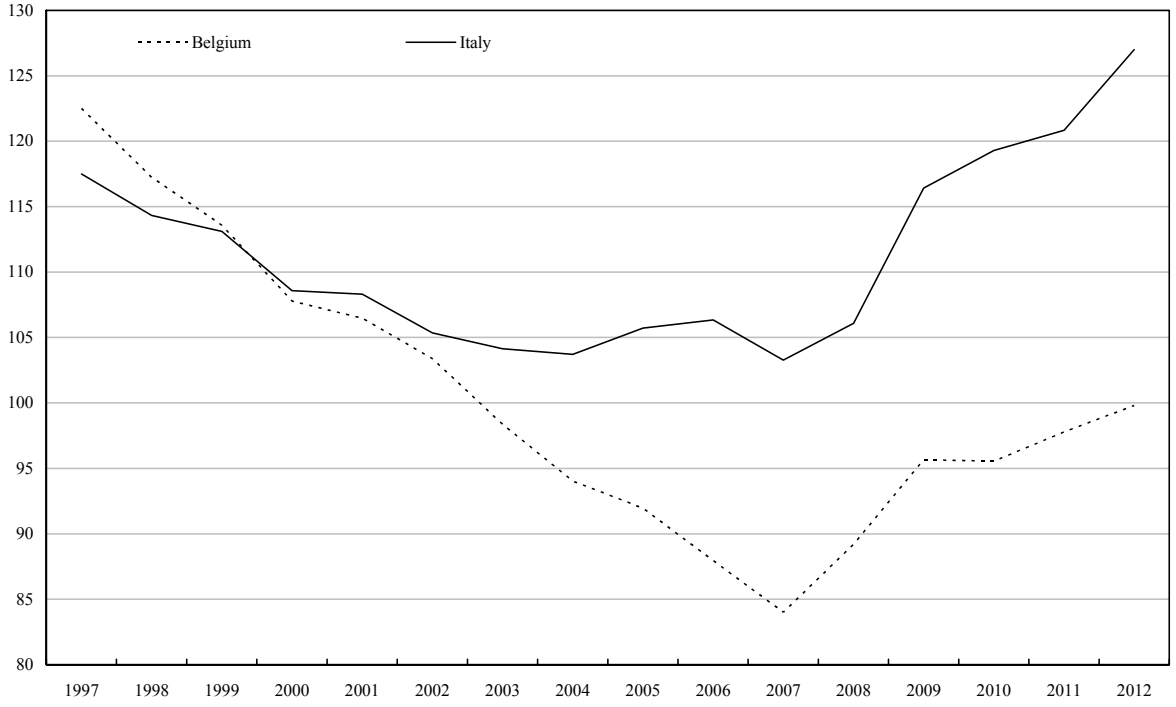
---

[29] The magnitude of the effects and the required time horizon depend on a variety of assumptions regarding initial values for key structural parameters, such as the price and wage mark-ups and the share of non-tradables in total activity (see also Forni *et al.*, 2010). Importantly, in the basic scenario, reforms are assumed to be stepwise credible; should they instead be immediately credible, the expected increase in real GDP would show up two years in advance as both households and firms foresee the potential gain for future income and demand and rapidly adjust their optimal choices.

[30] Preliminary estimates have already been published in January 2013 in the Bank of Italy's Economic Bulletin (Banca d'Italia, 2013).

Figure 12

Public Debt in Italy and in Belgium
(percent of GDP)



Source: European Commission (2013).

The experience of Belgium may provide same insight of what could have happened if Italy had been better positioned in 2007 in terms of public finances and structural features. In 2007 net borrowing in Belgium was virtually nil – it had been close to zero in most years of the previous decade – and public debt amounted to 84 per cent of GDP (Figure 12), having fallen by 38 percentage points with respect to 1997 (when, at 122 per cent, it was 5 percentage points of GDP above that of Italy). The growth performance in the decade 1998-2007 had been also fairly good; at 2.4 per cent on average it did not signal any serious structural weaknesses of the economy.[31] Those initial conditions – close to those Italy might have enjoyed had it implemented the fiscal adjustment and the structural reforms in time – allowed Belgium to react to the global crisis by introducing sizeable stimulus actions in 2009, which brought the deficit for that year to 5.5 per cent of GDP, close to the level of Italy. While the pace of consolidation was broadly similar in the two countries in 2010-11, Belgium was largely unscathed by the sovereign debt crisis (Figure 12), avoiding most of its negative effects on domestic credit markets, and it did not have to step up the fiscal adjustment in the second half of 2011, unlike Italy. Belgian GDP is assessed to remain broadly unchanged in 2012-13 (European Commission, 2013), against a fall of over 3.5 per cent in Italy.

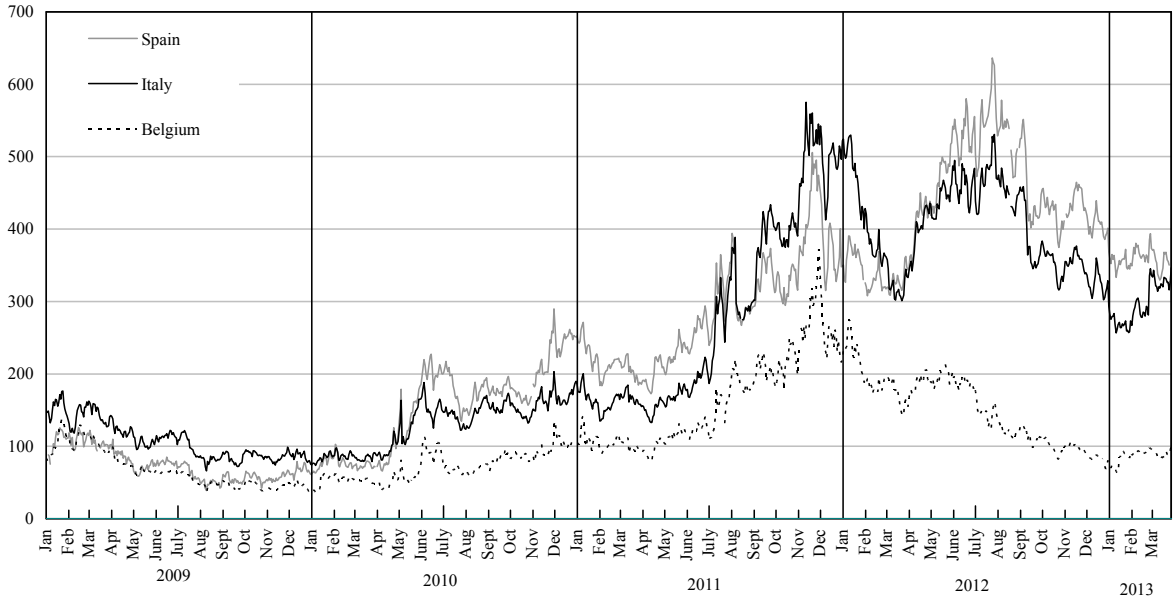
---

[31] In the ease-of-doing-business rank constructed by the World Bank for 2008, the relative ranks of Belgium and Italy were, respectively, 19 and 65, out of 181 countries. Recent discussions of the structural features of the Belgian economy, showing a mixed picture with strengths and weaknesses, can be found, *inter alia*, in OECD (2013b) and in the proceedings of the EC Country Seminar on Belgium (http://ec.europa.eu/economy_finance/events/2013/25092013_country_seminar_on_belgium).

Figure 13

Yield Spreads between 10-year Government Bonds and the German Bund

(daily data; percentage points)



Sources: Based on Bloomberg and Thomson Reuters Datastream data.

6 Conclusions

This paper reviews the main macroeconomic trends and the debate on policy priorities at the onset of EMU and points out that the reform process came to a virtual standstill in the decade up to the outbreak of the global crisis while fiscal policy was inconsistent with the commitments entered into at the European level.

We suggest that the lack of resolute policy reactions to the institutional dysfunctions and structural weaknesses was due to the fragmentation of the political constituency, while a variety of contingent factors masked the difficulties of the productive system. In particular, we point out that the relatively brisk performance of the construction sector and the expansionary fiscal policy added approximately 0.6 percentage points to annual growth in the period 1998-2007.

In Italy the output losses stemming from the global and the sovereign debt crisis have been considerable. Overall, in 2008-12 GDP contracted cumulatively by around 8 per cent, the largest fall since World War II. The Italian government's reaction to the sovereign crisis in 2011 was twofold. On the one hand, to reassure financial markets a massive fiscal adjustment was introduced, which is largely responsible for the further contraction of GDP, in excess of 1 per cent, expected for 2013. On the other hand, many long overdue structural reforms were implemented.

Had Italy been better positioned in 2007 in terms of both public finances and structural features, part of the adverse effects of the global and sovereign crises would arguably have been avoided.

In the last two years, forced by the crisis, Italy has started to adjust its fiscal imbalances and tackle its structural weaknesses. As a whole, the measures approved so far go in the right direction but their implementation and further actions are needed in several areas.

REFERENCES

Accetturo, A., A. Bassanetti., M. Bugamelli, I. Faiella, P. Finaldi Russo, D. Franco, S. Giacomelli and M. Omiccioli (2013), "Il sistema industriale italiano tra globalizzazione e crisi", Banca d'Italia, Questioni di Economia e Finanza, No. 193, July.

Amatori, F., M. Bugamelli e A. Colli (2013), "Italian Firms in History: Size, Technology and Entrepreneurship", in G. Toniolo (ed.), *Oxford Handbook of the Italian Economy Since Unification*, Oxford University Press.

Auerbach, A.J. and Y. Gorodnichenko (2012), "Measuring the Output Responses to Fiscal Policy", *American Economic Journal: Economic Policy*, Vol. 4, pp. 1-27.

Balassone, F, D. Franco, D. Monacelli and S. Momigliano (2002), "Italy: Fiscal Consolidation and Its Legacy", in Banca d'Italia (ed.), *The Impact of Fiscal Policy*, proceedings of Banca d'Italia's workshop held in Perugia, 21-23 March.

Balassone, F., S. Momigliano and P. Rizza (2011), "Italy: Medium-term Fiscal Planning and Frequent Government Changes", in P. Mauro (ed.), *Chipping Away at Public Debt*, International Monetary Fund, John Wiley & Sons.

Banca d'Italia (2002), *Annual Report*, May.

——————(2007), *Annual Report*, May.

——————(2011a), *Le infrastrutture in Italia: dotazione, programmazione, realizzazione*, Banca d'Italia, April.

——————(2011b), *Financial Stability Report*, November.

——————(2013), *Economic Bulletin*, January.

Baum, A., M. Poplawski-Ribeiro and A. Weber (2012), "Fiscal Multipliers and the State of the Economy", IMF, Working Paper, No. 12/286, December.

Bertola, G. and P. Sestito (2012), "Human Capital", in G. Toniolo (ed.), *Oxford Handbook of the Italian Economy Since Unification*.

Bianco, M., S. Giacomelli and G. Rodano (2012), "Concorrenza e regolamentazione in Italia", Banca d'Italia, Questioni di Economia e Finanza, No. 123, April.

Blanchard, O.J. and D. Leigh (2013), "Growth Forecast Errors and Fiscal Multipliers", IMF, Working Paper, No. 13/1, January.

Blinder, A. (2005), "Fear of Offshoring", CEPS, Working Paper, No. 119.

Bobbio, E., A. Brandolini, F. Colonna, F. D'Amuri, A. Rosolia, R. Torrini and R. Zizza (2011), "Partecipazione al lavoro e inclusione sociale: aspetti critici e possibili interventi", paper presented at the workshop *Europa 2020: Quali riforme strutturali per l'Italia?*, Banca d'Italia, 21 April.

Boeri, T., R. Faini, A. Ichino, G. Pisauro and C. Scarpa (2005) *Oltre il declino*, Il Mulino, Bologna.

Bordignon, M. and G. Turati (2009*)*, "Bailing Out Expectations and Public Health Expenditure", *Journal of Health Economics*, Elsevier, Vol. 28, No. 2, pp. 305-21.

Brandolini, A. and M. Bugamelli (eds.) (2009), "Reports on Trends in the Italian Productive System", Banca d'Italia, Questioni di economia e finanza, No. 45, April.

Brandolini, A., P. Casadio, P. Cipollone, M. Magnani, A. Rosolia and R. Torrini (2007), "Employment Growth in Italy in the 1990s: Institutional Arrangements and Market Forces",

in N. Acocella and R. Leoni (eds.), *Social Pacts, Employment and Growth. A Reappraisal of Ezio Tarantelli's Thought*, pp. 31-68, Heidelberg, Physica Verlag.

Busetti, F. and P. Cova (2013), "L'impatto macroeconomico della crisi del debito sovrano: un'analisi contro fattuale per l'economia italiana", Banca d'Italia, Questioni di Economia e Finanza, forthcoming.

Busetti, F., A. Locarno and L. Monteforte (2005), "The Bank of Italy's Quarterly Model", in G. Fagan and J. Morgan (eds.), *Econometric Models of the Euro-area Central Banks*, Edward Elgar, Cheltenham (UK).

Caivano, M., L. Rodano and S. Siviero (2010), "La trasmissione della crisi finanziaria globale all'economia italiana. Un'indagine contro-fattuale, 2008-2010", Banca d'Italia, Questioni di Economia e Finanza, No. 64, April.

Cappariello, R., G. Ortolani and V. Pellegrini (2012), "Le nuove statistiche di bilancia dei pagamenti e posizione verso l'estero dell'Italia: metodologie e risultati", Banca d'Italia, Questioni di Economia e Finanza, No. 138, October.

Caprioli, F. and S. Momigliano (2013), *The macroeconomic effects of expenditure shocks during good and bad times*, proceedings of Banca d'Italia's workshop *The Sovereign Debt Crisis and the Euro Area*, held in Rome on February 15; available at *http://www.bancaditalia.it/studiricerche/convegni/atti/sovereign_debt/*

Caroppo, M.S. and G. Turati (2007), "I sistemi sanitari regionali in Italia. Riflessioni in una prospettiva di lungo periodo", *Vita e pensiero*.

Checchi, D. and F. Zollino (2001), "Struttura del sistema scolastico e selezione sociale", *Rivista di Politica Economica*, pp. 43-84, July-August.

Cipollone, P., P. Montanaro and P. Sestito (2012), "Il capitale umano per la crescita economica: possibili percorsi di miglioramento del sistema d'istruzione in Italia", Banca d'Italia, Questioni di Economia e Finanza, No. 122, April.

Cipollone, P. and I. Visco (2007), "Il merito nella società della conoscenza", *Il Mulino*, No. 1, pp. 21-34.

Cozzi, T. (2013), "La crisi e i moltiplicatori fiscali", *Moneta e credito*, Vol. 66, No. 262, pp. 129-51.

Crafts, N. and M. Magnani (2013), "The Golden Age and the Second Globalization in Italy", in G. Toniolo (ed.), *Oxford Handbook of the Italian Economy Since Unification*, Oxford University Press.

Del Giovane, P. and R. Sabbatini (2008), *The Euro, Inflativo and Consumers' Perceptions*, Springer-Verlag, Berlin.

European Commission (2013), *Winter Forecasts*, February,

Eurostat (2012), *Taxation Trends in the European Union*, Luxembourg.

Faini, R. (2004), "Fu vero declino? L'Italia degli anni novanta", in G. Toniolo and V. Visco (eds.), *Il declino economico dell'Italia. Cause e rimedi*, Milano, Bruno Mondadori.

Faini, R. and A. Sapir (2005), "Un modello obsoleto? Crescita e specializzazione dell'economia italiana", in T. Boeri, R. Faini, A. Ichino, G. Pisauro and C. Scarpa (eds.), *Oltre il declino*, Bologna, Il Mulino.

Fornero, E. (2018), "Stop and go nel processo italiano di riforma del sistema previdenziale", in S. Pirrone (ed.), *Flessibilità e sicurezze*, Il Mulino, AREL.

Forni, L., A. Gerali and M. Pisani (2010), "The Macroeconomics of Fiscal Consolidations in a Monetary Union: The Case of Italy", Banca d'Italia, Temi di Discussione, No. 747.

Franco, D. and F. Zollino (2013), "Macroeconomic Imbalances in Europe: Institutional Progresses and Remaining Challenges", *Applied Economics*, forthcoming.

Galli, G.P., D. Terlizzese and I. Visco (1989), "Un modello trimestrale per la previsione e la politica economica: le proprietà di breve e di lungo periodo del modello della Banca d'Italia", *Politica Economica*, Vol. 5, No.1, pp. 3-52.

Giacomelli, S. and C. Menon (2013), "Firm Size and Judicial Efficiency: Evidence from the Neighbour's Court", Banca d'Italia, Temi di Discussione, No. 898, January.

Giordano, C. and F. Zollino (2013), "Going Beyond the Mystery of Italy's Price Competitiveness Indicators", *Voxeu*, 18 July.

Giordano, R., M. Pericoli and P. Tommasino (2013), "Pure or Wake-up-call Contagion? Another Look at the EMU Sovereign Debt Crisis", *International Finance*, forthcoming.

Hamburg, B., S. Momigliano, B. Manzke and S. Siviero (2010), "The Reaction of Fiscal Policy to the Crisis in Italy and Germany: Are They Really Polar Cases in the European Context?", in Banca d'Italia (ed.), *Fiscal Policy: Lessons from the Crisis*, proceedings of Banca d'Italia's workshop held in Perugia, 25-27 March.

Locarno, A., A. Notarpietro and M. Pisani (2013), "Fiscal Multipliers, Monetary Policy and Sovereign Risk: A Structural Model-based Assessment", Banca d'Italia, mimeo.

Lotti, F. and E. Viviano (2012), "Why Hiring Temporary Workers", Banca d'Italia, mimeo.

Lusinyan, L. and D. Muir (2013), "Assessing the Macroeconomic Impact of Structural Reforms: The Case of Italy", IMF, Working Paper, No. WP/13/22, January.

Marino, M.R., S. Momigliano and P. Rizza (2008), "A Structural Analysis of Italy's Fiscal Policies after Joining the Monetary Union: Are We learning from Our Past?", *Public Finance and Management*, Vol. 8, No. 3, pp. 451-501.

Momigliano, S. and P. Rizza (2007), "Temporary Measures in Italy: Buying or Losing Time?", in Magyar Nemzeti Bank (ed.), *Temporary Measures and Off-budget Activities*.

Morcaldo, G. (2007), "Pensioni: necessità di una riforma", available at: http://www.bancaditalia.it/ interventi/ altri_int/2007/morcaldo_pensioni.pdf

Nobili, A. and F. Zollino (2012), *A Structural Model for the Housing and Credit Markets in Italy*, Banca d'Italia, mimeo.

OECD (2000), *Economic Survey of Italy,* Paris.

——————(2007a), *Staying Competitive in the Global Economy: Moving Up the Value Chain*, Paris.

——————(2007b), *Economic Survey of Italy,* Paris.

——————(2009), *Economic Survey of Italy,* Paris.

——————(2010), *Going for Growth*, Paris.

——————(2013a), *Economic surveys Italy*, Paris.

——————(2013b), *Economic surveys Belgium*, Paris.

Persson, T. and G. Tabellini (2004), "Constitutional Rules and Fiscal Policy Outcomes", *American Economic Review*, pp. 25-45, March.

Sabbatini, R. and F. Zollino (2010), "Macroeconomic Trends and Reforms in Germany", *PSL Quarterly Review*, Vol. 63, No. 254, pp. 235-63.

Schizzerotto, A. and S. Marzadoro (2008), "Social Mobility in Italy since the Beginning of the Twentieth Century", *Rivista di Politica Economica*, pp. 5-40.

Visco, I. (1996), "La competitività delle imprese italiane nella prospettiva economica dell'Unione Europea", *Il Mulino*, Vol. 45, No. 5, pp. 930-39.

——————(2009), *Investire in conoscenza – Per la crescita economica,* Il Mulino, Bologna, Ch. 3.

——————(2013), *Concluding Remarks*, Banca d'Italia, Annual Report on 2012, May.

WTO (2008), *World Trade Report 2008, Trade in a Globalizing World*, World Trade Organization, Geneva.

COMMENTS ON SESSION 2
MACROECONOMIC DEVELOPMENTS UNDERLYING THE CRISIS OF THE EURO AREA

MACROECONOMIC AND FISCAL IMBALANCES IN ITALY: A VIEW FROM ESTONIA

Karsten Staehr[*]

Comments on "Macroeconomic Imbalances and Fiscal Policy in Italy Since the EMU" by Antonio Bassanetti, Matteo Bugamelli, Sandro Momigliano, Roberto Sabbatini and Francesco Zollino

I enjoyed very much reading the paper "The Policy Response to Macroeconomic and Fiscal Imbalances in Italy in the Last Fifteen Years", which is written jointly by Antonio Bassanetti, Matteo Bugamelli, Sandro Momigliano, Roberto Sabbatini and Francesco Zollino. The paper has been revised and has received a new title since it was presented at the workshop in Perugia in April 2013. It is a long and very comprehensive paper seeking to link the fiscal performance in Italy with macroeconomic developments before and after the outbreak of the global financial crisis in 2007-08. The paper is an excellent starting point for a discussion of the different factors that have influenced fiscal policy in Italy and, by extension, in many other European countries since the mid-1990s.

Italy faced serious problems financing its government debt after the outbreak of the global financial crisis and the spreading of the crisis to government debt markets in the periphery of Europe. The spreading of the financing problems to Italy may be attributed to its very large government debt, which must be rolled over continually, but it may also reflect the rather bleak medium-term growth outlook. The prospect of a serious government debt crisis in Italy is particularly disquieting given the size of the Italian economy and the very large government debt. After the relative stabilisation of European government debt markets from the second half of 2012 the pressure on Italy seems to have abated as the interest spread over the German Bund has fallen to a manageable level. At the time of writing in October 2013, Italy seems to have weathered the storm and does not need financial support from the IMF and/or the EU.

The main message of the paper is clearly spelled out. Policymakers abstained in the decade before the global financial crisis from structural reforms that could have stimulated economic growth and from fiscal reforms that could have improved the structural balance and reduced the debt stock. This complacency meant that Italy was ill prepared for the shocks associated with the global financial crisis and the nervousness of government debt markets.

This policy complacency is, convincingly, explained in two stages. The paper refers to the literature on political polarisation, which typically finds that policymaking is less efficient when it takes place in a highly polarised environment. In this case reforms may be postponed in a *war of attrition* due to a conflict over the distribution of the short-term costs of the reforms. The paper continues by arguing that the policy complacency was facilitated or helped along by events in the macroeconomic environment. The creation of the Economic and Monetary Union (EMU) and Italy's subsequent membership of the euro area provided positive impulses to the economy in the form of renewed confidence and lower interest rates on government debt. These developments

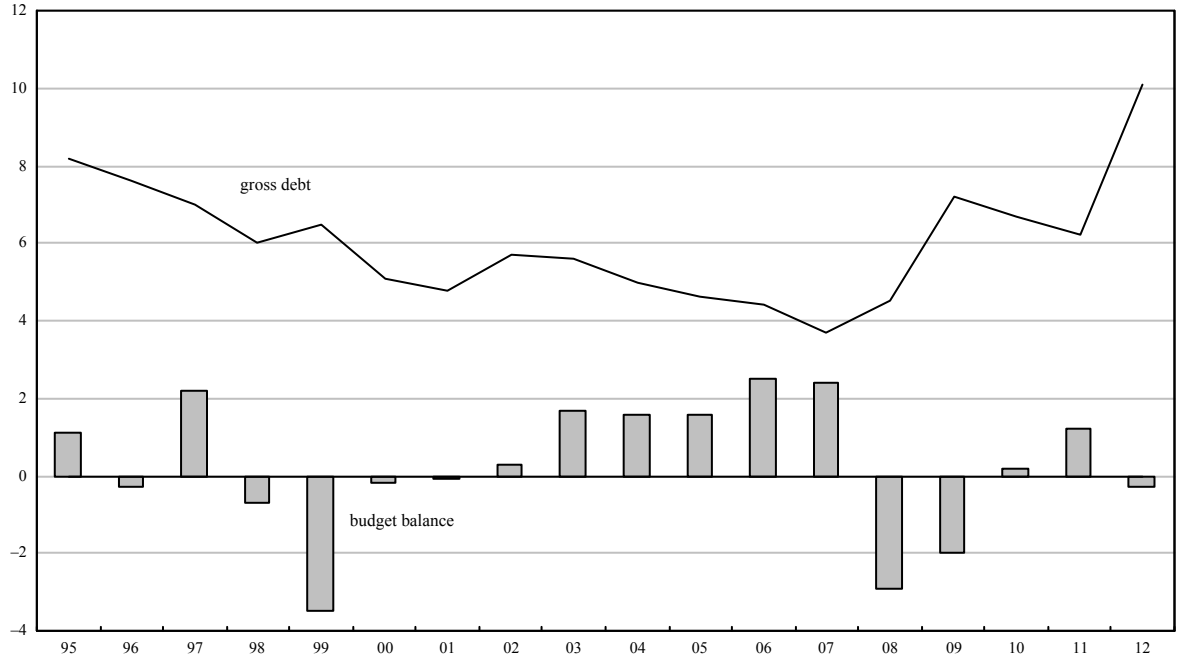
---

[*] Eesti Pank and Tallinn University of Technology – Eesti Pank – Estonia pst. 13 – 15095 Tallinn – Estonia. E-mail: karsten.staehr@eestipank.ee, Tel.: +372 6680716, Mob.: +372 58161415.

The views expressed in this paper are solely those of the author and do not necessarily reflect the views of Eesti Pank.

Figure 1

General Government Budget Balance and Gross Debt in Estonia
(percent of GDP)



Source: Eurostat (code: gov_dd_edpt1).

eased the pressure for reform as lower interest rates improved the fiscal position and access to foreign borrowing allowed an expansion of domestic demand. In other words, policymakers in Italy wasted the opportunities afforded by the euro and abstained from the structural reforms that might have stimulated economic growth and the fiscal reforms that could have improved the structural balance and reduced the debt stock. The authors aptly label the years 1998-2007 the "lost decade".

The explanations for the policy complacency in the paper are important, but are hardly the whole story. Many countries in Europe are more polarised than Italy and have large ethnic minorities, multiple languages and a very unequal income distribution. This applies for instance to my own country, Estonia, to which history in many ways has dealt an unfavourable hand of cards. Not only Italy, but also many other countries in Europe benefited from the benign macroeconomic environment during the *Great Moderation*. Most countries in the European periphery experienced large or increasing capital inflows and lower long-term interest rates in the pre-crisis period. This also applies to Estonia where lower capital inflows and lower interest rates brought about an unprecedented boom from 2000 to 2007.

Although polarised and greatly affected by external economic developments, Estonia has managed to retain an essentially balanced budget each year since the mid-1990s and has consequently accumulated a very modest gross debt (Figure 1). The prudent stance was also retained in 2009 when Estonia experienced an output decline of more than 14 per cent. Deep spending cuts, tax increases and additional revenue sources ensured that the deficit remained below the limit set in the Maastricht Treaty, and this helped Estonia gain membership of the euro area

from January 2011. The fiscal prudence of Estonia might be related to its past as a transition country, but other former transition countries faced financing problems in 2008-09.

It is striking how the global financial crisis affected countries across Europe in different ways. The paper by Bassanetti *et al.* brings up important factors that apply for Italy, but the comparison with Estonia suggests that other factors could also play a role. Studies comparing fiscal policy and economic performance across different European countries would be likely to provide additional insights. It might be particularly useful to estimate fiscal reaction functions in order to ascertain the effect on the fiscal stance of different developments in the economy. Fiscal reaction functions have for instance been used to assess the response of the primary balance to interest payments or the debt stock. Positive feedback from the debt stock to the primary balance is often seen as a precondition for fiscal sustainability (Bohn 1998).

Some studies suggest that the fiscal stance generally exhibits more persistence in western Europe than in eastern Europe (Staehr 2008, Cuestas and Staehr 2013). This seems consistent with experiences in Italy and Estonia; policymakers in Italy have been reluctant to undertake reforms that would fundamentally change the fiscal course, while policymakers in Estonia have been more assertive. A recent study estimating the reaction of the primary balance finds that there was little feedback from the debt stock and interest payments in countries across Europe before the crisis, but a strong feedback from the debt stock after the crisis, in particular for the countries experiencing debt financing problems (Baldi and Staehr 2013).

Capital inflows and low interest rates facilitated fiscal complacency but may also have led to complacency in other respects. One example is the perception of what can be considered a "reasonable" interest rate on long-term government debt and which interest rate is incompatible with fiscal sustainability. From 2009 it became virtually "perceived wisdom" that an increase in the long-term interest rate to 6-7 per cent was a signal of emerging financing problems, suggesting that a bailout was needed. Given the ECB inflation target of close to 2 per cent, a nominal interest rate of 6-7 per cent entails a real (expected) interest rate of 4-5 per cent. This is not far from what is frequently seen as a good proxy of the steady-rate long-term interest rate. It is for instance close to the steady-rate outcome in many intertemporal optimisation models in which the quarterly discount rate is 0.99. It is also the level of the real interest rate observed in many OECD countries over extended periods of time (Orr *et al.* 1995).

It is striking that nominal interest rates of 6-7 per cent and hence (expected) nominal interest rates of 4-5 per cent had become to be seen as unendurable at the time of the outbreak of the global financial crisis. The interest rate would only apply to new debt or to debt that is rolled over; much of the government debt was after all financed at much lower interest rates due to the collapse of the spread between the interest rates of most euro area countries and the German Bund rate. It is worrying if fiscal policy in Italy and elsewhere in Europe has relied on the assumption that the real interest rate would remain substantially below a level that traditionally has been seen as a steady-state level. The *Great Moderation* in the pre-crisis period may thus have caused a form of "expectational complacency" that have led to a fiscal stance that is only sustainable if the real interest rate is substantially below its long-term level.

The authors make a strong argument for a link between the overall macroeconomic performance and the fiscal stance and argue that structural reforms in the pre-crisis period could have raised trend growth and thus strengthened the fiscal situation before the outbreak of the global financial crisis. There is a lot to support this view; given the fiscal *policy* stance, faster economic growth and a higher income level would be likely to improve the fiscal balance. This argument, however, rests on two assumptions. The first assumption is that there is a clear link between structural reforms and economic growth, even though things might be more complicated in

practice. The reforms might entail costs in the short term or produce unanticipated effects, so that it is difficult establish a direct link between reforms and growth (Blanchard, 2004; Aiginger, 2005).

The second assumption is that the fiscal *policy* would not react to the improved macroeconomic outlook. This might be the case, but the experience in Italy in the period before the global financial crisis was exactly that the policy stance changed in reaction to changed fundamentals, in this case lower interest payments. Higher income or stronger trend growth may have led to a similar relaxation of the policy stance and thus had a very limited impact on the fiscal stance. At a more general level it is worth noting that countries across the world have very different income levels and trend growth and it would be unfortunate if only the countries with fortuitous developments exhibited a prudent fiscal stance.

REFERENCES

Aiginger, K. (2005), "Labour Market Reforms and Economic Growth – The European Experience in the 1990s", *Journal of Economic Studies*, Vol. 32, No. 6, pp. 540-73.

Baldi, G. and K. Staehr (2013), "The European Debt Crisis and Fiscal Reaction Functions in Europe, 1999-2012", Eesti Pank, Working Paper, No. 5/2013.

Blanchard, O. (2004), "The Economic Future of Europe", *Journal of Economic Perspectives*, Vol. 18, No. 4, pp. 3-26.

Bohn, H. (1998), "The Behavior of U.S. Public Debt and Deficits", *Quarterly Journal of Economics*, Vol. 113, No. 3, pp. 949-63.

Cuestas, J.C. and K. Staehr (2013), "Fiscal Shocks and Budget Balance Persistence in the EU Countries from Central and Eastern Europe", *Applied Economics*, Vol. 45, No. 22, pp. 3211-19.

Orr, A., M. Edey and M. Kennedy (1995), "Real Long-term Interest Rates: The Evidence from Pooled-time-Series", OECD, Economic Studies, No. 25.

Staehr, K. (2008), "Fiscal Policies and Business Cycles in an Enlarged Euro Area", *Economic Systems*, Vol. 32, No. 1, pp. 46-69.

Session 3

FISCAL POLICY AND MACROECONOMIC IMBALANCES IN EMERGING ECONOMIES AND RESOURCE-RICH COUNTRIES

THE EVOLUTION OF THE LATVIAN EXTERNAL SECTOR: IMBALANCES, COMPETITIVENESS AND ADJUSTMENT

Francesco Di Comite,[*] *Gabriele Giudice,*[*] *Radoslav Krastev*[*] *and Daniel Monteiro*[*]

1 Introduction

Since 1992 Latvia has undergone intense economic restructuring which led in the early 2000s to a period of sustained growth fuelled by capital inflows and a strong domestic demand. At the same time, the country developed unsustainable external and internal imbalances that kept on increasing until 2008 and put government finances under strain, pushing it to ask for assistance when the international financial crisis caused a sudden stop in external financing. The country's external position deteriorated to such extent that its current account deficits reached a staggering 25 per cent of GDP in the quarters preceding the crisis. Similarly startling was the development of internal imbalances, with housing prices doubling in just a couple of years and the emergence of a construction bubble financed by a steep increase in private sector debt, which more than tripled as a percentage of GDP in less than a decade, from 39 per cent in 2000 to more than 130 per cent in 2008.

This paper focuses on the process leading to the accumulation of internal and external imbalances in order to understand the reasons behind them and the precautionary measures that can be adopted to prevent their reappearance in the future. More precisely, we investigate the sources of these imbalances and seek to determine the relative contributions of the demand and the supply side. Our study shows that most of the problems confronting Latvia arose from excesses on the internal demand side rather than from a loss of international competitiveness or other possible export performance-based explanations. In particular, the availability of cheap credit and extremely optimistic expectations regarding future income appear to have played a leading role in pushing households and enterprises to excessive levels of consumption, indebtedness and risk taking. As for external competitiveness, we show that the country didn't show any particularly worrying trends in terms of export performance in the period considered, as the increases in labour compensation appear to have been offset in the tradable sector by quality upgrading and improvements in product specialisation. However, this is shown to be less the case in the context of the non-tradable sectors, construction in particular, where the virtually unlimited availability of credit resulted in a boom that inflated profits and wages in the sector, causing labour and capital to be reallocated from more competitive sectors towards non-tradable ones and playing a key role in inflating internal demand.

The paper is organized as follows: first we take a long-term view of the economy and look at the evolution of Latvian net external positions since its independence in 1991; we then analyse the factors that undermined their sustainability by the time the crisis set in, looking at them through the lens of both traditional competitiveness indicators and alternative measures; finally, we focus on the role played by internal demand factors and imports in generating these imbalances.

2 Latvia's external position since independence

In the early phase of Latvia's independence and transition to a market economy (1992-94), the country's current account posted surpluses which were mainly due to limited access to external financing and weak purchasing power in the course of a process of price liberalisation and foreign trade reorientation. The current account was broadly balanced in 1995, moving to relatively large

[*] European Commission.

deficits afterwards as catching-up dynamics and capital inflows started to gain momentum. In the period of 1996-2000, the current account deficit as a percentage of GDP remained in the single-digit zone and was largely covered by net FDI inflows. However, the deficit widened significantly in 2000-07 and only a small share of it was financed by net FDI inflows in that period. The current account (CA) deficit peaked to the extremely high levels of 22.5 per cent and 22.3 per cent of GDP in 2006 and 2007, respectively, showing clear signs of overheating in the economy. The 2008 crisis sharply reversed the CA to a surplus, driven by the collapse of domestic demand as well as large losses in foreign-owned companies that are booked symmetrically as an inflow in the income balance of the CA and an outflow in the FDI balance of the financial account.

2.1 External balance and debt position

Unlike some other countries in Eastern Europe, Latvia did not suffer from a heavy external debt burden in the early phase of its transition to a market economy. The country was even a net creditor in the first years of independence. However, the following period of large CA deficits caused a rapid deterioration in the country's external indebtedness (see Figure 1, upper pane). The gross external debt increased from 31.6 per cent of GDP in 1995 to 129.2 per cent in 2008. Although the nominal debt value stabilised in 2009-10, its value as a share of GDP deteriorated further to 165.2 per cent in 2010 as a result of the recession. In net terms, the external debt widened from -3.4 per cent of GDP in 1995 to a peak of 58.7 per cent in 2009, moving downwards to 53.2 per cent in 2010 due to the accumulation of reserves in the government sector and deleveraging in the private sector. The net international investment position of the country thus deteriorated significantly to –81.4 per cent of GDP in 2009 reflecting both private debt and FDI dynamics (see Figure 1, lower pane).

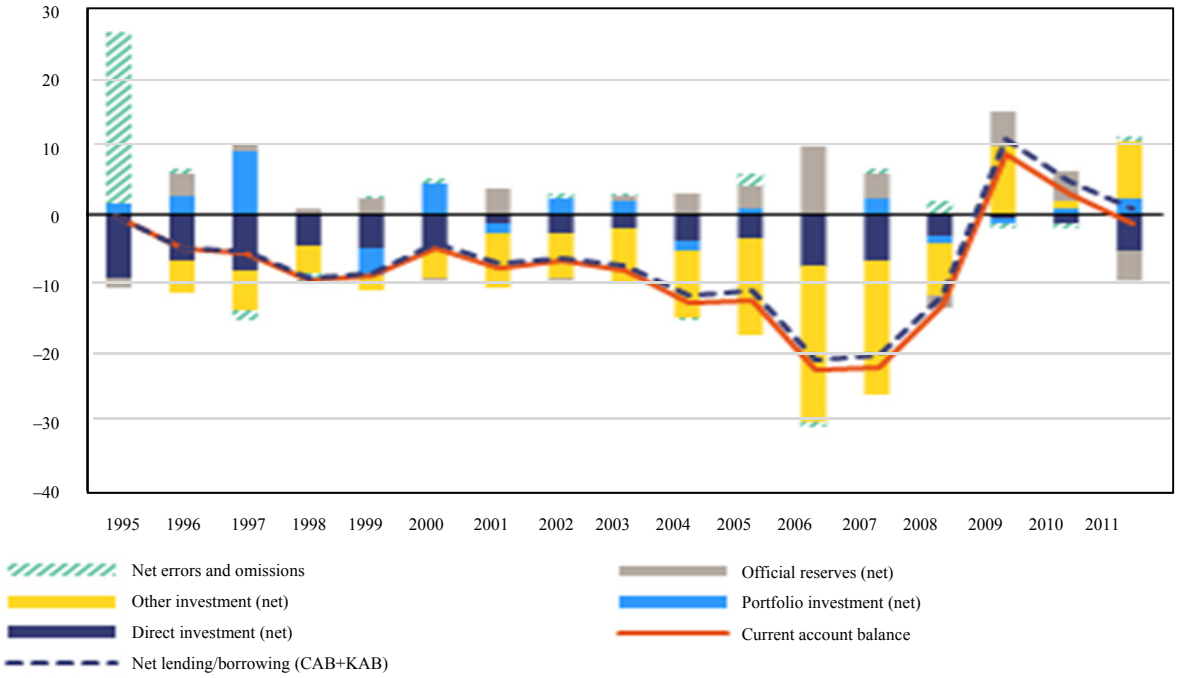
The rising share of foreign ownership has significantly influenced Latvia's external balance. This improved access to external financing and supported the modernisation of the economy. However, the rising share of foreign ownership has also increased the importance of dividend outflows and reinvested earnings in the balance of payments. The impact of reinvested earnings on the CA balance has been substantial in some years even though this item does not correspond to a cash outflow.

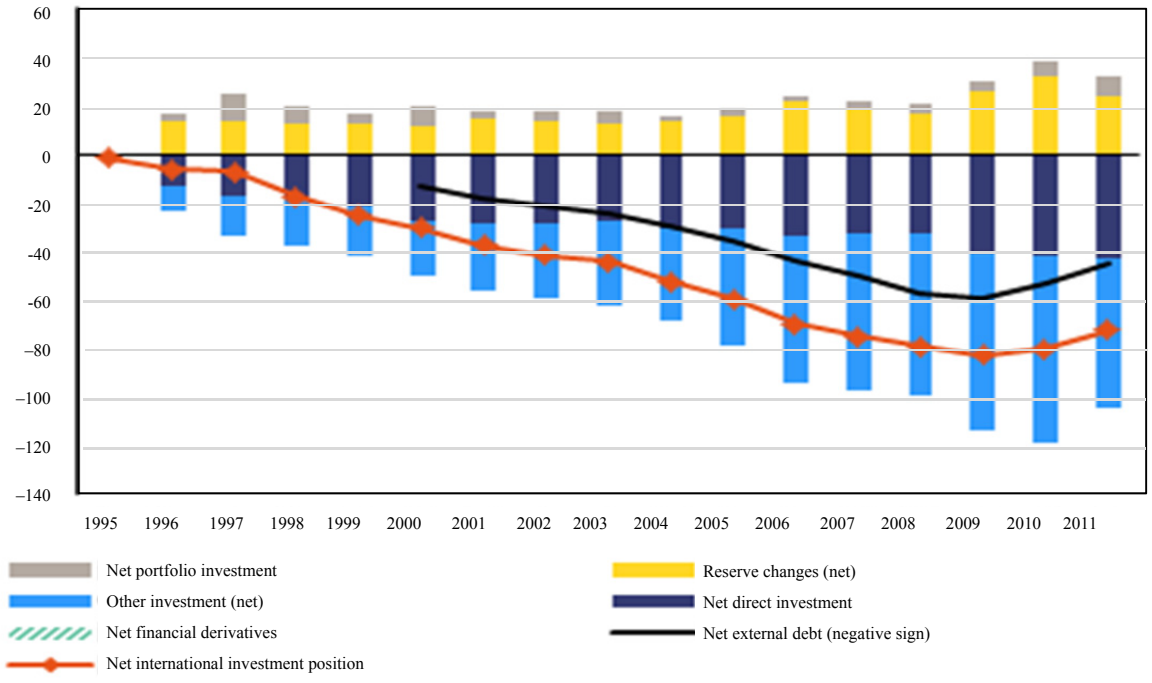
2.2 External trade dynamics

The country's export sector has undergone significant structural changes since independence. On the one hand, the geographical dimension of exports moved from the planned markets of the former Soviet Unit to the free market of Western Europe. On the other hand, many industries dependent on cheap energy imports and outdated technologies had little chance to survive the challenges of liberalised energy prices and direct competition from technologically advanced western companies. Not surprisingly, the merchandise trade balance of the country has deteriorated significantly since 1992. However, the services trade balance was always on surplus during the transition to a market economy. Within the economy of the former Soviet Union, Latvia was an important transport corridor and most of its service exports were transportation, mainly sea and railway transport services. In the early period of transition (1992-94), transport businesses generated around 90 per cent of total service exports and the latter accounted for about 1/3 of the total value of exports of both goods and services. As Latvia progressed towards a market economy, the range of service exports widened substantially, in particular towards tourism and financial intermediation. Transportation remained an important sector with 49 per cent of the total value of service exports in 2010 but well below its levels from the early period of independence (see Figure 2).

Figure 1

Decomposition of Current Account Balance (Upper Pane) and Net International Investment Position (Lower Pane)
(percent of GDP)

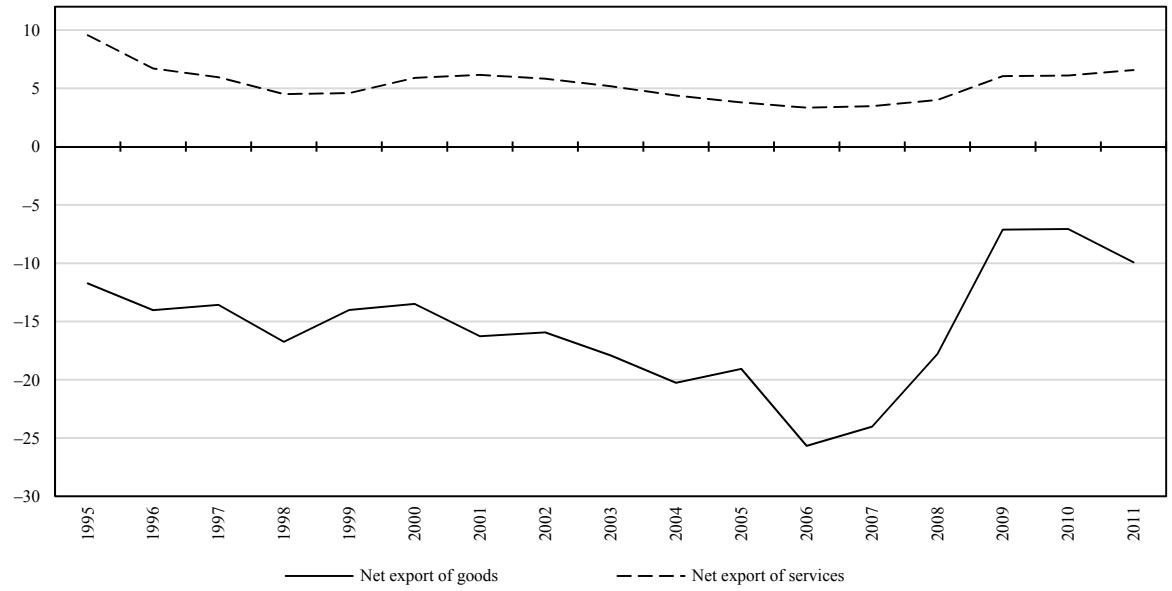




Source: Commission Services.

Figure 2

Trade Balance of Goods and Services
(percent of GDP)



Source: Commission Services.

The diverging trends of net exports of goods and services suggests that economy-wide labour cost developments, with the exception of some extreme hikes in 2006-07, cannot be fully blamed for the overall deterioration in the external balance of the country, as the more labour intensive sector of services was consistently in surplus. The structural dynamics in the foreign trade balance from 1992 until the economic crisis of 2008-09 shows that the factors underpinning the deterioration in the country's external position and competitiveness are more complex and are related to a comprehensive range of indicators that capture more than just labour cost and labour productivity.

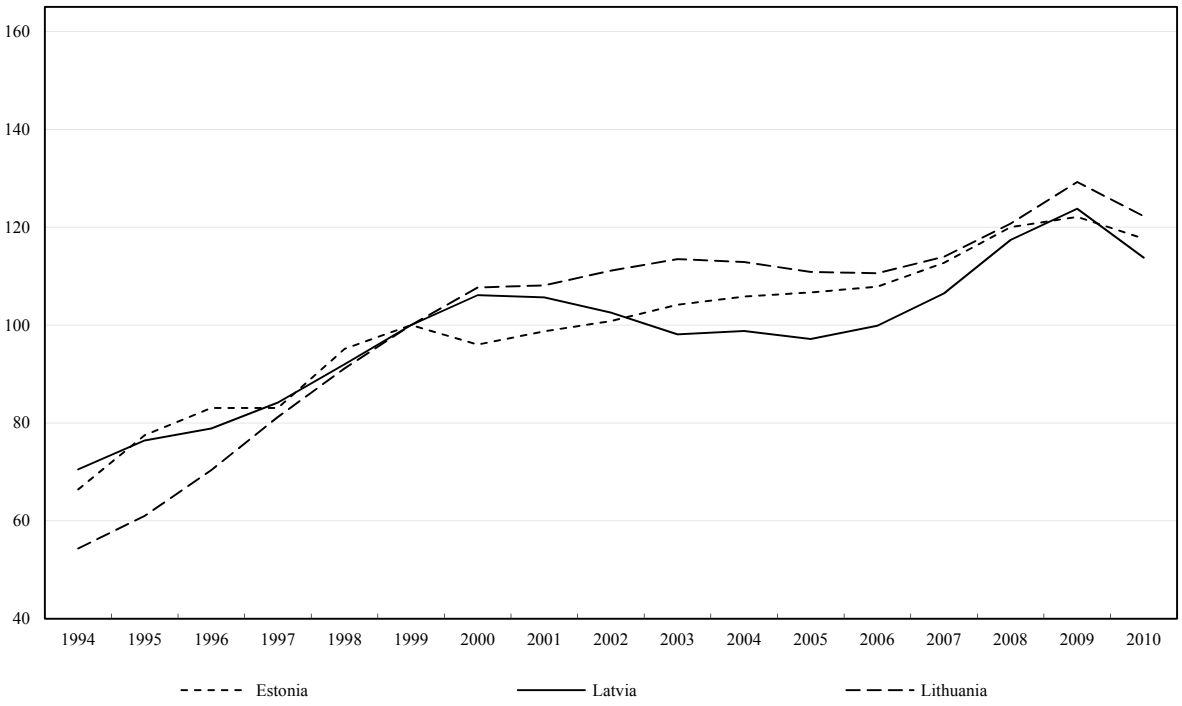
2.3 The evolution of price and cost competitiveness

The standard approach to analysing external competitiveness through real exchange rates and labour productivity explains only part of the movements in the Latvian external balance. Similarly to the other two Baltic countries, Estonia and Lithuania, the real effective exchange rate in Latvia appreciated significantly in the pre-crisis period of rapid economic growth, as shown in Figure 3. In Latvia, and to a lesser extent in Estonia and Lithuania, the appreciation was more pronounced for the rate based on unit labour costs than on CPI, showing that wages rose faster than the cumulative effect of consumer prices and real GDP growth. This divergence was quite significant in the period of overheating between 2005 and the first half of 2008. However, the fluctuations of the real effective exchange rates, based either on consumer prices or unit labour costs, fail to explain the rapid increase in the CA deficit in the period of 2000 until 2005. In that period, the real exchange rate depreciated in consumer price terms and did not change significantly in unit labour cost terms while the CA deficit surged to 12.5 per cent of GDP in 2005 from 4.8 per cent in 2000. Subsequently, when the crisis hit the country in 2008-09, the CA balance moved to a surplus before the spike in the real effective exchange rate and unit labour costs was fully corrected.

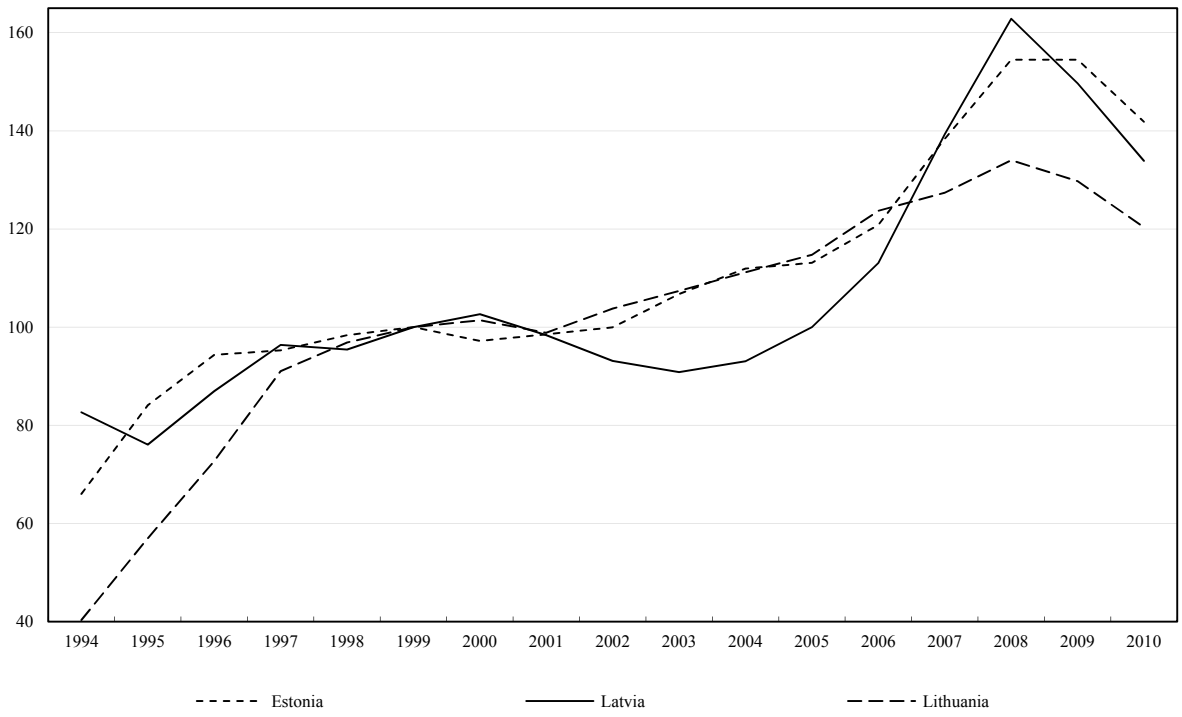
Figure 3

Evolution of REER CPI and REER ULC in the Baltics

REER CPI



REER ULC



Source: Commission Services. Note: 1999=100.

The dynamics of the CA balance and standard competitiveness indicators in Latvia show that the assessment of the country's external position need to cover a much broader area of indicators that go beyond the simplified model of relative export prices and labour costs. The remainder of the study seeks to assess the relevance of standard competitiveness indicators and to propose complementary analysis that may provide a better understanding of developments in competitiveness and external imbalances. The Latvian case also emphasizes the need to analyse the demand side of the economy, in particular savings and import demand, as excessive external imbalances can arise even in periods of improving export competitiveness.

3 Sustainability of the external position and traditional competitiveness measures

The set of traditional indicators on external balance sustainability comprises flow variables derived from the balance of payments as well as stock values of external assets and liabilities that have direct implication on future balance of payments transactions such as dividend, interest and principal payments. As for the flow values, balance of payments indicators are largely focused on the CA balance and its components, including trade in goods and services, income and current transfers. FDI and other financing flows are also analysed within the financial account of the balance of payments. All these indicators provide a fairly good picture of the country's external balance in historical terms but they are not forward looking and may not always signal risks of sudden reversals in the future. As far as the external balance sustainability may be dependent on market sentiment, especially in small open economies, credit default swaps and yields on private and public external debt can be used as indicators with forward implications on the external balance.

The use of stock indicators such as foreign reserves, the net international investment position and gross and net external debt also provide important information on future balance of payments flows. The country's indebtedness at a certain point in time has direct implications on future outflows related to interest payments (part of the CA balance) and principal debt repayments (part of the financial account). In addition to the debt exposure, the net international investment position includes the FDI stock (foreign equity) that is not of a debt nature but has important implications on the future external flows related to dividend payments and reinvestment earnings. Table 1 shows that both dividends and reinvested earnings have a significant impact on Latvia's external balance as the share of foreign equity in the country is relatively high.

Although the analysis of the external balance indicators is often straightforward, there are some important additional aspects that need to be taken into account for Latvia as well as for other small and catching-up economies with a high share of foreign equity.

Firstly, the CA balance is strongly dependant on cyclical effects in the external environment that can be linked to the prices of primary resources, as Latvia is strongly dependant on energy imports, on the prices of commodities with a high weight in the export and import volumes, and on the external demand in major trading partners. Cyclical effects could also affect the CA balance through the income statements of foreign-owned companies, as profits and consequently reinvested earnings usually rise in periods of rapid economic growth which results in a higher accounting outflow in the CA balance and a symmetrically booked inflow in the financial account with an overall neutral effect on the balance of payments. In periods of contraction, losses of foreign-owned entities have a reverse positive impact on the CA and a symmetric negative impact on the financial account. However, reinvested earnings do not originate from actual cross-border transactions and could be often influenced by cyclical effects rather than long-term trends. Therefore, the adjustment of Latvia's CA balance by excluding the impact of reinvested earnings provides additional information on actual cross-border flows and eliminates some cyclical effects.

Table 1

Selected External Sector Indicators
(percent of GDP)

	1992-95	1996-00	2001-05	2006	2007	2008	2009	2010
CA to GDP	7.0	–6.8	–10.1	–22.6	–22.4	–13.1	8.6	3.0
- o/w net dividends	*0.0*	*–0.2*	*–1.0*	*–1.0*	*–1.7*	*–1.4*	*–2.4*	*–1.7*
- o/w net reinvested earnings	*0.0*	*–0.8*	*–1.3*	*–3.6*	*–2.1*	*0.2*	*8.0*	*1.3*
Net FDI to GDP	4.4	5.7	2.9	7.5	6.8	3.0	0.6	1.5
- o/w reinvested earnings net	*0.0*	*0.8*	*1.3*	*3.6*	*2.1*	*–0.2*	*–8.0*	*–1.3*
Gross external debt (eop)	31.6	61.9	100.0	114.5	128.1	130.0	156.5	165.2
Net external debt (eop)	–3.4	13.1	35.8	44.2	49.7	57.1	58.7	53.2
Net IIP (eop)	–1.7	–30.2	–59.6	–69.9	–74.7	–79.0	–82.7	–81.4

Source: Commission Services.

Table 1 suggests that such adjustment could significantly change the reading of the CA balance in Latvia, as for example the large surplus in 2009 was largely based on losses in foreign-owned entities that cannot be sustained in the long run.

The second specific aspect of the balance of payments analysis for Latvia is related to the catching-up status of its economy and EU convergence prospects. Investment demand in such economies tends to exceed the rates of domestic savings and the difference is reflected into relatively large CA deficits. However, such deficits are not necessarily a sign of worsening competitiveness and can be sustainable in the long term, particularly if they are financed by non-debt financial flows (FDI), which are directed to export-oriented or import substitution industries. However, FDI flows directed to domestic demand-facing industries are more difficult to interpret as on the one hand they may improve the technological base and the productivity of the economy but on the other hand may also worsen the long-term outlook on the CA through dividend outflows that will not be offset by a positive impact on exports.

3.1 Competitiveness through prices: real effective exchange rates (REER)

Real effective exchange rates provide a measure of price developments in relation to trading partners and therefore have some forward-looking implications on the country's competitiveness. However, it is often difficult to determine the equilibrium REER and consequently moves towards the equilibrium could be mistakenly interpreted as a loss of competitiveness. Moreover, different price indicators used for the calculation of REERs can lead to very different conclusions. Tax impacts on consumer prices can also distort the REER readings as value added taxes or excise duties do not affect export prices and have fully identical effects on imported and domestically produced goods and services. Finally, REERs do not take into account changes in productivity unless they are adjusted for unit labour costs. For catching-up economies, structural changes with shifts to higher value-added or more labour intensive sectors (e.g, services) are more pronounced

than in trading partners and REERs will tend to overestimate potential price effects on competitiveness. There is also empirical evidence that fluctuations in the REERs are not always fully correlated with external balance indicators even if the data series are adjusted for time lags. This is also the case for Latvia as can be seen from Figures 2 and 3, especially in relation to the CPI-based REER.

3.2 Competitiveness through productive efficiency: unit labour costs (ULC)

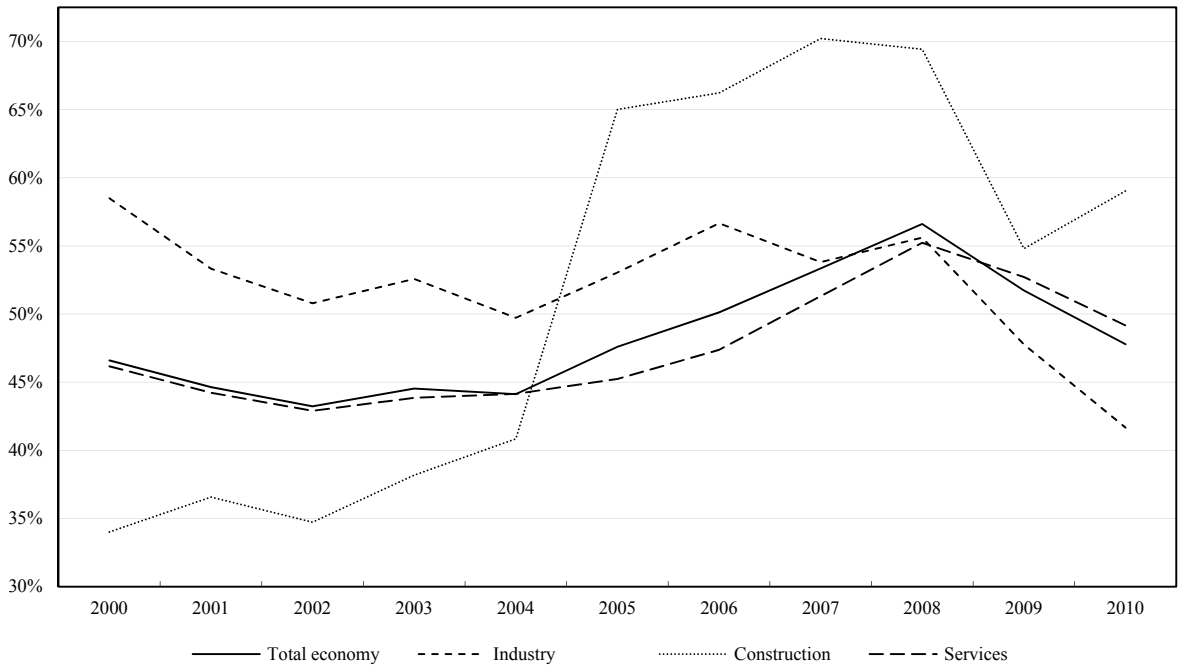
Changes in ULC relative to major trading partners provide a good overview of competitiveness in terms of labour productivity. It also provides some information on the side of import demand as far as labour income is one of the main determinants of household consumption. However, labour costs are only one factor of production and in some tradable sectors they account for less than 50 per cent of the total production costs. A more comprehensive analysis of competitiveness needs to take into account all input costs as well as profit margins. While non-labour input costs may be difficult to measure, changes in the profit margins could be relatively easy to monitor both on aggregate and at a sector level through the value added approach of calculating GDP. For catching-up economies, structural changes can have a significant effect on ULC dynamics. The way ULC indices are usually calculated does not include any adjustments for these changes, as aggregate labour costs are simply divided by GDP. In case the economy is shifting towards more labour-intensive sectors such as services, like is often the case in catching-up countries, this approach can show deterioration in the aggregate ULC index even if indices at sector level remain unchanged. In order to account for these composition effects, changes in ULC at an aggregate level can be calculated as a weighted average of the changes in the ULC values for each sector, following the approach of calculating consumer prices or GDP indices. For example, Figure 4 plots the evolution of the ratio of labour compensation over gross value added at a sector level and it shows that there can be significant heterogeneity in wage dynamics across sectors. Considering that labour share increased enormously in construction during the boom and went through a strong correction since the bust, a sector approach to ULC assessment would identify the role of the construction sector in driving imbalances, as the negative impact of its growing wage share was reinforced by its increasing contribution to total GDP.

3.3 Export performance and capacity to compete abroad

The evolution of the country's export market share in world imports (or the change in the share *vis-à-vis* major competitors) is a good outcome indicator of export competitiveness. Latvia's share in EU and global imports are plotted in Figure 5. Even if it does not capture the dynamics in the external balance, since imports need also to be taken into account to that end, the indicator gives an idea of the capacity of the country's enterprises to compete on international markets. However, this is also a backward looking indicator that does not capture the dynamics in production and other factors, and therefore cannot be entirely relied upon to forecast future movements in the external balance. Nevertheless, the steady improvement in Latvia's export market share, even in periods of deteriorating REER and ULC, suggests that standard competitiveness analysis needs to be expanded to include a broader range of indicators going beyond prices and labour costs, for example by taking into account the fact that higher domestic costs of production may be offset by higher quality and better access to foreign markets. The diverging trends in the current account balance and export market shares also suggest that the vulnerability of the Latvian external position was mostly driven by demand factors, and notably the huge growth of imports, which should be carefully studied in parallel to export competitiveness indicators.

Figure 4

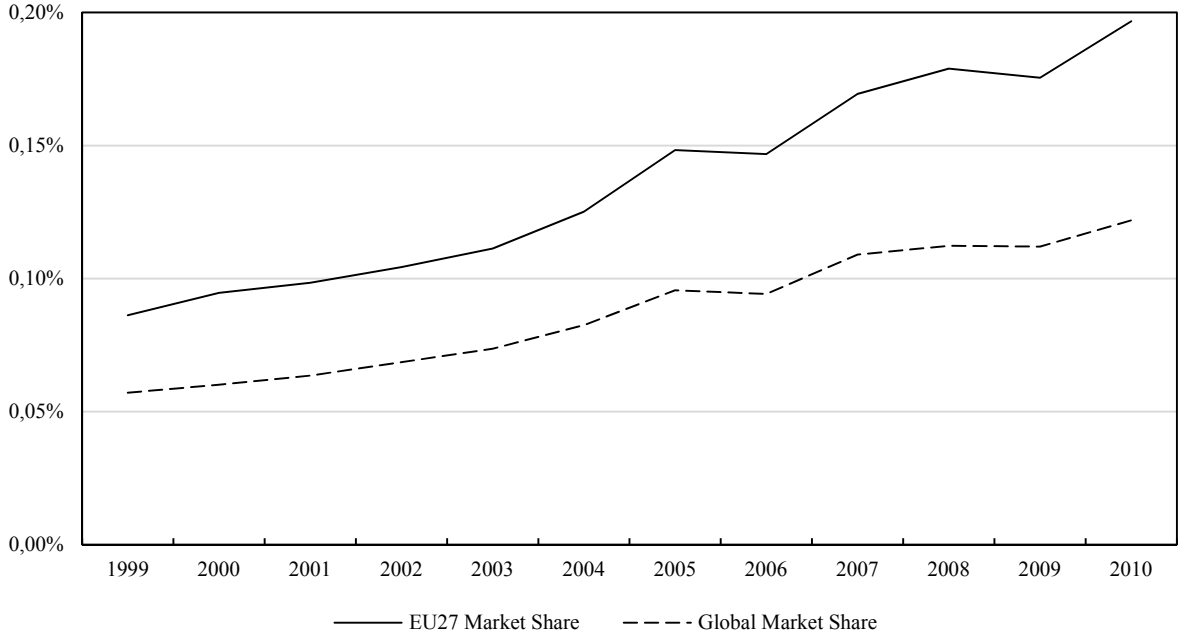
Ratio of Labour Compensation Over Gross Value Added at a Sector Level



Source: Commission Services.

Figure 5

Evolution of Latvia's Export Market Shares



Source: Commission Services.

3.3.1 Quality and non-cost competitiveness of exports

Following the methodology proposed in Di Comite (2012) on the measurement of quality upgrading and non-cost competitiveness at a country-product level, it is possible to go beyond market shares to analyse Latvian firms' capacity to compete abroad. By comparing how Latvian enterprises fare *vis-à-vis* international competitors in a given market, a fair indicator of competitiveness can be produced, which is not distorted by home market bias or trade barriers (as would be the case if Latvian products were compared with imports in the Latvian market).

Keeping EU27 performance as a benchmark, Latvian trends in physical unit labour costs, quality content of exports and non-cost competitiveness can be inferred from the observation of export prices and wage bills at a sector level.[1] In this way, it is possible to identify to what extent long-term competitiveness issues arose in the tradable sector during the boom years and whether the country is getting back on track after the crisis. There is currently no consensus on the definition of quality and non-cost competitiveness, which also implies that instruments to measure them vary substantially. One alternative would be to measure demand shifts through a methodology based on a nested constant-elasticity-of-substitution utility function with demand shifters, this methodology leading to the identification of one dimension of differentiation across varieties. In this paper we aim at going one step forward and thus exploit the properties of a quadratic utility function in order to identify separately two different components of demand. One, referred to as "quality", captures the capacity of firms to extract higher mark-ups from their products. The other, called "non-cost competitiveness", expresses the ability of a firm to sell higher volumes of their products, for a given level of mark-ups. Specifically, the functional form adopted for identification purposes is the following, based on the utility function of a representative consumer U in the market i, consuming $q_{s,i}$ quantities of a mass of varieties S available in a market i and a numéraire variety q_0, which may be seen as representing the consumption of all the other goods in the economy and just serves as a unit of account for all the other parameters in the model:

$$U_i = \int_{s \in S_i} \alpha_s q_{s,i}\, ds \; - \frac{1}{2} \int_{s \in S_i} \beta_{s,i} q_{s,i}^2\, ds \; - \frac{\gamma_i}{2} \left[\int_{s \in S_i} q_{s,i}\, ds \right]^2 + q_0$$

The demand shifter $\alpha_s$is a positive and continuous function measuring the quality of a variety s (in this case a country-product), defined on the total mass of varieties S present in the export market considered i. Similarly, the parameter $\beta_{s,i}$ measures the non-cost competitiveness of a variety s in the export market i, and can be seen as a demand function slope shifter, which in equilibrium affects only quantities sold but not prices of mark-ups. Finally, the market-specific parameter γ_i captures the substitutability between all the pairs of varieties of the same kind of good in a particular market. While the details of the identification strategy and the data requirements are explained in Di Comite (2012), an intuition is provided in Figure 6. Price dynamics are interpreted as a function of cost and demand factors: changes in demand are then divided into market-wide effects and variety-specific characteristics; these are finally disaggregated into a quality and a non-cost competitiveness component, the latter being obtained by exploiting information on quantities sold.

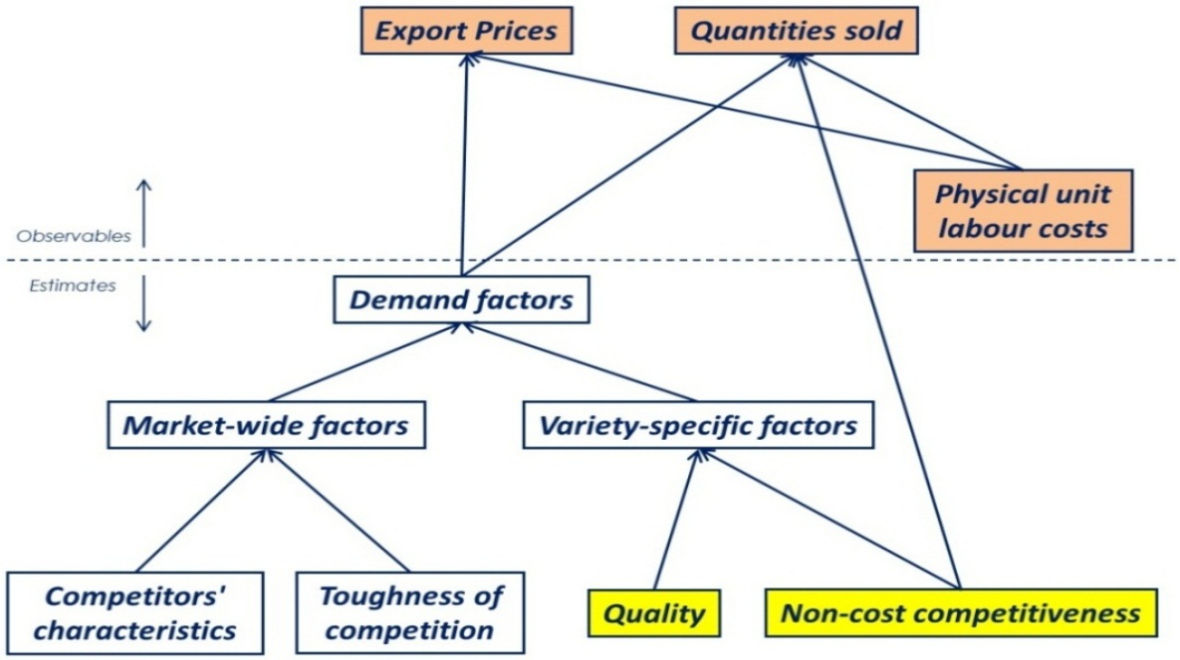
By focusing on quality and non-cost competitiveness, this methodology can be used to single out trends on the supply-side of the economy, at least as far as tradable products are concerned. In the case of Latvia, we know from the previous analysis that wages increased substantially from 2003 to 2008, but did they actually outpace productivity growth? Combining trade data with information on value added and wage bill at a sector level, it can be seen already in Figure 4 that in

---

[1] Physical unit labour costs (PULC) are defined as the cost, in euros, of producing a given quantity of the products exported. Quality is the vertical intercept of the inverse demand function, net of competition effects, and is expressed in the same unit as prices: euros per given quantity of the product sold.

Figure 6

Scheme of Quality and Non-cost Competitiveness Identification Strategy



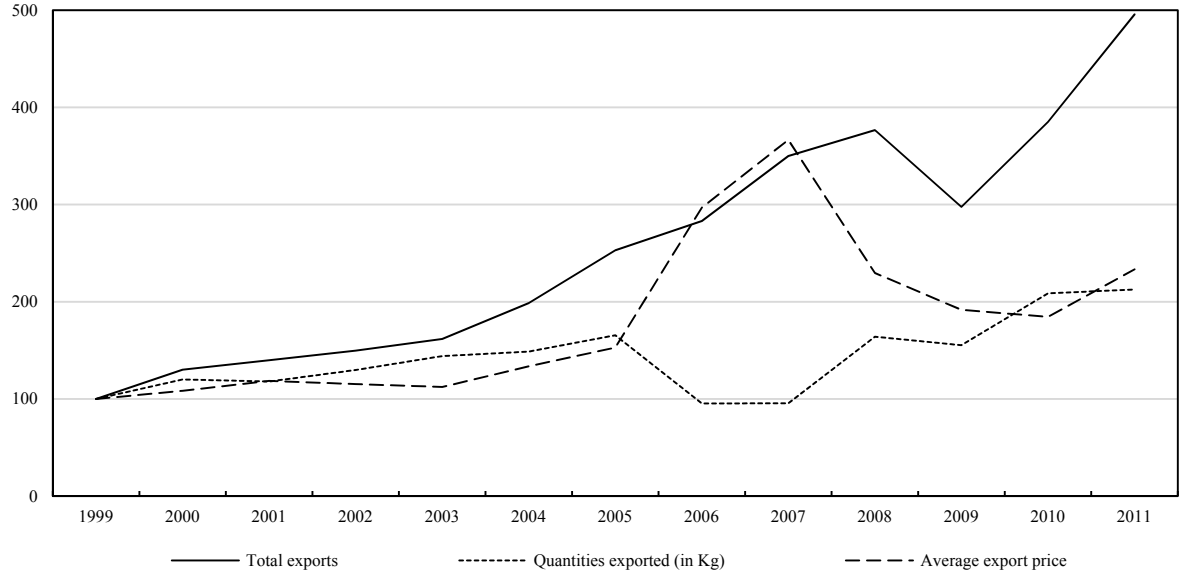
the export sector this does not appear to be the case, consistently with the wage share dynamics in the industry sector. Turning to Figure 7, it is clear that only in 2006 and 2007, the years of overheating, did an abnormal spike in intra-EU27 export prices result in a drop in quantities exported, with prices quickly falling in the aftermath of the crisis.

This is also what emerges from Figure 8, where the above-mentioned methodology is used to measure the relative importance of quality improvements and changes in physical unit labour costs (PULC) in determining Latvian export price dynamics. First, unweighted total Latvian exports (total) are considered; then, CN2-product-level parameters are calculated and added up weighting each product by its yearly share of total Latvian exports (wavrg). Disaggregating Latvian export price dynamics into a cost and a quality component, normalising them to EU27 levels and focusing on the series that corrects for industrial Latvian specialisation, it can be noticed that quality has improved rather constantly during the decade, whereas in the same period physical unit labour costs of exports did not really increase, with the notable exception of the overheating years 2006 and 2007 and the crisis starting in 2008.

The dynamics observed in Figure 8 would be consistent with a process of constant quality upgrading and catching-up with the European Union average which was interrupted only by the crisis. What is most remarkable is that after the crisis hit, Latvian physical unit labour costs of export decreased while at the same time the quality content of its products *vis-à-vis* EU27 has increased. This suggests that the Latvian industrial sector managed to keep innovating and improving its products in the context of falling or stable physical unit labour costs, resulting in the significant rebound in exports in 2010 and 2011 observed in Figure 7. This is a reassuring sign of the renewed capacity of Latvian firms to compete in international markets, which underlines the positive contribution of the export sector to the current account balance of the country.

Figure 7

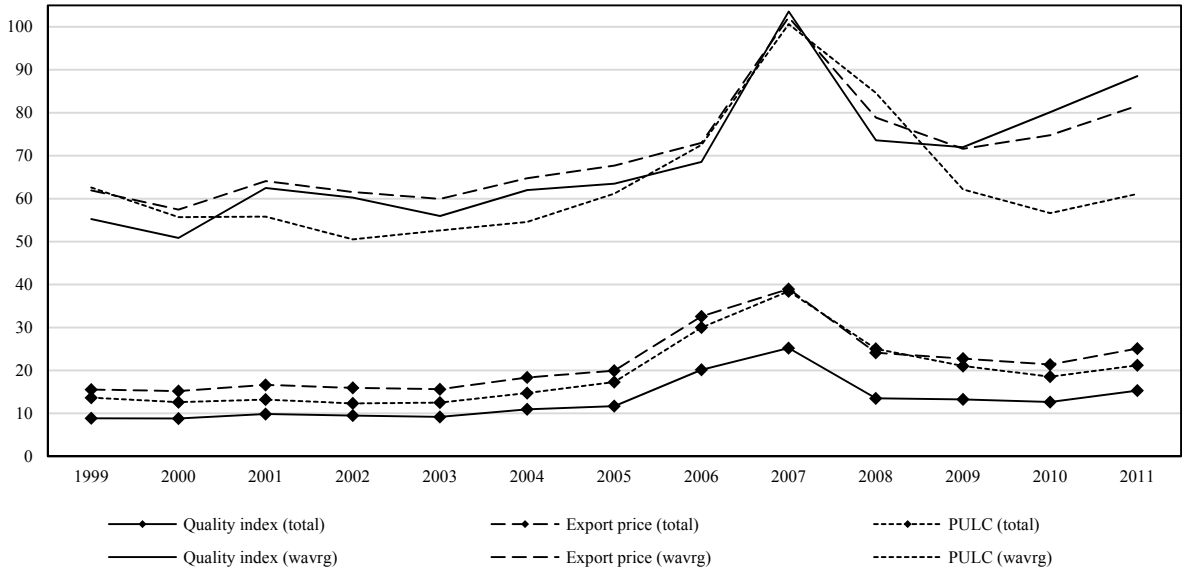
Evolution of Total Value of Latvian Exports of Goods, Decomposed into Quantities Exported and Average Export Price



Source: Eurostat Comext. Note: 1999=100.

Figure 8

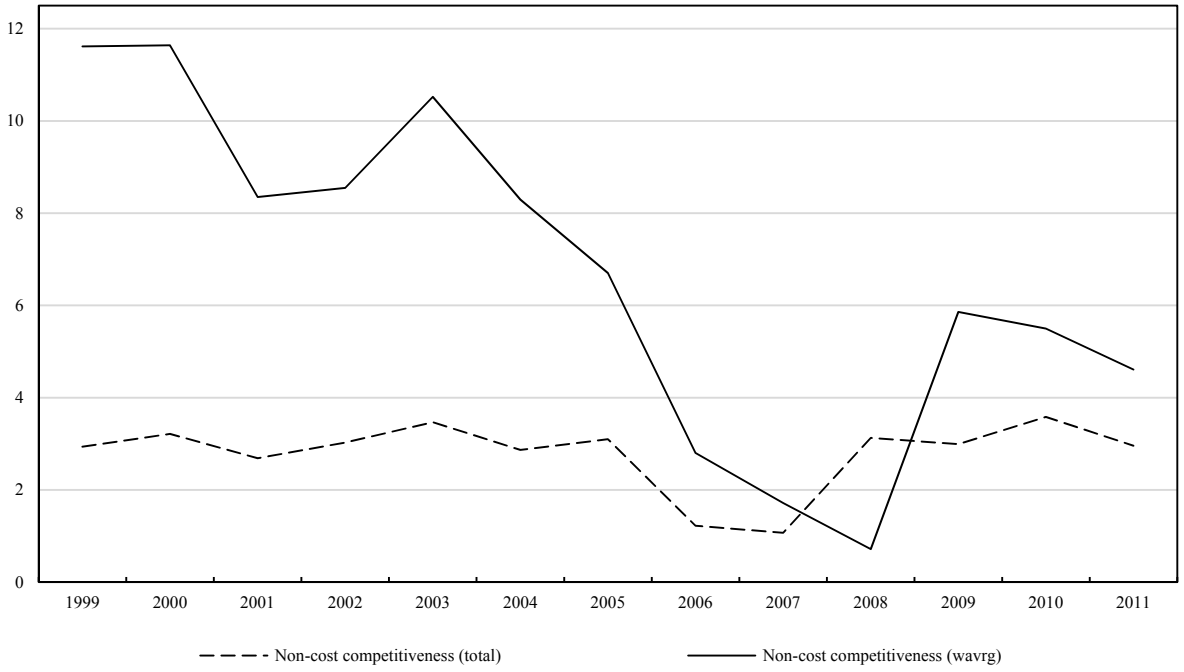
Evolution of PULC, Quality and Export Prices of Latvian Exports as Compared to the EU Average



Source: Authors' calculations based on Eurostat Comext data. Note: EU27 average values=100. Results corrected for Latvian product specialisation by measuring each parameter at a product level for Latvia and EU27 and then aggregate them weighting each product by its Latvian export share. Physical unit labour costs (PULC) are defined as the cost, in euros, of producing a given quantity of the products exported. The quality index indicates the intercept of the vertical inverse demand function, also expressed in euros per a given quantity of the product sold.

Figure 9

Evolution of Non-cost Competitiveness of Latvian Exports as Compared to EU27



Source: Authors' calculations based on Eurostat Comext data. Note: EU27 average values=100. Results corrected for Latvian product specialisation by measuring each parameter at a product level for Latvia and EU27 and then aggregating them weighting each product by its Latvian export share.

The dynamics of non-cost competitiveness, shown in Figure 9, also deserve to be mentioned, as the gradual decrease of the weighted average series *vis-à-vis* the unweighted total indicator suggest that the most important export products, while experiencing a process of quality upgrading, are also selling less for a given level of mark-up with respect to EU27. This may be explained by the fact that they are entering new markets or products niches and still have to build up a customer base or a good distribution network. It should be noticed that non-cost competitiveness is measured as the capacity to sell, given a level of mark-up, so it is not its absolute level that matters (as countries may differ in size and number of firms) but its trend over time. Looking at non-cost competitiveness for the unweighted total exports, a drop can be noticed in the years 2006 and 2007, which are the years in which Latvian export prices soared dramatically and quantities dropped substantially (see Figure 7), whereas the rest of the EU did not experience any major shocks in those years (to a much lesser extent, a similar drop in quantities was experienced by the rest of the EU in 2008 and 2009, but with no particular effect on prices). Non-cost competitiveness recovered to some extent in 2008. However, the observed reversion in the relative non-cost competitiveness indicator was probably affected by a fall in its denominator, since the non-cost competitiveness of EU27 contracted because of the international financial crisis which unfolded in 2008.

It is worth noting, though, that the aggregate trends shown here may hide substantial heterogeneity across products. Table 2 shows that this is actually the case, as it shows linear trends in quality, physical unit labour costs, non-cost competitiveness and export prices for the whole manufacturing sector and for the ten most important Latvian export products. We also report the results for the export-share weighted sum of the manufacturing products to provide a more precise

Table 2

Simple Linear Trends of Latvian Quality, PULC, Non-cost Competitiveness and Export Prices *vis-à-vis* EU27

Product (CN2 Product Category)	Average Share of Latvian Exports (1999-2011)	Quality trend	Physical Unit Labour Cost Trend	Non-cost Competitiveness Trend	Export Price Trend	Market Share Trend in the EU
Wood and articles of wood (44)	26.19%	1.20%	0.39%	–0.51%	0.98%	0.07%
Iron and steel (72)	7.60%	3.32%	1.60%	0.03%	2.57%	0.04%
Machinery and mechanical appliances (84)	5.18%	8.73%	5.02%	0.00%	6.73%	0.01%
Electrical machinery and equipment (85)	4.92%	12.04%	7.17%	–0.02%	9.20%	0.01%
Mineral fuels and oils (27)	4.17%	1.51%	0.71%	0.03%	1.62%	0.01%
Furniture (94)	3.98%	3.35%	1.63%	–0.14%	2.50%	0.00%
Apparel and clothing (62)	3.76%	8.36%	3.74%	–0.05%	5.97%	–0.02%
Vehicles and accessories (87)	3.15%	8.34%	5.48%	0.01%	6.86%	0.01%
Pharmaceutical products (30)	3.09%	4.41%	1.90%	–0.01%	3.40%	0.00%
Articles of iron or steel (73)	2.44%	2.63%	0.63%	0.02%	1.74%	0.02%
Whole manufacturing		0.69%	1.16%	–0.02%	1.09%	0.01%
Export-share weighted sum		3.35%	1.37%	–0.16%	2.39%	0.03%

Source: Authors' calculations based on Eurostat Comext data. Note: Aggregates are shown for the "whole manufacturing" product as measured by Eurostat and for the "export-share weighted sum" as a weighted average of all the manufacturing products, where each product is weighted by Latvian export shares, in values. Physical unit labour costs (PULC) are defined as the cost, in euros, of producing a given quantity of the products exported. The quality index indicates the intercept of the vertical inverse demand function, also expressed in euros per a given quantity of the product sold.

aggregate indicator than the trends in total exports.[2] It can be noted that all the products experienced quality increases *vis-à-vis* the rest of the European Union which were larger than increases in their physical unit labour costs, which points to an overall positive effect on mark-ups, driven by lower costs of production and a higher willingness to pay for Latvian products. On the other hand, non-cost competitiveness often shows a negative sign, pointing to the fact that all the market share gained by Latvian firms came from the actual quality improvement of their products rather than from a better capacity to sell their products on foreign markets (for a given level of mark-up). This is particularly evident looking at Latvia's most important export product, "Wood and articles of wood", which is indeed experiencing a sharp fall in non-cost competitiveness labour costs but an increase in quality much more pronounced than the increase in physical unit labour costs, resulting overall in an increase in market shares.

Table 3 confirms the qualitative results provided in Table 2 by running a simple linear trend regression first on all the products, with and without product dummies, and then on the weighted average results for the entire economy. Prices and quality levels are all significantly increasing, as compared to the European Union average, confirming that Latvian export industry has fared extremely well during the last decade and even the overheating and the subsequent crisis do not seem to have caused lasting damages on the export capacity of the country. Physical unit labour costs also show an increase, partly offsetting the gains obtained by quality upgrading, but it is more modest than quality and export price increases and it is not statistically significant along all the specifications. As for non-cost competitiveness, it appears to have worsened only when weighted average results are considered, but not when all the products are pooled in the regression. This is in line with what has been observed in Figure 9 and points in the direction of major economic restructuring within product categories towards more value added varieties, whose full demand potential has possibly not been tapped yet.

Another way to grasp the high level of heterogeneity across export products is to plot their parameter levels *vis-à-vis* EU27 in 1999 and their linear trend growth from 1999 to 2011. This is shown in Figure 10, where it can be clearly noticed that a rapid process of price and quality convergence to EU levels is taking place, involving especially the products which are furthest from EU27 levels. The steeper slope and higher intercept of the price and quality trend lines as compared to the PULC line also confirms that costs are converging more slowly than quality, which is a good indicator of long-term sustainability of external competitiveness.

A key message emerging from the above analysis is that the different products appear to have a certain degree of heterogeneity and are not necessarily affected by the same shocks and dynamics. Notably, while unit labour costs in the non-tradable sector increased substantially in the years leading up to the crisis, the tradable sector, as captured by external trade data, appeared rather sheltered from this trend for most of the decade. This analysis also points to the benefit that the economies could obtain by allowing resources to be reallocated smoothly across products, as the Latvian economy managed to do. However, it should be noted that the export mix of the country is still very much concentrated on a few products, as the six most important export products account for 50 per cent of the total value of exports, which suggests that there is still a lot of space for differentiation and reallocation of resources towards products with higher growth potential. This should be clear by looking at Tables 2 and 3, showing that the current largest export product, "Wood and articles of wood", underperforms the rest of the economy on almost all the competitiveness dimensions observed.

---

[2] Total values shipped and average prices calculated on total exports implicitly amount to weighting each sector according to its physical weight and are thus not the most relevant dimension to analyse aggregate trends.

Table 3

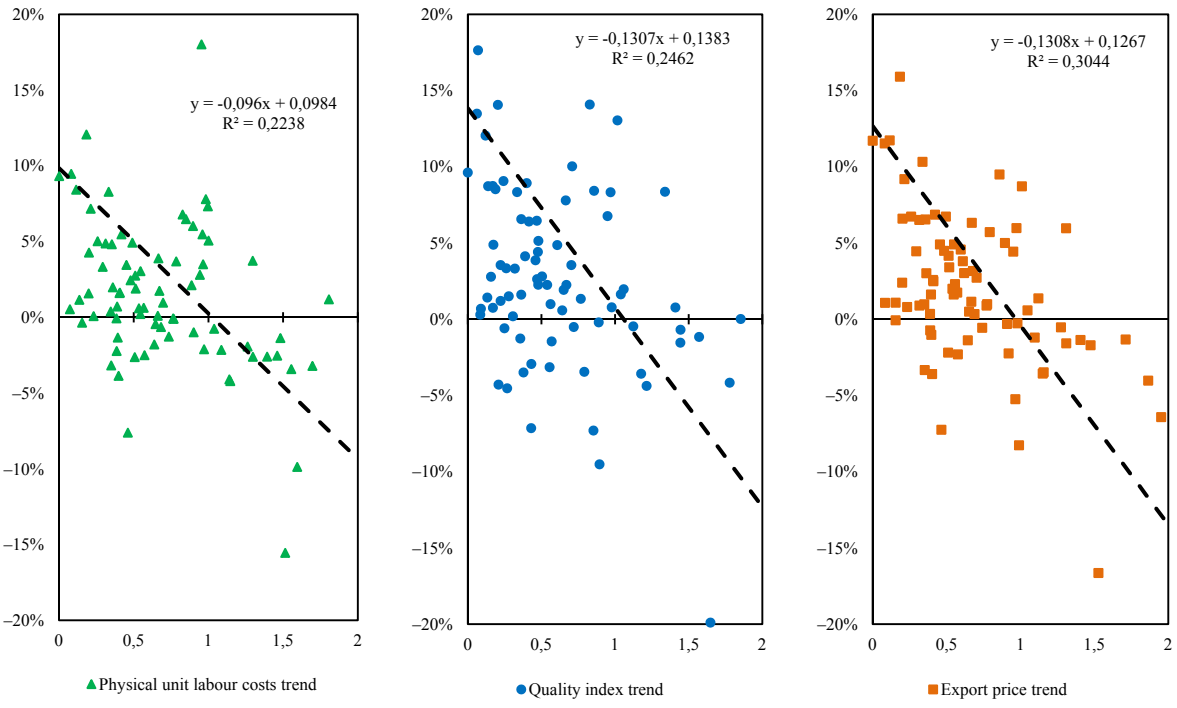
Linear Trends of Latvian Quality, PULC, Non-cost Competitiveness, Export Prices and Market Shares. Evolution *vis-à-vis* EU27, Compared Product-by-product and on Weighted Average Aggregates

Regression Type	Quality Trend	Physical Unit Labour Cost Trend	Non-cost Competitiveness Trend	Export Price Trend	Market Share Trend in the EU
Simple time trend	**2.47%** *(4.70)*	0.61% *(1.63)*	0.00% *(0.19)*	**1.63%** *(4.16)*	**0.01%** *(8.54)*
Product dummies	**2.26%** *(5.87)*	**0.56%** *(1.98)*	0.00% *(0.12)*	**1.57%** *(5.23)*	**0.01%** *(12.93)*
Simple time trend on weighted averages	**2.54%** *(86.97)*	**0.89%** *(13.84)*	**–0.71%** *(–43.09)*	**1.75%** *(71.99)*	**–0.05%** *(–47.97)*

Source: Commission Services. Note: *t*-statistics are reported in parentheses. Results in bold are significant at 1 per cent level. The first row represents a regression on a simple linear trend, the second adds product dummies, the third takes the weighted average values for the entire economy, each product being weighted by Latvian export shares.

Figure 10

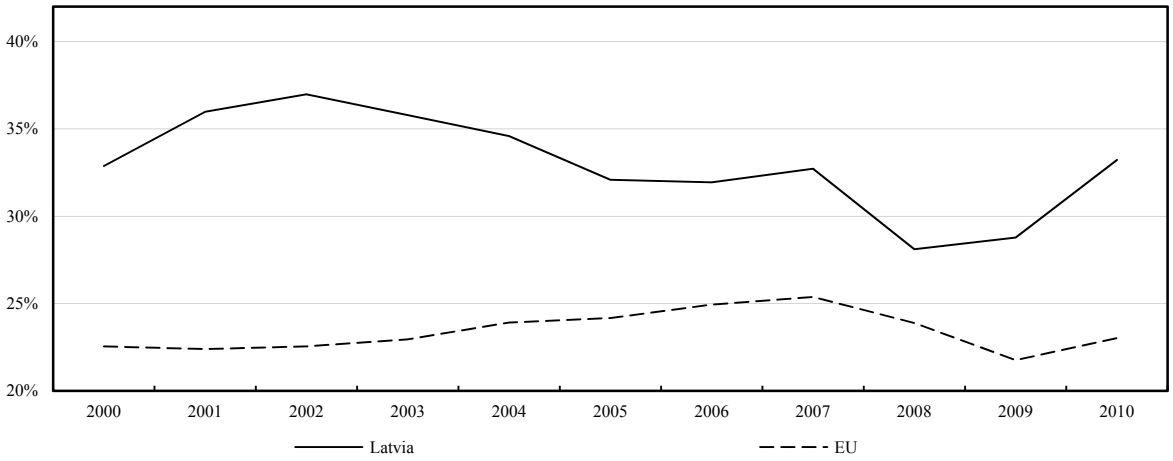
PULC, Quality and Price Growth and Initial Levels *vis-à-vis* EU27



Source: Commission Services.
Note: On the horizontal axis the levels in 1999 of Latvian physical unit labour costs, quality index and export prices against the European Union (EU27=1) for each product in the sample (97 CN2 product codes). On the vertical axis the product-specific linear trend growth over the period 1999-2011, with a dashed linear trend line.

Figure 11

Evolution of Latvia's Corporate Profit Rates



Source: Commission Services. Note: Corporate profit rates are calculated as a net-operating-surplus-to-GVA ratio).

3.4 Further alternative indicators of competitiveness

As highlighted in the previous section, standard competitiveness indicators based on prices and labour costs may fail to capture the full scope of factors affecting production costs and revenues, which can be affected by changes in quality as well as in product and market structures. For example, in some sectors of the economy, labour costs account for a relatively small share in total production costs and therefore other input costs have to be also taken into account. In particular, Latvia's historical exposure to energy-intensive industries calls for a closer look at energy costs, but also various other costs in the field of transportation, technology, logistics, and others could be brought into consideration subject to data availability. A way to assess the effects of other costs that could offset or add to changes in labour expenses is to look at corporate profit margins. In the case of Latvia, corporate profit rates have remained among the highest in the EU through the whole transition period which is a clear indication that increasing labour costs have been offset by other cost or revenue factors affecting the corporate income statements.

3.4.1 Profit margins

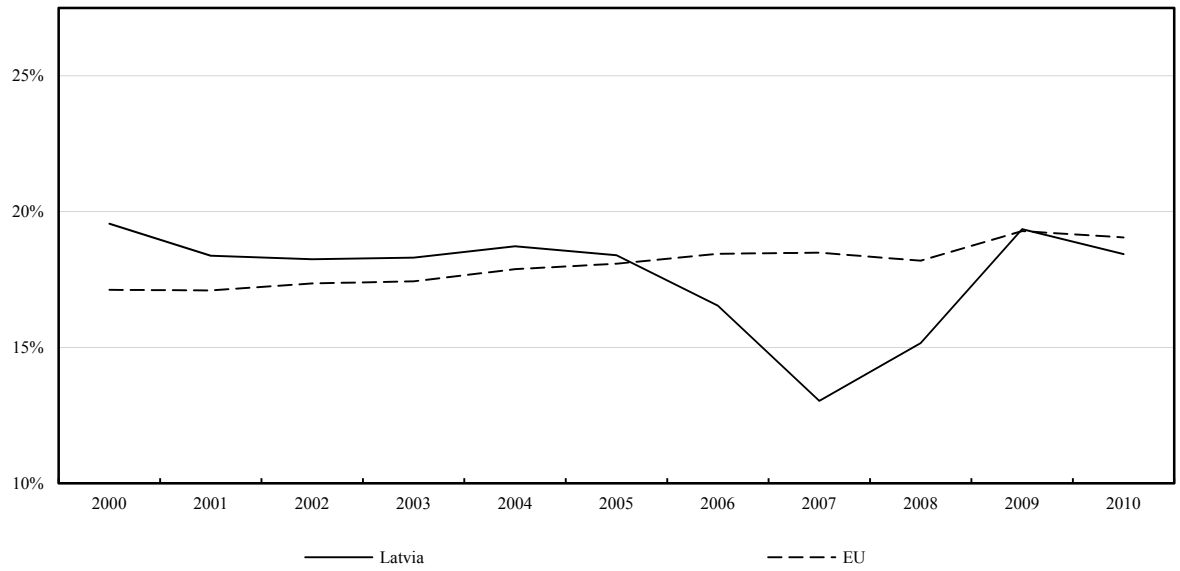
The share of corporate profits in gross value added can be calculated from national accounts statistics both at sector and aggregate levels on the basis of the following identity:

GVA (Gross Value Added) = *P* (Profit and other capital remuneration) + *K* (Capital depreciation) + *L* (Labour remuneration)

In addition to production-related costs, the analysis of corporate profitability reflects various competitiveness effects channelled through the revenue side of the income statement, in particular re-positioning of products in different geographical markets, product segmentation, as well as external demand and price effects. Figure 11 shows that Latvia's corporate profit rates remained higher than in the rest of the European Union in the period of 2000-10, even during the crisis, providing another argument in favour of the view that the major cause of accumulating external imbalances in the boom years was linked to excess domestic demand and not linked to a loss of competitiveness or difficulties in the industrial sector.

Figure 12

Evolution of Unit Capital Costs for Latvian and the EU



Source: Commission Services.

3.4.1.1 Capital productivity

The above identity ($GVA = P + K + L$) also provides information about changes in capital productivity by monitoring the ratio of capital use to gross value added (K/GVA). A decrease in the ratio means improvement in capital productivity as it shows lower capital costs per unit of value added. The ratio follows the logic of unit labour costs and could be similarly named as unit capital cost. The calculations for Latvia (Figure 12) show that unit capital cost has improved (use of capital to GVA has declined) in periods of increased unit labour costs which has to some extent sustained the favourable export position in the corporate sector and explains the large profit margins.

3.4.1.2 Energy and other input costs

In the analysis of the gross value added, profits can be seen as a residual value determined by other capital and labour remuneration. However, in the corporate income statements, profit is also determined by a number of other costs that are booked as intermediate consumption in the national accounts and deducted from gross output. Therefore, in order to have a fuller picture of the factors affecting profits, it is also useful to look into output and intermediate consumption. In the case of Latvia, it is worth to focus the analysis on energy costs as a key component of intermediate consumption, as Latvia's energy intensity, calculated as the share of energy intake in GDP, is still among the highest in the EU (80 per cent above the EU average in 2010).

Energy constitutes a pervasive input, being used to a larger or lesser extent in all economic activities. For the Baltic countries and Latvia in particular, energy costs in relation to output are substantial. In replication of the ULC (unit labour cost) approach, it is possible to construct a unit energy cost (UEC) for the assessment of possible gains/losses from energy efficiency and energy prices relative to trading partners. Given the country's high dependence on energy imports, changes

in the UEC also have an important impact on the country's foreign trade balance as nearly 50 per cent of the goods' trade deficit is generated by net energy imports (52 per cent in 2010). In a similar vein, it is possible to construct unit transport costs and other unit input costs that affect companies' income statements. From the point of view of the national accounts, all these costs are booked as intermediate consumption and deducted from gross output:

$$\text{Gross Output} - \text{Intermediate Consumption} = GVA = P + K + L$$

This identity of gross valued added suggests that more efficient use of energy, transport or other inputs will result into lower intermediate consumption and higher value added. These gains could be then allocated to profit or labour on the right-hand side of the equation with different implications on ULC. Historical data show a stable ratio of intermediate consumption to output in Latvia which suggests that on aggregated basis, the country's economic agents have not gained or lost efficiency through changes in the modes of using inputs counted as intermediate consumption. However, there is a strong potential for reducing the share of intermediate consumption to output through energy efficiency, given Latvia's high energy intensity at present, and therefore it is important to monitor both sides of the above equation in future analysis of competitiveness.

4 Beyond export competitiveness: the role of imports and internal demand

After having seen how the export sector of the economy fared during and before the crisis, in this section we analyse the demand side of the economy.

4.1 Analysis of the national account identities

The aggregate supply and demand of the economy provides a field where "real-variable" policies may be implemented in order to improve the current account. Starting from a breakdown of output into expenditure components, it can be shown that current account imbalances may be ultimately ascribed to imbalances in the relationship between savings and investments of an economy:

$$Y = C + I + G + X - M$$

where Y is GDP, C is consumption, I is investment, G is government expenditure, X is exports and M imports.

$$Y - T - C = I_P + I_G + G - T + NX$$

where T is taxation, I_P and I_G are private and public investment, *and* NX is net exports.

$$S_P - I_P = I_G - S_G + NX$$

where S_P and S_G are private and public savings.

$$NX = (S_P - I_P) + (S_G - I_G)$$

or, if we consider the existence of factor income and transfer payments from abroad and add their net value to both sides of the identity

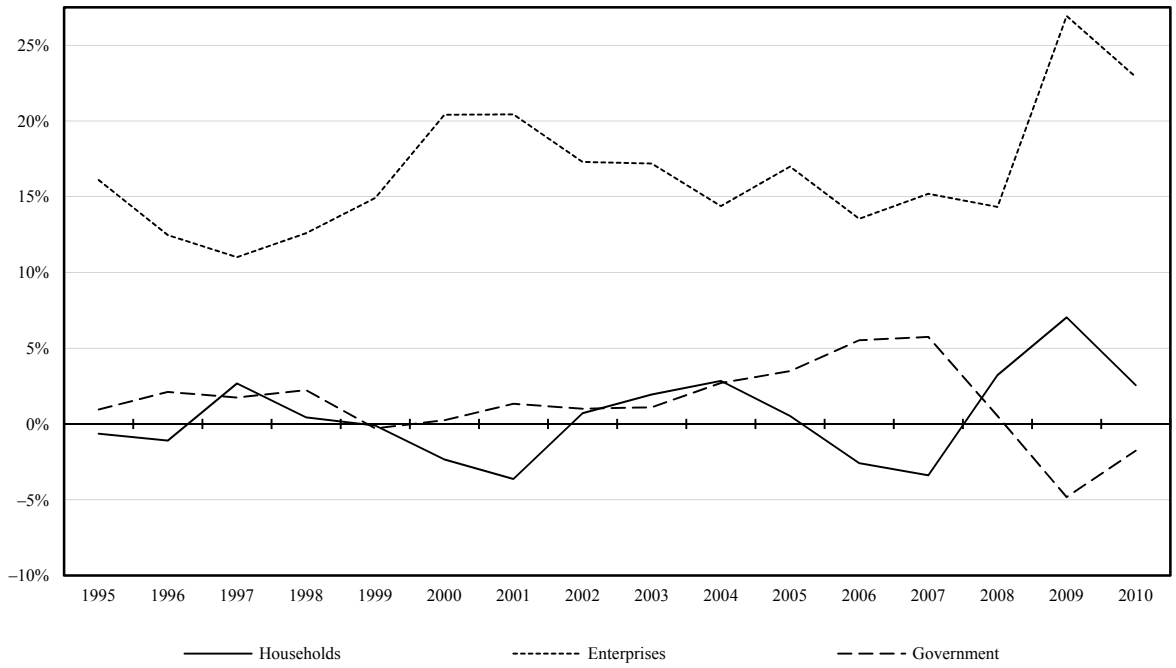
$$CA = (S_P - I_P)' + (S_G - I_G)'$$

where the new levels of net savings, $(S - I)'$, should increase with factor income and transfer inflows, and decrease with outflows. Private sector savings and investments (S_P and I_P)' can be further broken down into household and corporate sectors, (S_{Ph} ,S_{Pc} , I_{Ph} and I_{Pc})':

$$CA = (S_{Ph} - I_{Ph})' + (S_{Pc} - I_{Pc})' + (S_G - I_G)$$

Figure 13

Evolution of Gross Saving Rates in Latvia
(percent of GDP)



Source: Eurostat.

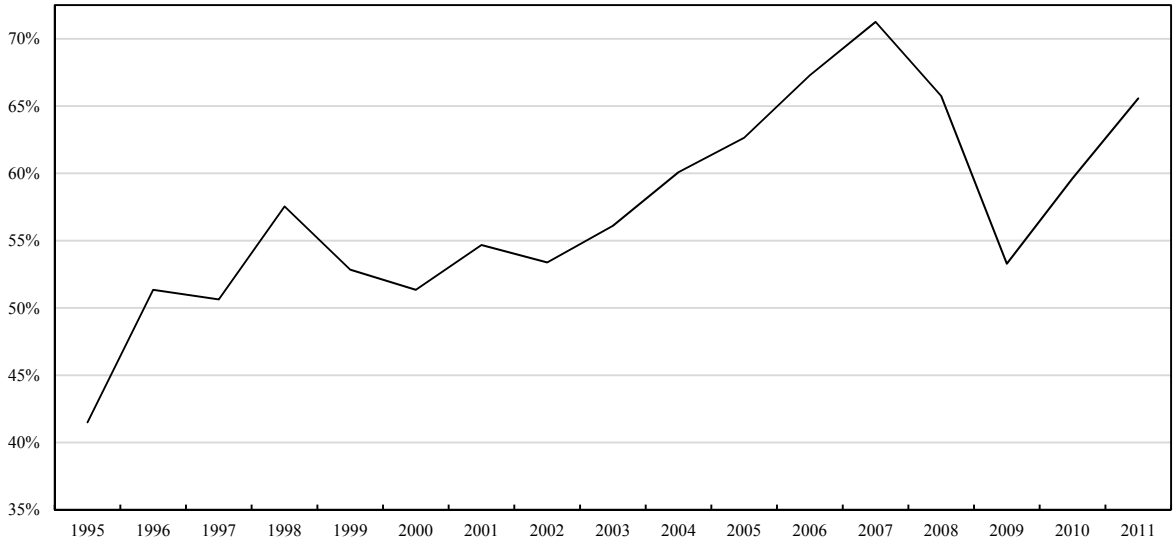
Therefore, a positive trade balance or current account can only be maintained when the economy as a whole saves more than it invests domestically. The surplus can then be exported, thereby increasing the international investment position of the economy. The evolution of gross saving rates in Latvia is show in Figure 13.

External imbalances beget the question of who is saving and dis-saving in the economy. The role of the different institutional sectors – public, private and, within the latter, households and firms – should then be assessed. In fact, an imbalance may be rather benign when it is the result of a high investment rate of corporations in an economy with many growth opportunities which may then translate, for example, into larger volumes of imports of capital goods. Quite differently, an imbalance that stems from a continuous decrease in the saving rate of households and that translates into high volumes of consumer goods being imported may give rise to worries regarding sustainability. A similar argument carries over to the government sector, where the composition of government expenditure and investment and their repercussion effects on the economy as a whole play a crucial role.

As detailed in the next section, Latvian external imbalances were clearly influenced by import demand. The historical overview of the Latvian economy shows that domestic demand was pushed by two major sources: very high external financial inflows (both through bank lending and FDI) and high consumption propensity in the household sector. In fact, household saving rates in Latvia were very low in the boom years in comparison with the EU average. When the crisis took place in 2008-09, a quick adjustment of household saving rates combined with lower aggregate incomes quickly reversed the current account to a surplus.

Figure 14

Latvian Imports-to-GDP Ratio
(real terms)



Source: Eurostat.

4.2 Excess imports and import content of consumption

Latvian imports increased markedly as a percentage of GDP in the heating-up period, reaching a peak of more than 70 per cent in real terms, as can be seen in Figure 14. The speed and magnitude of the observed increase in imports could hardly be matched by a similar increase in exports, the consequence being that Latvian current account balance deteriorated markedly in the run-up to the crisis.

In fact, Latvian import behaviour appears to have undergone an important change during the boom and subsequent adjustment period when compared to historical trends. Figure 15 contrasts the expected Latvian import demand, derived from an estimated import demand function for the pre-accession period,[3] with actual import behaviour in recent years.

A change in import behaviour is noticeable in the wake of EU accession, with actual imports decoupling from expected imports during the 2004-07 heating up period. In fact, "excess" imports, defined as the difference between actual and expected imports, cumulated from 2004 through 2007 to reach 20 per cent of 2005 GDP, with a correction period following from 2008 to 2010. While an increase in imports can be partly explained by the opening-up of the economy in the wake of EU-accession, other important factors contributed to a spike in import demand. Among these are very dynamic developments in compensation growth (Figure 16), a bout of "EU-phoria" following

---

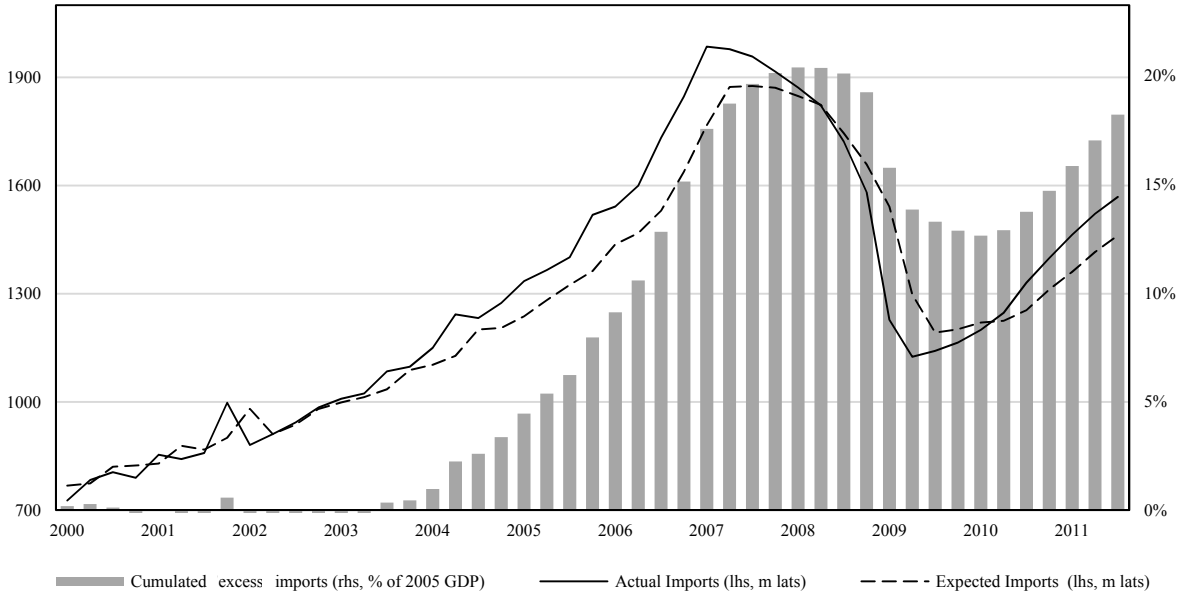
[3] In line with a general class of parsimonious models used to explain aggregated imports, the following import demand function was estimated on quarterly data from Q1 1995 to Q4 2003, *i.e.*, the pre-accession years:

$$\ln(real\ imports_t) = \beta_1 \ln(real\ GDP_t) + \beta_2 \frac{import\ deflator_t}{GDP\ deflator_t} + \beta_3 \ln(real\ imports_{t-1}) + e_t$$

The choice of this particular specification was based on a standard battery of statistical criteria and comparisons with alternative specifications. The estimated statistical model passes standard misspecification and serial correlations tests, and all the estimate coefficients have the expected sign and are significant at a 5 per cent level. The regression explains 94 per cent of the variance in real imports.

Figure 15

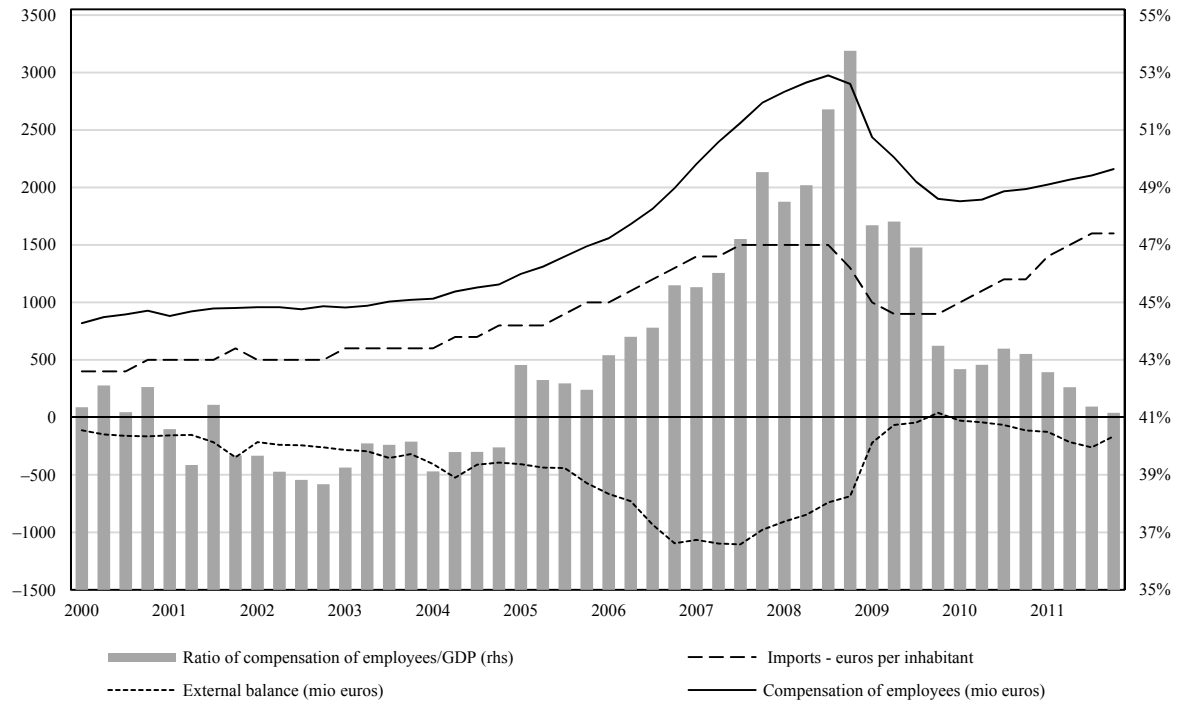
Actual vs. Expected Imports
(constant 2005 prices)



Source: Eurostat and author's calculations.

Figure 16

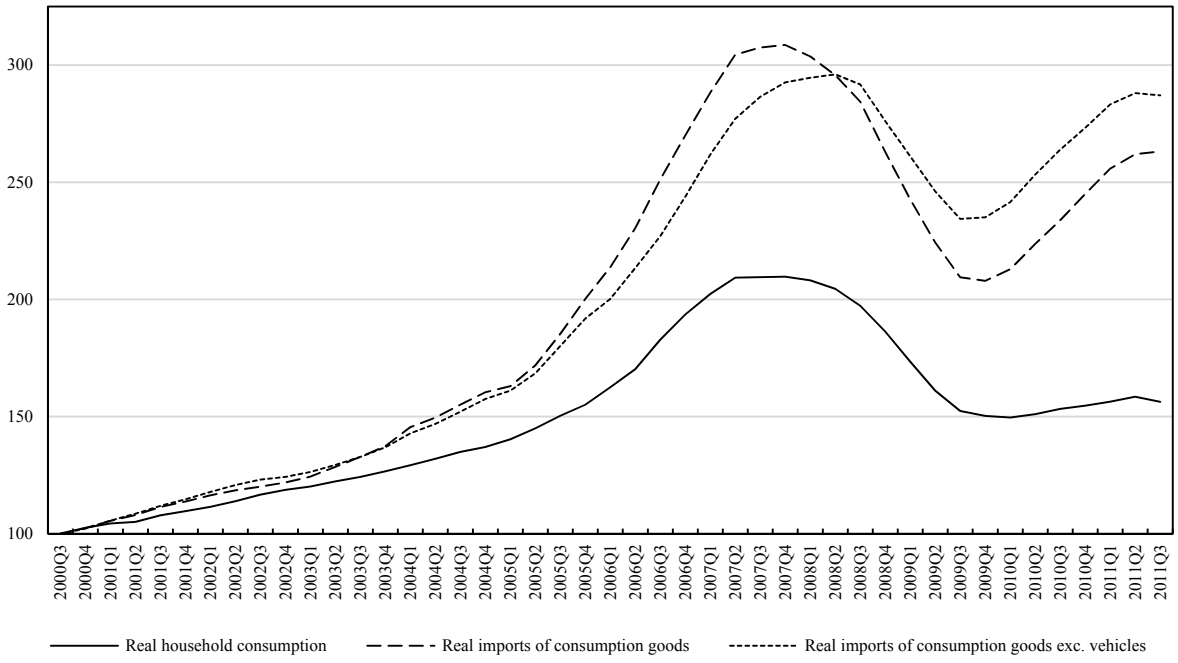
Compensation Growth and External Imbalances



Source: Eurostat.

Figure 17

Latvian Imports of Consumption Goods and Consumption Growth



Source: Eurostat.

accession in 2004 which may have masked the important economic challenges still confronting Latvia, unrealistic expectations of high and fast growing future incomes by households and, possibly, a shift in preferences towards foreign, more expensive goods.

In fact, the import content of consumption appears to have increased significantly in the pre-crisis period. As depicted in Figure 17, in the heating-up period from 2004 until the collapse of Lehman brothers in the third quarter of 2008, Latvian imports of consumption goods increased much faster than household consumption, with the chart data suggesting a 28 per cent increase in the real imported-consumption-to-total-consumption ratio.[4]

The aforementioned effects were compounded by increased credit flows, namely from abroad, as the private sector leveraged up in a context of favourable credit conditions. Figure 18 evidences the important role of credit inflows in financing a buoyant import demand. Credit inflows in the form of bank loans from abroad[5] are seen to have co-moved strongly with soaring imports. In fact, whereas prior to 2004 foreign credit inflows played a minor role, accounting for as little as 10 per cent of total imports, they grew to represent almost two thirds of import values in the 2004-07 heating up period. When the collapse of the Lehman Brothers investment bank in 2008 brought about a sudden stop in credit inflows, imports collapsed along with GDP. However, whereas credit inflows were brought to a halt, there is a limit to import adjustment in a small and very open economy such as Latvia's, which prompted the country to seek a balance of payments assistance programme from the EU in order to support its international transactions.

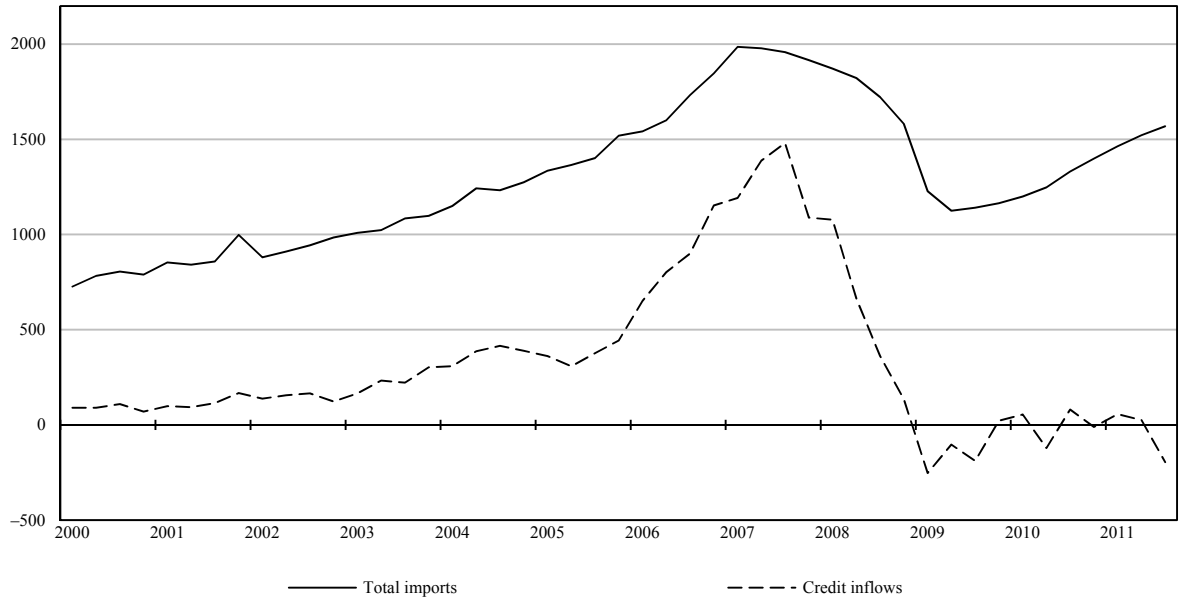
---

4 Due to the fact that Latvian input-output tables do not cover this period, more exact figures on the import content of consumption are not available.

5 Obtained from the "other investments" category of the financial account of the balance of payments (4-quarter average).

Figure 18

Credit Growth and Imports



Source: Eurostat, Bank of Latvia.

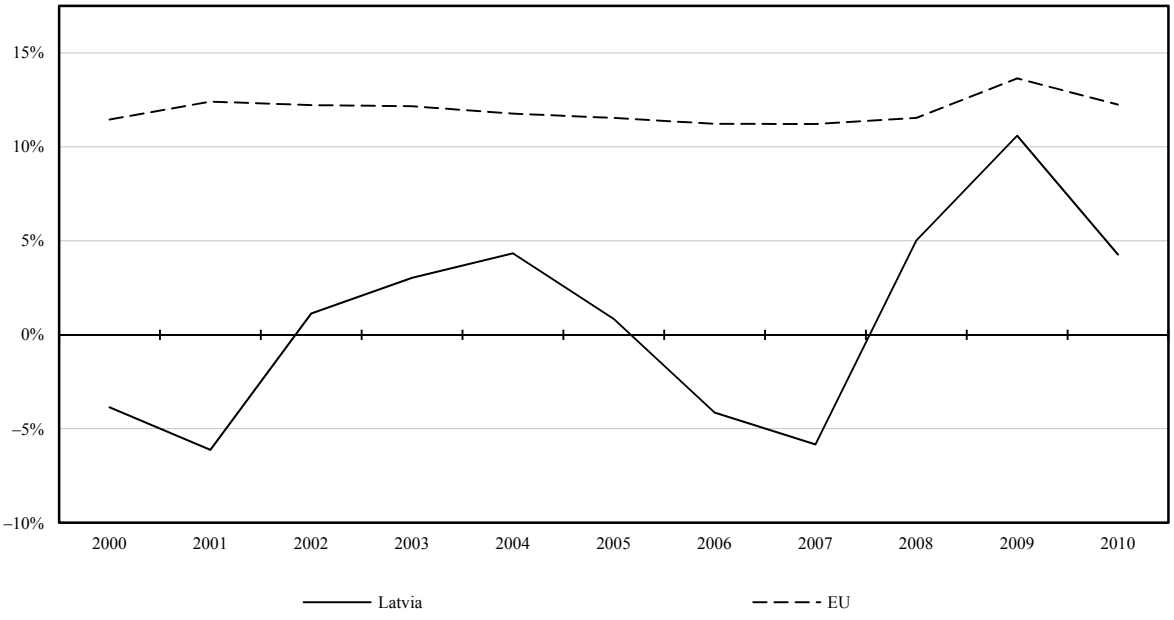
5 Conclusions

In this paper it has been argued that rather than a competitiveness problem, the Latvian economy suffered from an excess of demand, fuelled by an extraordinary credit expansion. While controlling import behaviour in an economic union without capital controls and under a currency peg may be difficult, there are nevertheless some policy tools available. For example, indirect taxation may be used to redirect income from consumption towards savings, while property taxation can help curb the expansion of the non-tradable sector and taxation of vehicles (an entirely imported good in Latvia) can help moderate import values. As can be seen from Figure 19, this is going to be a challenging task for Latvian authorities, as household savings rates have been historically very low in Latvia (significantly below the EU levels) and declined steeply to negative rates in boom years.

Authorities have basically two major tools for managing demand. One of the tools is related to financial and bank regulations that could increase risk awareness and limit excess credit growth, especially in the area of mortgage lending that was a major source of overheating in Latvia. The second tool for managing household demand is based on taxation and fiscal policies whereby the tax burden can be rebalanced from labour to consumption. This would simultaneously reduce labour costs for businesses and exporters, discourage excess consumption and support higher saving rates. Additionally, property taxation can help curb excessive expansion of the non-tradable construction sector and taxation of vehicles (an entirely imported good in Latvia) can help moderate import values. The rebalancing of the tax burden was effectively done in Latvia through increases in VAT, excise, housing and transport vehicle tax rates during the period of radical fiscal consolidation in 2008-10. However, the potential for further rebalancing is still in place as both excise tax rates and property taxes (for real estate and transport vehicles) are below the EU average.

Figure 19

Household Savings
(percentage of disposable income)



Source: Eurostat, Bank of Latvia.

While a significant part of the change in Latvian import behaviour is bound to be structural and associated with its integration in the single market, the future sustainability of the Latvian external position will depend on the judicious management of its internal demand and on the continued promotion of its external competitiveness, so that, differently from what happened in the 2008-09 crisis, exports dynamics can accommodate import growth. Under the conditions of fixed exchange rate regimes and demand-driven imbalances, the policy response to offsetting the import demand effects of external financial inflows and encouraging saving propensity in the household sector appear of high importance and with much lower negative effects on growth than the alternative fiscal and budgetary measures.

REFERENCES

Di Comite, F. (2012), "Measuring Quality and Non-cost Competitiveness at a Country-sector Level", European Economy, Economic Paper, forthcoming.

TACKLING TURKEY'S EXTERNAL AND DOMESTIC MACROECONOMIC IMBALANCES

Oliver Röhn,[*] Rauf Gönenç,[*] Vincent Koen[*] and Ramazan Karaşahin[*]

Effective macroeconomic and structural policies helped Turkey bounce back quickly and strongly from the global crisis, with annual growth averaging close to 9 per cent over 2010-11. However, the current account deficit widened to around 10 per cent of GDP in 2011 and consumer price inflation rose to over 10 per cent. Both the current account gap and inflation have since come down, coinciding with an innovative monetary policy approach that tried to slow domestic demand while strengthening external competitiveness. Nevertheless both imbalances remain too large for comfort and the improvements may prove transient. In this paper we argue that fiscal policy should play a larger countercyclical role given the trilemma faced by monetary policy. In particular, in cyclical upturns a tighter fiscal stance would help restrain domestic demand and hence inflationary pressures, allowing the central bank to keep the interest rate lower than otherwise and thereby containing interest-rate-elastic capital inflows. This would also allow building up buffers to help counteract a possible capital flow reversal, and contribute to raising domestic saving. Nevertheless, the power of fiscal policy should not be exaggerated given the relatively small size of the government sector in Turkey. More balanced growth calls for a range of structural reforms to strengthened competitiveness and lift private saving and the government has recently taken steps in this direction.

1 Introduction

The impact of the global crisis was severe for Turkey, but domestic demand recovered swiftly and growth reached 9.2 per cent in 2010 and 8.5 per cent in 2011. However, in the process, significant economic tensions arose. With estimated slack shrinking fast, consumer price inflation rose to over 10 per cent by December 2011, almost twice the target rate. At the same time, the current account deficit widened to 11 per cent of GDP in the first quarter of 2011, a historically unprecedented level. While the current account gap and inflation have started to come down since, both remain above comfort levels.

This paper discusses the underlying causes of these imbalances, which include both the macroeconomic policy stance but also and crucially a range of structural factors. The paper then turns to the policies that can help mitigate these imbalances and achieve more balanced growth. Structural policies to reform the labour market, to step up formalisation, and to boost productivity are also indispensable to durably improve the current account and help lower inflation, and are discussed in detail in Gönenç *et al*. (2012).

2 Bringing down the current account deficit and financing it better

Turkey's current account deficit reached 9.9 per cent of GDP in 2011 (Figure 1). In absolute

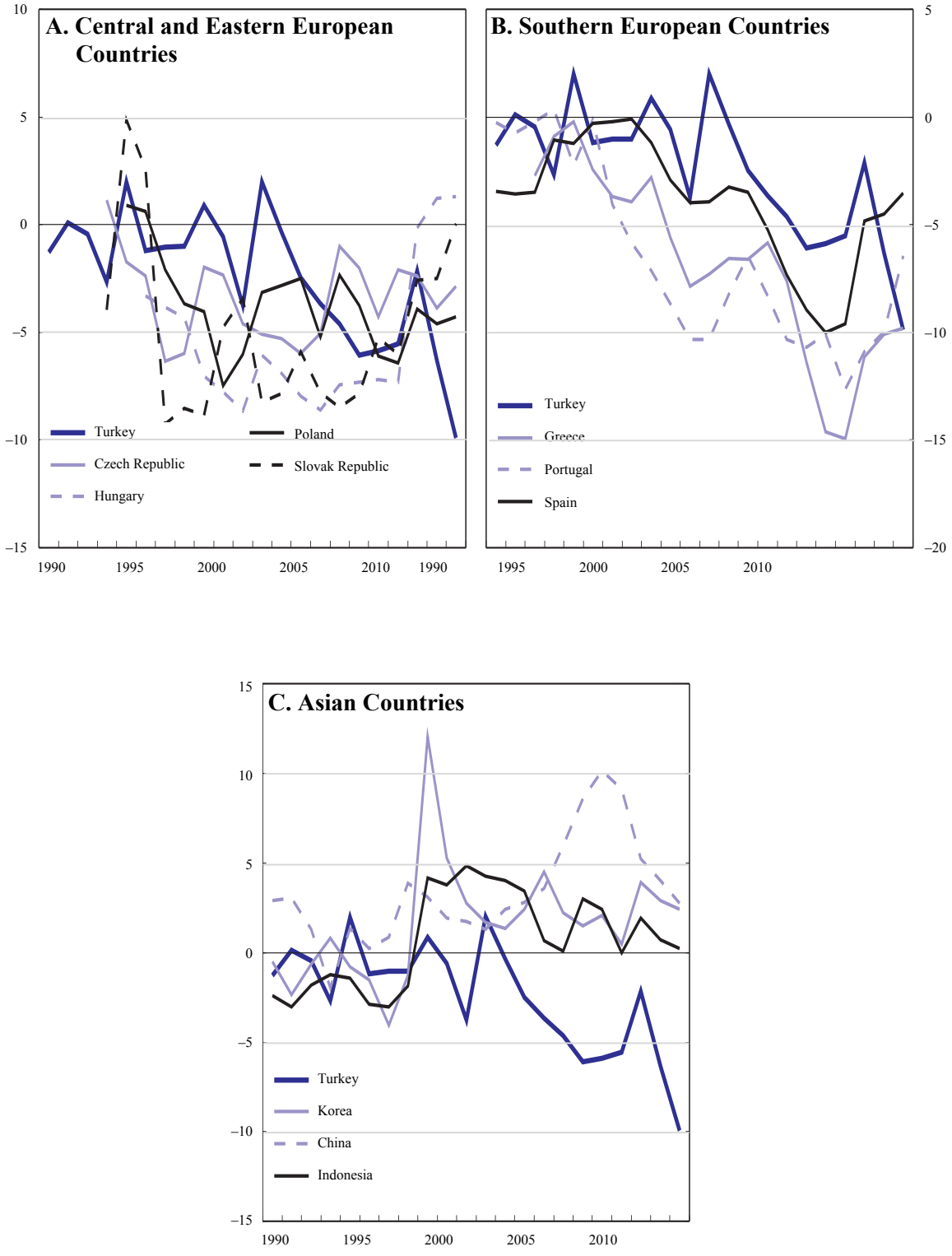
---

[*] OECD Economics Department.

This paper is a slightly updated version of a chapter from the *OECD Economic Survey of Turkey* (available at: www.oecd.org/eco/surveys/turkey), which was published in July 2012 under the authority of the Economic and Development Review Committee (EDRC). It has benefitted from background research by Şeref Saygili. The authors thank Andrew Dean and Robert Ford for their valuable comments. Special thanks go to Béatrice Guérard for technical assistance and to Nadine Dufour and Pascal Halim for technical preparation.

Figure 1

Turkey's Current Account Deficit Has Reached Unprecedented Levels
(current account balance as a percentage of GDP)



Source: OECD, *OECD Economic Outlook Database*.

US dollar terms Turkey recorded the second-largest current account deficit in 2011 among all OECD countries. With domestic demand slowing since mid-2011, the current account deficit is narrowing. Even so, it is on course to remain large for some time. A substantial dependence on foreign financing leaves an economy vulnerable to a slowdown in capital inflows with potentially negative consequences for financial stability and growth. In addition, the financing structure of the external deficit also deteriorated after the crisis, with a higher reliance on short-term bank loans, though it began to improve in 2011. Nevertheless, short-term capital inflows continue to play a large role in external financing. With financial market tensions lingering in the euro area, banks in developed countries facing higher capital requirements and more generally uncertainty about the global economic outlook, external financing conditions will remain strained. Accordingly, reducing the current account deficit through a rebalancing of demand is a pressing near-term economic challenge.

This paper suggests that the worsening of Turkey's external balance mainly results from price and labour cost inflation outstripping productivity growth and nominal exchange rate depreciation, thus eroding competitiveness in the tradable sector. This especially affected the formal low-skill labour-intensive manufacturing sector but more recently other sectors too. Additional low-skilled rural migrant labour facing limited formal employment opportunities was mainly absorbed by a new generation of semi-formal and informal enterprises in export-oriented sectors. However, productivity and wage growth is low in these firms, constraining household income and saving. At the same time, overall household saving was low and falling due to macroeconomic stabilisation leading to a fall in interest rates and lower precautionary saving, higher availability of credit, low aggregate employment and the large share of the low-skilled in the population. With investment opportunities aplenty as the economy grew rapidly, this translated into a growing saving-investment gap and consequently a widening current account deficit.

Box 1
Current Account Imbalances: International Experience and Theoretical Considerations

Turkey's sizeable current account deficit is not uncommon for catching-up economies which, given a certain level of political and macroeconomic stability as well as security of property rights, provide ample investment opportunities and high returns for foreign investors. For instance, new EU member countries in Central and Eastern Europe have experienced deficits of similar magnitude as have southern peripheral euro area countries. Recent history has shown that in many cases these imbalances, driven by continuously deteriorating competitiveness as well as asset and credit booms, were unsustainable (Atoyan, 2010). The external balance has improved since the crisis in almost all of these countries, partly due to cyclical weakness, while that of Turkey deteriorated to a level not seen before the crisis. In contrast to these catching-up economies, many emerging Asian countries, after running external deficits before the 1997/98 crisis, combined rapid growth with sizeable current account surpluses on the back of an export-led growth strategy.

Normative assessments of external imbalances are generally difficult as they can arise for "good" or "bad" reasons (Blanchard and Milesi-Ferretti, 2012). On the one hand, external imbalances can be the result of utility-maximising behaviour in the absence of distortions and reflect the optimal allocation of capital across time and space. On this score, demographic factors or strong economic prospects, as in Turkey, would be relevant. On the other hand, deficits can reflect domestic market distortions. For example, deficient financial regulation can affect the quality of financial intermediation and spur asset and credit booms, or labour market distortions might lead to low employment rates and thus low household

income and saving. These distortions should be removed, first and foremost for efficiency and welfare reasons, but a reduction in imbalances can be a welcome side effect. Finally, good reasons for current account imbalances can interact with distortions and lead to inefficient outcomes and increased risk. For example temporary but persistent capital inflows and ensuing currency appreciation can lead to a crowding-out of the tradable manufacturing sector which is more difficult to reverse the more financially constrained the sector is (Caballero and Lorenzoni, 2007).

Irrespective of the underlying causes of external deficits, they imperil the sustainability of growth if they reach a substantial size, calling for policy intervention. In addition, if the country is large enough and has strong financial linkages to other countries, thus constituting a systemic risk, policy attention is warranted from a multilateral perspective. In the case of Turkey, however, financial linkages are still limited and spillovers to other OECD countries from a potential domestic financial crisis would be unlikely to be large even though some of the neighbouring non-OECD countries might be adversely affected.

3 Key features of Turkey's current account developments

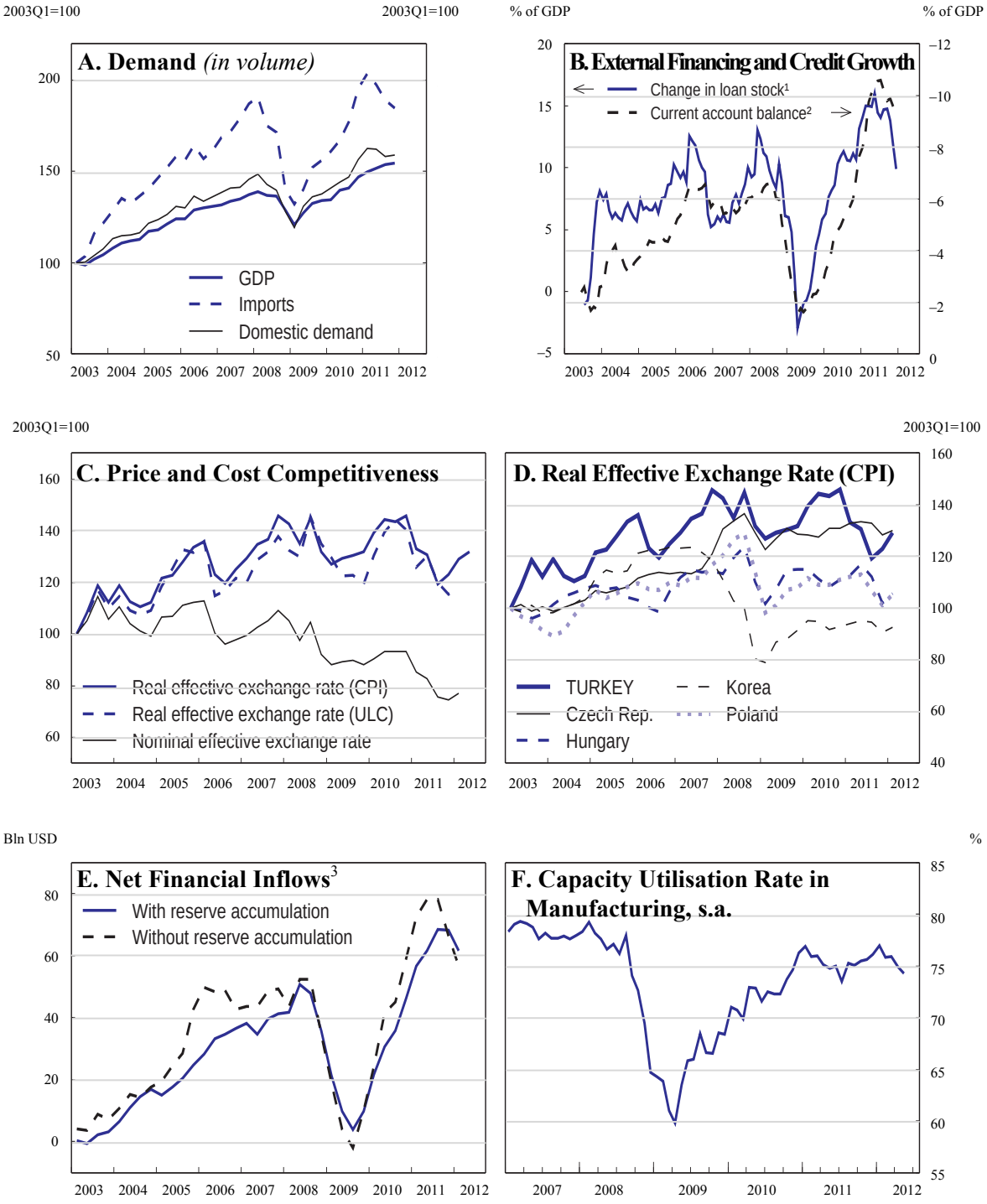
Turkey's current account deficit hovered around 1 per cent of GDP during much of the 1980s and 1990s. A more sizeable external imbalance started to emerge only after the financial crisis of 2001, when Turkey experienced strong growth, thanks to important reforms to strengthen its macroeconomic policy framework and financial sector. Spells of current account deterioration have been characterised by *i)* strong credit-financed, domestic demand driven growth, *ii)* sizeable capital inflows, *iii)* real exchange rate appreciation and *iv)* increasing import penetration (Figure 2). These episodes were interrupted by short periods of rebalancing driven by capital outflows and sharp nominal depreciation largely due to external factors, especially global financial turmoil. Despite these nominal depreciations, price and cost competitiveness have worsened over the past decade.

Developments after the outbreak of the global crisis fit this pattern quite well, but with two important differences. First, the deterioration of the current account has been much starker: the deficit went from 0.5 per cent of GDP in 2009Q2 to 11 per cent in 2011Q1, partly due to oil price increases and cyclical asymmetries, since Turkey recovered far more strongly from the financial crisis than most other OECD economies. Loose monetary conditions in many of Turkey's partner countries fuelled a sharp increase in capital inflows which may have contributed to exceptionally strong domestic credit growth. At the same time, demand for Turkish exports, in particular in the European Union, Turkey's main export market, remained subdued. But as discussed below, competitiveness losses that had accumulated over the previous decade and that were not entirely reversed by the sharp depreciation during the financial crisis, also contributed to the strong deterioration of the current account.

Second, the rebalancing from domestic to external demand observed since the second half of 2011 has so far been gradual and not driven by an abrupt contraction in activity, unlike during the global financial crisis. Monetary and financial policy contributed to this gradual rebalancing through a mix of mostly unorthodox measures (see below). However, this rebalancing might prove difficult to maintain for at least two reasons: *i)* the substantial nominal depreciation in 2011 has fed through to domestic prices and was partly reversed in early 2012, eroding some of the initial gains in competitiveness; and *ii)* if global financing conditions worsen, triggering capital outflows, restoring external equilibrium might require a sharp slowdown in domestic demand and import growth.

Figure 2

Current Account Developments



1) Net 6-month change in the total loan stock as a percentage of 6-month rolling cumulative GDP.
2) 6-month rolling cumulative current account balance as a percentage of 6-month rolling cumulative GDP. Monthly GDP figures are approximated using the industrial production index.
3) 4-quarter rolling sum.
Source: Central Bank of Republic of Turkey; OECD, *OECD Economic Outlook Database*; OECD, *Main Economic Indicators Database*; IMF, *International Financial Statistics*.

4 Accumulated competitiveness losses led to a marked worsening of the trade balance

The current account deterioration since the beginning of the 2000s largely reflects that of the trade balance (Figure 3A). Important drivers of trade developments are price and non-price competitiveness as well as domestic and external demand conditions (see Annex 1). Differences between domestic and external demand conditions have contributed to the rising trade deficit, in particular after the crisis. However, thanks to quality improvements and product innovations, non-price competitiveness has tended to improve, as documented in a previous *Economic Survey* (OECD, 2008). Nevertheless, price competitiveness remains key, all the more so given the recent growth of more price-sensitive low-technology industries. The price competitiveness of Turkey's tradable sector has come under pressure since the early 2000s owing to sizeable inflation differentials with trading partners. Nominal labour costs per unit have also run ahead of those in partner countries, due to widespread wage indexation in the formal sector and insufficient labour productivity growth. Consequently the real exchange rate, both in CPI and unit labour cost terms, appreciated significantly notwithstanding short bouts of sharp depreciation driven by the nominal exchange rate in times of global financial turmoil. Cumulatively, the real exchange rate appreciated by 40-45 per cent between early 2003 and late 2010. It then weakened by about 15-20 per cent until the second half of 2011 before starting to appreciate again. Some estimates of the equilibrium real exchange rate for Turkey suggest that it may have been still overvalued in the fall of 2011 (IMF, 2012; Cline and Williamson, 2011). This evidence, in combination with high minimum wages and costly labour market rules in comparison with other OECD and emerging economies as analysed in previous *Surveys* (OECD, 2008, 2010), points to a significant competitiveness gap in Turkey's tradable sector.

The periods of widening competitiveness gap have seen rising import penetration, and vice versa. However, as Turkey primarily imports raw materials and intermediate goods, part of the rise in import penetration reflects a more global trend towards integration into vertically-integrated global production chains, as in many other OECD countries. As Turkey's import penetration is still below the OECD average, this trend might endure (Figure 3B and C).

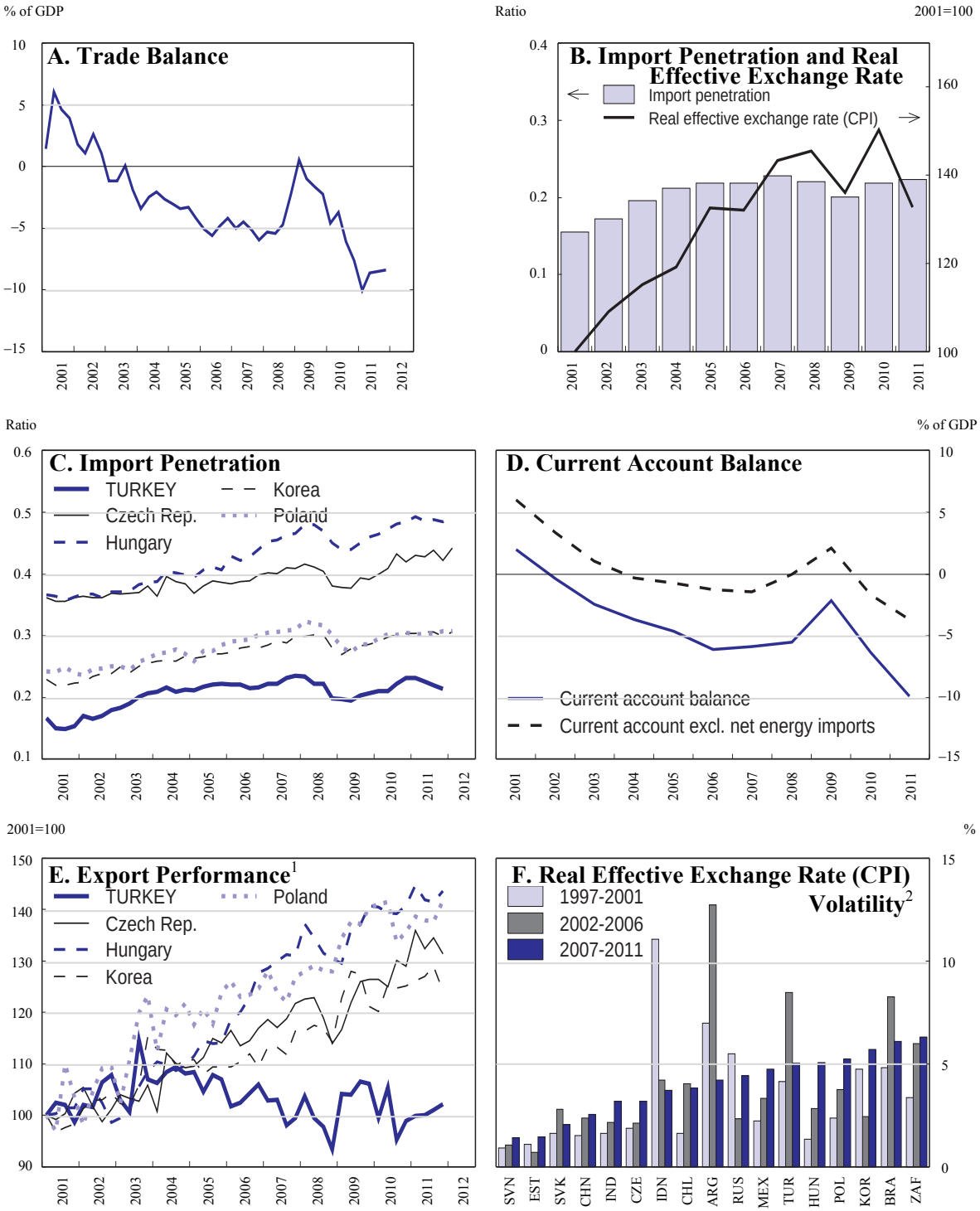
Another factor that may contribute to a limited responsiveness of total imports to improvements in competitiveness in the short to medium term is Turkey's large dependence on energy imports. While net energy imports only explain part of the post-crisis deterioration in the current account, they accounted for about half of the current account deficit in 2011.[1] Dependence on energy and in particular fossil-fuel imports at least partly reflects fundamental factors such as a lack of natural resources and high energy imports may therefore be a manifestation of a comparative disadvantage. However, energy price controls and hence departures from cost-based pricing may have led to inefficiencies in the use of energy inputs. In addition, potential appears to exist to substitute energy imports through domestic sources (e.g., hydro, wind, thermal and nuclear power). This, however, requires further efforts to promote efficiency and competition in the energy sector. Even if structural reforms promoting more efficient consumption and production of energy take time, their implementation is crucial to reduce energy imports and the current account deficit. As experience has shown, in particular in Asia, substantial current account surpluses are compatible with large net energy imports. For this to happen, however, the competitiveness of the export sector needs to be durably improved.

On the export side, aggregate measures of Turkey's export market share have been volatile over the past ten years, without a clear up- or downward trend, whereas several of Turkey's emerging market peers gained market share (Figure 3E). However, this aggregate measure masks

[1] According to CBRT estimates, each $10 increase in the oil price increases the current account deficit by 0.5 per cent of GDP.

Figure 3

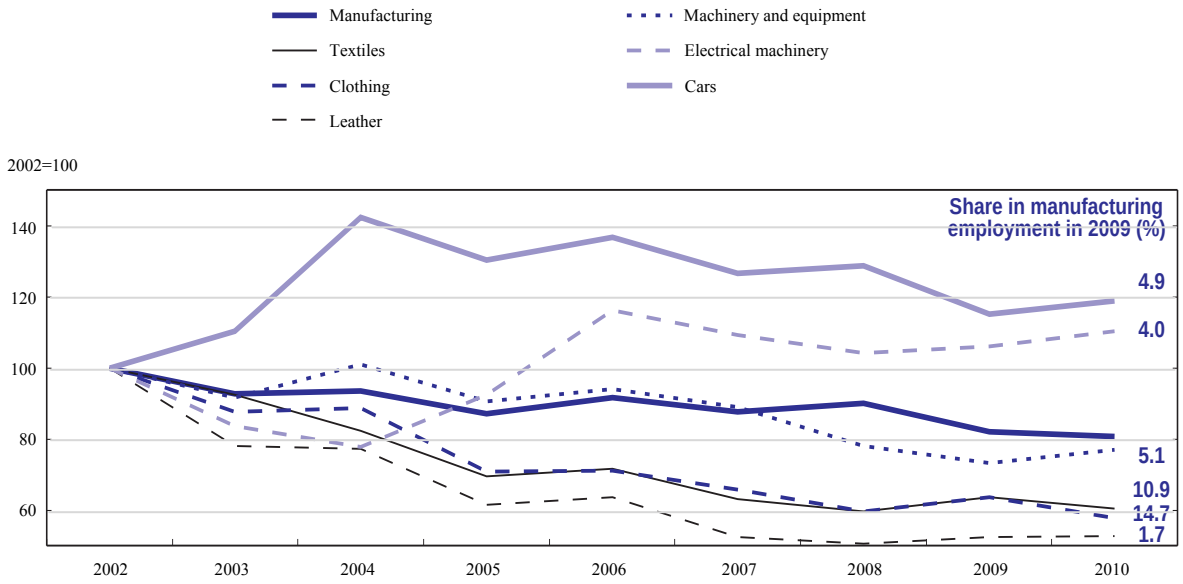
Trade Developments



1) "Export performance" measures export competitiveness and is calculated as actual volume growth in exports relative to the growth of the country's export market, which represents the potential export growth for a country assuming that its market shares remain unchanged.
2) Standard deviation of monthly growth rate.
Source: Turkish Statistical Institute; OECD, *OECD Economic Outlook Database*.

Figure 4

Sectoral Export Margins



Note: Ratio of export prices in national currency to unit labour costs in national currency, which can be interpreted as a measure of margins encompassing both price and non-price competitiveness (see Yilmaz and Gönenç, 2008).
Source: OECD estimates.

important structural changes within the manufacturing export sector analysed in previous *Economic Surveys* (OECD, 2008, 2010): while traditional low-tech formal sectors relying heavily on low-skilled labour (textiles, clothing, leather) were hardest hit by the squeeze in price competitiveness during the 2000s, new medium-tech sectors (cars, white goods, industrial machinery) could partly offset nominal cost pressures and on average strongly increased production, exports and employment (Figure 4). The latter sectors benefitted from their higher capital intensity in combination with a general trend decline in capital costs, quality improvements which allowed them to set higher price mark-ups, higher productivity growth and a shift towards imported intermediate goods.

In addition, a new generation of export-oriented manufacturing firms sprung up in previously non-industrialised, low-income regions. They rely mainly on low-skilled labour, but maintained competitiveness by often using informal and semi-formal labour contracts to circumvent high minimum wages, wage pressures and formal-sector rigidities. However, productivity growth in these new sectors is low (see Gönenç *et al.*, 2012), leaving limited room for wage growth if competitiveness is to be preserved, with negative repercussions on labour income and household saving, as discussed in the next section.

Looking ahead, improvements in the trade balance will mainly depend on Turkey's ability to boost exports. With demand from Europe likely subdued in the short to medium term, one way to do so is by diversifying into new fast-growing export markets. Efforts in this direction are already under way: Turkish exporters have increasingly penetrated new markets in the Middle East but also in Asia and the Americas, Özlale and Cunedioglu, 2011). Nevertheless, given its specialisation in low- to medium-tech products, Turkey is likely to continue to face low-cost competition also in new markets. This points to the importance of striving to improve competitiveness. Future

competitiveness is shaped by: *i)* nominal labour cost developments; *ii)* productivity growth; and *iii)* nominal exchange rates. Nominal exchange rate pressures depend on capital inflows as well as monetary policy settings. Labour costs are influenced by inflation dynamics as well as structural reforms in the labour market. Finally productivity growth depends notably on the ability to shift resources into the formal sector, competition in product markets and quality improvements in human capital (Gönenç *et al*., 2012).

In addition to developments in competitiveness, investment in the tradable sector and hence the future ability to generate export revenues or reduce import bills may also be influenced by the volatility of the real exchange (Hausmann and Rigobon, 2003). Volatile real exchange rates make production in the tradable sector more risky relative to non-tradables. While the volatility of Turkey's real exchange rate has decreased since the mid-2000s, it remains higher than in many other emerging economies (Figure 3F). Further declines in exchange rate volatility would strengthen the tradable sector.

5 Private domestic saving needs to be strengthened

The corollary of the widening trade deficit was the opening-up of a domestic saving-investment gap from the beginning of the 2000s. This gap reflected both a secular decline in private saving and a surge in private investment (Figure 5A). In contrast to private saving, public deficits turned into surpluses in the 2000s thanks to strong consolidation efforts. This increase only partly offset the drop in private saving. In the context of the global crisis, public dissaving resumed, as fiscal policy provided a stimulus (OECD, 2010). However, in 2010-11 the latter was largely withdrawn. In contrast to private investment, public investment remained relatively stable throughout the entire period and was mainly directed at enhancing transport infrastructure.

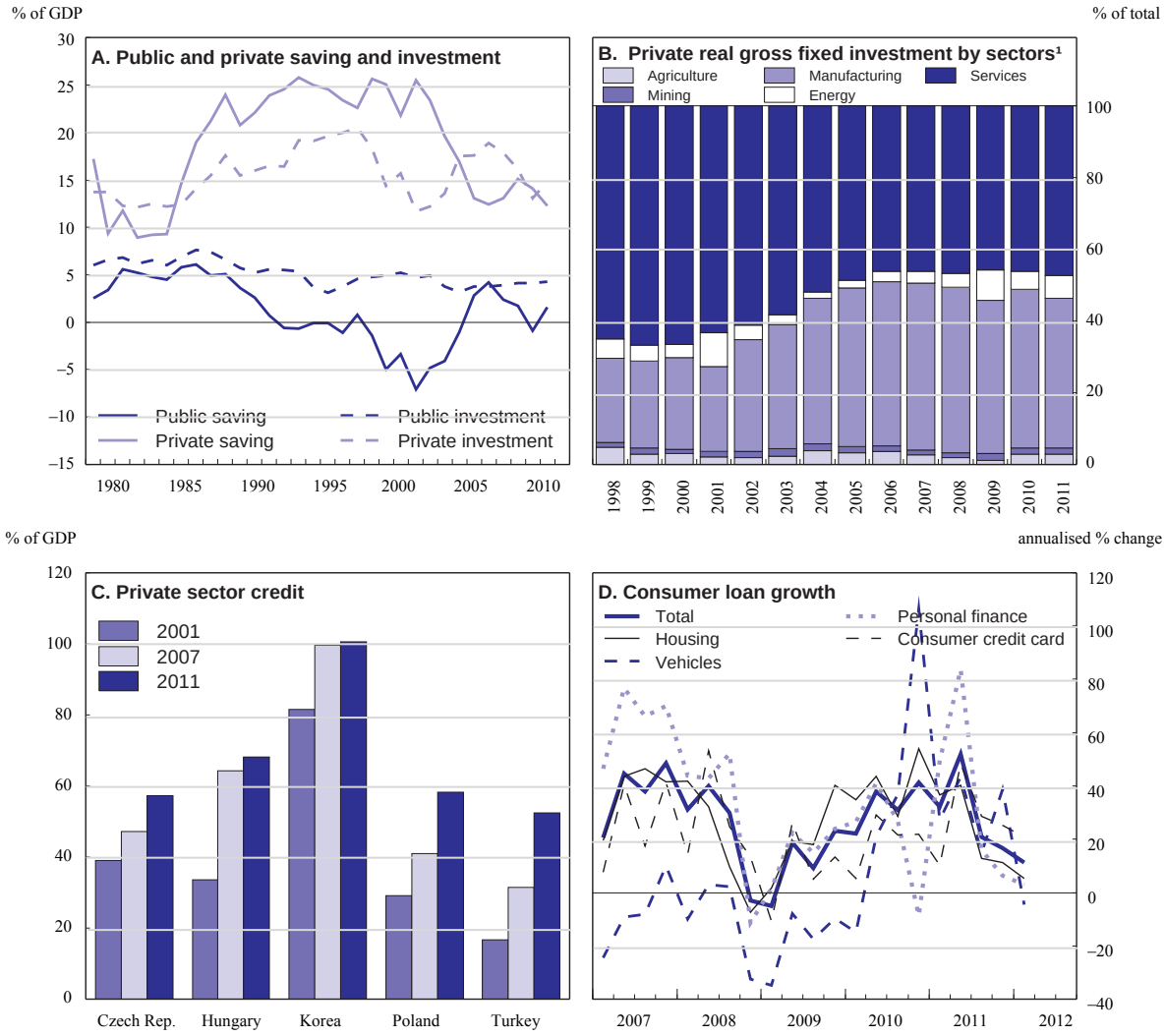
The surge in private investment can be traced back to major structural and institutional reforms including macroeconomic stabilisation, microeconomic liberalisation and strengthening of the banking sector which led to sharply falling capital costs following the 2000-01 crisis (OECD, 2008, 2010). In addition the government granted regional and horizontal investment incentives and provided public infrastructures (organised industrial zones) especially in previously non-industrial regions. But strong entrepreneurial dynamism also played a role. Investment was mainly driven by machinery and equipment and channelled into manufacturing, suggesting that investment incentives remained high despite competitiveness losses (Figure 5B). However, investment in manufacturing may have been partly used to substitute labour, and investment also largely took place in the new generation of export-oriented manufacturing firms which could circumvent costly labour regulations. Besides manufacturing, investment in transport and communication also expanded strongly. Construction investment only increased moderately,[2] in contrast with the boom experienced in several of the peripheral euro area countries and new EU member states in Central and Eastern Europe. Private investment collapsed during the global crisis but quickly rebounded, largely driven by the same forces as prior to the crisis.

Even so, the investment share in GDP, currently at about 22 per cent, remains lower than in several high-performing Asian countries. This suggests that if anything, investment in Turkey needs to grow faster to sustain GDP and employment growth, and the government recently announced new investment incentives (see Box 2). The new system preserves a number of positive features of the preceding regime: *i)* eligible beneficiaries are identified on the basis of explicit criteria and rules, minimising room for administrative discretion; *ii)* no distinction is made according to firm ownership (public *versus* private or domestic *versus* foreign); and *iii)* no trade

[2] However, there are some concerns about a real estate investment boom in the Istanbul area.

Figure 5

Drivers of the Saving-investment Gap



1) Data for 2010 and 2011 are projections.
Source: Ministry of Development; IMF, *International Financial Statistics*; OECD, *OECD Economic Outlook Database*; Central Bank of the Republic of Turkey.

protection is involved, in contrast to incentive policies applied in a number of other emerging countries. A stronger emphasis is given to sectoral criteria, with newly defined "strategic sectors" receiving additional incentives. The definition of "strategic sectors" will be rule-based, which should reduce interest group pressures and attempts to "pick winners". Additional safeguards, including the rules of the World Trade Organisation and the provisions of Turkey's Customs Union agreement with the European Union, which includes a "State Aid Commission" evaluating the competitive impacts of incentives, are expected to help minimize any distortions in competition and resource allocation. The new incentive system may increase the saving-investment gap in the short term by encouraging additional investment. However, if the incentives have the intended effects, they might stimulate additional supply capacity in the tradable sector with favourable effects on the trade balance in the longer term.

Box 2
Investment Incentives

A new incentive package was legislated in June 2012 to stimulate domestic and foreign investment in the face of a weak global economy and to encourage additional supply capacity in the tradable sector, which may help increase exports or reduce imports in coming years. It will be applied retrospectively to investments made from January 2012.

This new system is an extended version of the comprehensive existing incentive regime, which went through successive vintages in 2004, 2005 and 2009. In a nutshell, this system granted VAT and customs duty exemptions, employer social security contribution exemptions, corporate or personal income tax concessions and land grants and interest-rate subsidies to investment projects. Eligibility depended on region, sector and size:

- The region was the key criterion. Turkey's 26 NUTS 2 regions were combined into four groups based on economic and social development. Investments in the least developed group ("Level IV") received support of up to 45 per cent of their initial costs (calculated in nominal values by cumulating the corporate or personal income tax exemptions and social security contribution cuts received during the operational life cycle of a project, as a share of its initial cost). In the more developed group ("Level I"), investments received support of up to 25 per cent of their initial costs.
- Benefits were differentiated to a lesser extent between sectors and only a few sectors considered in excess supply were excluded.
- Finally, incentives were differentiated by investment size: large investments with initial costs above TL 50 million (€ 20 million) were granted additional corporate tax concessions.

The new regime legislated in June 2012 introduces certain additional features:

- As the earlier groupings were criticized for combining provinces with large development gaps, the new system distinguished six areas instead of four by clustering Turkey's 81 NUTS 3 provinces. Besides, the level of support has been raised.
- "Priority" sectors, which are considered to provide positive externalities for the rest of the economy, receive stronger incentives, irrespective of regional location. These sectors include tourism (investment in cultural and touristic preservation and development areas), mining, railroad and maritime transport, pharmaceuticals, defence (with a minimum investment of TL 20 million (€ 9 million)) and education. They receive the same degree of benefits as those granted in "Region 5" (the second most supported region).
- Newly defined "strategic" sectors will receive additional benefits. The government announced that the sectors where Turkey's dependence on imports is highest (where imports represent more than 50 per cent of domestic demand) will be eligible. Only projects generating more than 40 per cent of local value added will be supported.
- "Eligible forms of business organisation", which are expected to provide extra benefits to the economy, will also receive additional benefits. Eligible forms include joint investments between more than five partners (to promote clustering), investments undertaken in organised industrial zones, and mass production of innovative products developed in co-operation with the national science foundation (TUBITAK).
- Additional support will be granted to investments in the least developed region. Most importantly, employer and employee social security contributions and personal income taxes (up to a cap) will be exempted for 10 years, entirely eliminating the labour tax wedge during that period.

How far this new incentive regime will differ in practice from the earlier framework will depend to a large extent on the definition and scope of "strategic" sectors and their additional benefits relative to "non-strategic" sectors.

While data on household saving are not readily available as part of the national accounts, studies point to a pronounced decline in household saving between 2001 and 2008 (World Bank, 2012). Five main reasons can be identified: *i)* increased macroeconomic stability reduced precautionary motives for saving; *ii)* lower real interest rates; *iii)* improved income prospects; *iv)* better credit availability, in particular for lower-income households; and *v)* low and – in the first half of the 2000s – declining employment rates. While the first three explanations can be generally seen as welcome developments, the last two deserve further analysis.

Banking sector loans to the private sector had been very low in Turkey before the 2001 crisis. Private credit grew rapidly thereafter, even though it remains low compared to peer countries (Figure 5C and OECD, 2010). Better credit availability led to an increase in purchases of consumer durables (World Bank, 2012). Consumer loan growth bounced back after the crisis and reached a disquieting pace in the first half of 2011, mainly driven by personal finance loans (Figure 5D). This triggered measures by the Central Bank of the Republic of Turkey (CBRT) and the banking regulators (see below), which helped curb consumer loan growth. Non-performing consumer loan ratios of banks fell until the end of 2011 and remain low despite some deterioration since early 2012. Ratios of household interest payments to household disposable income have been falling since the crisis, to around 4.8 per cent by the end of 2011. Nevertheless, household financial liability-to-asset ratios have been increasing rapidly albeit from low levels, to around 46 per cent by the end of 2011 (CBRT, 2012a).

Household saving rates and income are closely correlated in Turkey (World Bank, 2012). Employment rates, in particular those of women, are traditionally low in Turkey and declined in the early 2000s, translating into a higher share of households that depend only on one income earner and thus reducing the saving potential. Moreover, migration from rural to urban areas increased the already large share of low-skilled in the population looking for work. Formal employment and income prospects for low-skilled deteriorated during the 2000s due to the competitive losses of formal labour-intensive industries (see above) and the growing skill demand in the economy. While part of the low-skilled were absorbed by the informal sector, a sizeable wage gap exists (Baskaya and Hülagü, 2011) and wage growth is on average lower. Given persistently high inflation this has held back real household income, with negative repercussions on the saving potential. Employment rates have been increasing rapidly since the crisis, though partly in the form of unpaid rural labour and in low-income activities. Increasing employment rates more durably and with a higher share in the formal sector is an important avenue to lift household income and saving.

There is room to channel existing household savings into more productive uses. A sizeable part of private savings are kept outside of the financial system (see below). This is consistent with the large errors and omissions line in the balance of payments, which tends to expand when external financing conditions worsen. The large share of the informal economy which increases demand for informal, unregistered and anonymous assets may be mainly responsible, but it may also reflect a lack of financial literacy. Additionally, households typically hold a higher share of savings in the form of non-financial assets. This is despite the fact that generally falling inflation and increased stability of the financial sector should have boosted demand for financial assets. A relatively limited choice of alternative saving instruments offered by banks and other financial

institutions may be part of the reason. The banking system and other financial institutions could thus help to enhance the productive allocation of long-term household savings by offering a wider variety of saving instruments.

Corporate saving is also low in Turkey, below that in other emerging markets (Bayoumi *et al*., 2010, World Bank, 2012). Corporate saving tends to be correlated with firm profits and GDP, and productivity growth might be the single most important factors influencing firm profits (André *et al*., 2007). The relatively low level of corporate saving in Turkey may also be related to the high share of small to medium-sized enterprises (SMEs) that mainly operate in the semi-formal and informal sector. These firms tend to operate below the optimal size to avoid costly administrative burdens and are constrained by limited access to external finance. Thus, policies that tackle the underlying causes of informality such as costly labour market regulations may increase corporate saving.

Firm profitability is also influenced by changes in the real exchange rate, but the effect depends on export- and import-intensities as well as net foreign exchange positions of firms through balance-sheet effects and therefore the economy-wide impact is ambiguous. The World Bank (2012), using Turkish firm-level data, shows that currency appreciations have reduced net profit margins and saving in large export-intensive firms. Yilmaz and Gönenç (2008) find that average profit margins of labour-intensive manufacturing sectors have been particularly squeezed due to the trend currency appreciation in the run-up to the financial crisis. However, non-tradable sectors tend to be positively affected by appreciation due to lower import prices. Moreover, net foreign exchange liability positions in the non-financial corporate sector are sizeable and have been rising sharply recently (see below) and Kesriyeli *et al.* (2011) report that real exchange rate appreciation boosts investment and profits for sectors with higher net foreign exchange liabilities in Turkey. Nevertheless, to the extent that tradable goods production is associated with greater technology and skill transfer from abroad than for non-tradables (Rodrik, 2006), a real-depreciation-induced shift from non-tradable to tradable production might improve economy-wide productivity growth and hence corporate saving.

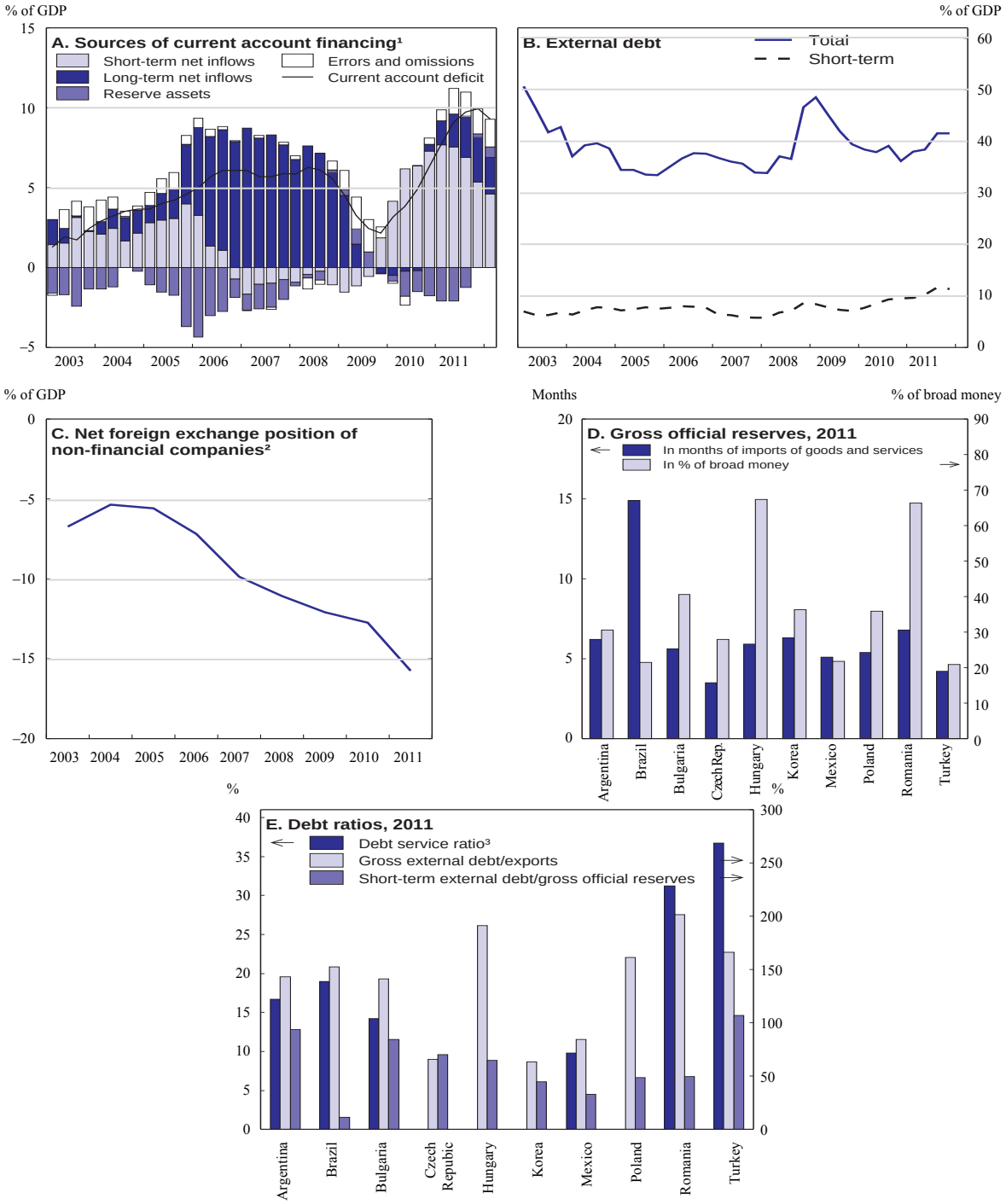
6 The financing structure of the current account weakened after the crisis

The sustainability of a country's current account deficit and its financial vulnerability are influenced by the composition of the inflows funding the external gap. Short-term loans and portfolio inflows are usually more prone to sudden reversal while long-term loans and foreign direct investment (FDI) inflows are regarded as more stable. Moreover, debt contracts require regular payments regardless of the borrowers' economic situation whereas equity and FDI inflows are largely state-contingent liabilities and are generally associated with technology and skill transfers.

Prior to the global crisis Turkey's growing current account deficit was largely financed by long-term loans and FDI inflows. However, FDI inflows were mainly directed towards non-tradable services sectors such as financial intermediation and transport, storage and communication, with limited potential to generate export revenues. The financing structure of Turkey's current account deficit changed dramatically after the crisis. Large short-term inflows from advanced economies, driven by the abundance of cheap money and carry-trade opportunities, have accounted for the bulk of inflows over the past two years (Figure 6A). In particular inflows into the government bond market and short-term loans, mainly channelled through the banking sector, increased sharply. Part of these inflows was absorbed through the build-up of reserve assets by the CBRT to contain currency appreciation. As concerns over the sovereign debt crisis in the euro area intensified and foreign banks started deleveraging in the second half of 2011, capital

Figure 6

The Financing of the Current Account Has Worsened After the Crisis



1) Rolling 4-quarter sum as a percentage of moving average GDP. Short-term inflows refer to the sum of portfolio investment and short-term other investment net inflows. Long-term inflows refer to the sum of FDI and long-term other investment net inflows. GDP data for 2012Q1 is projected.
2) Difference between the foreign-currency-denominated assets and liabilities.
3) Total debt service payments in per cent of exports of goods and services. Data for 2010.
Source: IMF, *International Financial Statistics*; OECD, *OECD Economic Outlook Database*; Undersecretariat of Treasury; Central Bank of the Republic of Turkey; World Bank, *Global Development Finance and Quarterly External Debt Statistics/SDDS*.

Table 1

Indicators of External Financing Structure

	2002Q4	2007Q4	2012Q1
Debt bias[1]	87.7%	51.7%	56.6%
Short-term debt[2]	10.1%	11.4%	14.0%
Currency mismatch[3]	–27.2%	–9.0%	–14.4%
Reserve assets *(percent of GDP)*	11.4%	10.3%	11.6%

1 Debt in percent of total liabilities.
2 Short-term liabilities to BIS banks (consolidated) in percent of total liabilities.
3 Difference between foreign currency denominated assets and liabilities as a share of GDP. All foreign assets are assumed to be denominated in foreign currency, whereas FDI and portfolio equity liabilities are assumed to be denominated in domestic currency.
Source: Central Bank of the Republic of Turkey; World Bank, IMF, BIS, OECD Joint External Debt Hub; Undersecretary of Treasury; OECD, *OECD Economic Outlook Database*.

inflows slowed markedly. The resulting financing gap was partly closed by a drawing down of foreign assets by domestic banks and sales of foreign exchange reserves by the CBRT. Besides official flows, unrecorded exports and capital inflows captured in the balance of payments' net errors and omissions funded around one sixth of the current account gap in 2011.[3] However, over the course of 2011 and into 2012 the financing side of the current account showed signs of improvement and FDI inflows increased markedly, rising from US$ 9 billion in 2010 to US$ 15.9 billion in 2011.

As the financing structure of the current account worsened, the external debt trended upwards again after the crisis, mainly driven by short-term liabilities (Figure 6B). Research generally shows a positive relationship between external debt (and in particular short-term debt) and the probability of financial crisis.[4] These results are confirmed by recent OECD analysis looking at the relationship between the composition of external assets and liabilities and the likelihood of banking crisis and contagion risk (Ahrend and Goujard, 2011). This study finds that debt bias (the share of debt in total liabilities), short-term bank debt – mainly through increased contagion risk – and currency mismatch between external assets and liabilities are positively related to the risk of financial crisis. Compared to the situation prior to the crisis, Turkey's position with respect to all three indicators has deteriorated (Table 1). In addition, the currency mismatch measure might underestimate Turkey's true exposure to a sudden and sharp depreciation as foreign currency loans by domestic banks are not included. About 30 per cent of total loans to the non-financial sector are denominated in foreign currency (CBRT, 2011). Taking these loans into account, the net foreign currency liability exposure of the non-financial corporate sector was about $125 billion (16 per cent of GDP) in the first quarter of 2012 (Figure 6C), pointing to significant vulnerability to an exchange rate shock. Besides, the net foreign currency exposure of the public sector stands at about 6 per cent of GDP, whereas the CBRT and the household sector hold long positions in foreign currency of about 7 and 8 per cent, respectively. The financial sector's net exposure is close to zero (CBRT, 2011). Reserve assets reduce the probability of a financial crisis

3 Theses flows are usually attributed to "under-the-mattress" savings, unofficial exports mainly to neighbouring economies, unrecorded tourism income and capital inflows related to the restructuring of public receivables (JP Morgan, 2011) or to political instability in the MENA region.

4 See, e.g., Radelet and Sachs (1998), Rodrik and Velasco (1999) and Rogoff (1999, 2011). Moreover Blanchard, Das and Faruquee (2010) show a positive correlation between short-term debt and output losses in emerging markets during the crisis.

according to the OECD study, albeit with decreasing marginal effectiveness. Reserve assets increased somewhat after the crisis but official reserves are somewhat lower than peer economies' in terms of months of imports of goods and services and as a share of broad money and short-term debt (Figure 6D).

7 How does the current account deficit compare to benchmarks?

An important question is to what extent Turkey's current account deficit is excessive. To explore this issue, one needs to establish benchmarks. Two standard ways of doing so are to look at the sustainability of the net external asset position or to estimate equations which relate the current account in the medium term to fundamental determinants of saving and investment. Results from both approaches are described below and details can be found in Röhn (2012.)

7.1 External sustainability approach

The external sustainability approach rests on simple accounting, using balance of payments identities. The derived current account benchmark ensures that the net foreign asset position remains stable at some (arbitrary) level. A standard choice for this level is the currently observed net foreign asset position. Besides the level, this approach only requires assumptions about real GDP growth and inflation. Calculations of this sort show that, assuming 5 per cent real GDP growth and inflation (measured by the GDP deflator), similar to the assumptions in Turkey's 2012-14 Medium Term Programme, a stable net foreign asset position at the current level (2012Q1) of minus 48 per cent of GDP is consistent with a current account deficit of 5.4 per cent of GDP.[5] This is well below recently observed levels. Even if real GDP growth of 7 per cent is assumed, the stabilising current account deficit would move only to 6.3 per cent of GDP.

Alternatively, it might be more relevant to consider stabilising the gross external debt position as FDI and other equity liabilities are generally not considered to compromise sustainability. In this case it is necessary to adjust the current account for non-debt-creating flows. Under the baseline of 5 per cent real GDP growth and inflation, stability of the gross external debt ratio at the latest observed level of 40 per cent (2012Q1) of GDP is obtained with an adjusted current account deficit of 4.7 per cent of GDP compared with an observed deficit of 6.3 per cent in 2012Q1. Under the alternative assumption of 7 per cent real GDP growth, the benchmark would be 5.4 per cent of GDP.

7.2 Macroeconomic balance approach

Estimations relating the current account to fundamental determinants of saving and investment show that its deterioration after 2001 can be partly explained by higher net oil imports, strong credit growth and a worsening of the terms-of-trade and of the net asset position. Based on assumptions about medium-term values for all saving and investment determinants, estimates of current account norms range between 3 and 4 per cent of GDP depending on the exact empirical specification.[6] This is broadly in line with previous findings for Turkey, which are in the range of

---

[5] All calculations in this section assume a contribution of net errors and omissions to the financing of the current account deficit of 1 per cent of GDP, consistent with historical averages.

[6] The notion of a current account norm is somewhat misleading as some determinants entering the estimations are "undesirable" fundamentals such as the oil import bill and the fiscal deficit. Thus, all else equal, a more energy inefficient economy or spendthrift

(continues)

2.5-5 per cent of GDP (IMF, 2010, Bussière *et al.,* 2010, Medina *et al.,* 2010). The analysis, however, also shows that saving and investment determinants only explain a small part of the deterioration after 2001. The difference between the estimated and actual current account appears to partly reflect real exchange rate appreciation and hence competitiveness losses as well as differences in the cyclical position between Turkey and the rest of the world.

8 Policy options to reduce the current account deficit and inflation

8.1 Monetary policy

Like many other emerging economies with an open capital account, Turkey faces the complex task of taming inflationary pressures without attracting surges in short-term capital inflows. On the one hand, these inflows fuel domestic credit growth, thereby counteracting the intended monetary tightening. On the other hand, they push up the exchange rate, hampering competitiveness. Striking the right balance in the face of this "impossible trinity" – or "trilemma" – remains the key challenge for Turkey's monetary policy in the short to medium term.

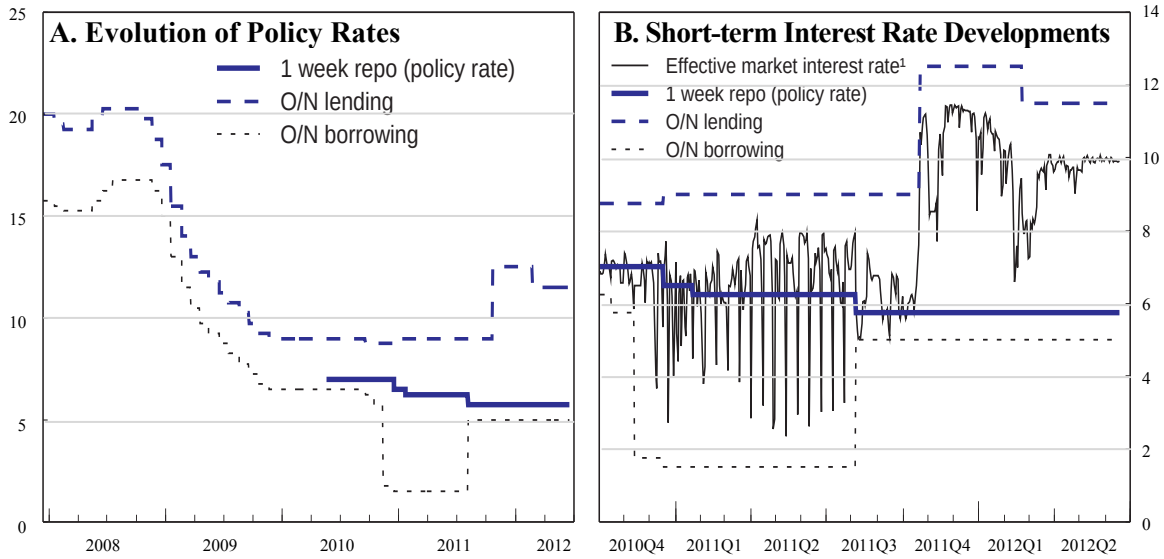
Between the crises of 2001 and 2008-09, monetary policy developed gradually into a fully-fledged inflation targeting framework with the short-term interest rate as the main policy instrument (OECD, 2008). In order to reduce high inflation and improve credibility, the CBRT kept real interest rates high in international comparison. This brought down annual inflation from above 70 per cent to below 10 per cent between 2001 and 2005. However, high real interest rates, together with reforms to strengthen the resilience of the banking sector and structural reform progress in other areas, attracted strong capital inflows, fuelling real exchange rate appreciation, despite a substantial build-up in foreign reserves. This approach therefore entailed competitiveness losses and a widening current account deficit. In effect, in dealing with the trilemma, Turkey moved towards higher monetary independence and capital openness at the expense of exchange rate stability (Cortuk and Singh, 2011).

In late 2010, Turkey's monetary policy shifted towards a more unorthodox mix, putting more weight on exchange rate developments, credit growth and rebalancing of demand. Faced with short-term capital inflows and accelerating credit, the CBRT first responded with sterilised foreign exchange purchases to stem nominal appreciation and then with hikes in unremunerated reserve requirements differentiated by maturity and currency denomination. The policy rate (the one-week repo rate, which became the policy rate in May 2010) was not raised but the interest rate corridor (difference between overnight (O/N) borrowing and lending rates) was widened by lowering the borrowing rate with the aim to increase interest rate volatility at the lower end so as to discourage short-term inflows (Figure 7). Credit decelerated more markedly after measures were taken by the banking regulator and supervisor (BRSA) in June 2011 (see below) and capital inflows abated due to heightened global financial turmoil. In August the policy stance shifted in the wake of a sharply depreciated nominal exchange rate and some evidence of a domestic slowdown. The policy rate was cut from 6.25 to 5.75 per cent, the interest corridor narrowed, reserve requirements on foreign exchange deposits lowered and the CBRT engaged directly in foreign exchange sales, leading reserve assets to fall by about $7 billion between July and October. Faced with sharply rising inflation, which was partly due to pass-through effects from the nominal deprecation of the lira, the CBRT changed gear once again in October. The O/N lending rate was raised to 12.5 per cent and the CBRT repeatedly provided less liquidity through the one-week repo facility, which caused the market rate to jump. This tighter monetary policy stance was broadly maintained until mid-2012,

government would imply a lower norm for the current account balance. Norm estimates therefore rather summarise average current account tendencies given reasonable assumptions about medium-term developments of the fundamentals.

Figure 7

A New Monetary Policy Regime
(percent)



1) Overnight repo rate at the Istanbul Stock Exchange.
Source: Central Bank of Republic of Turkey.

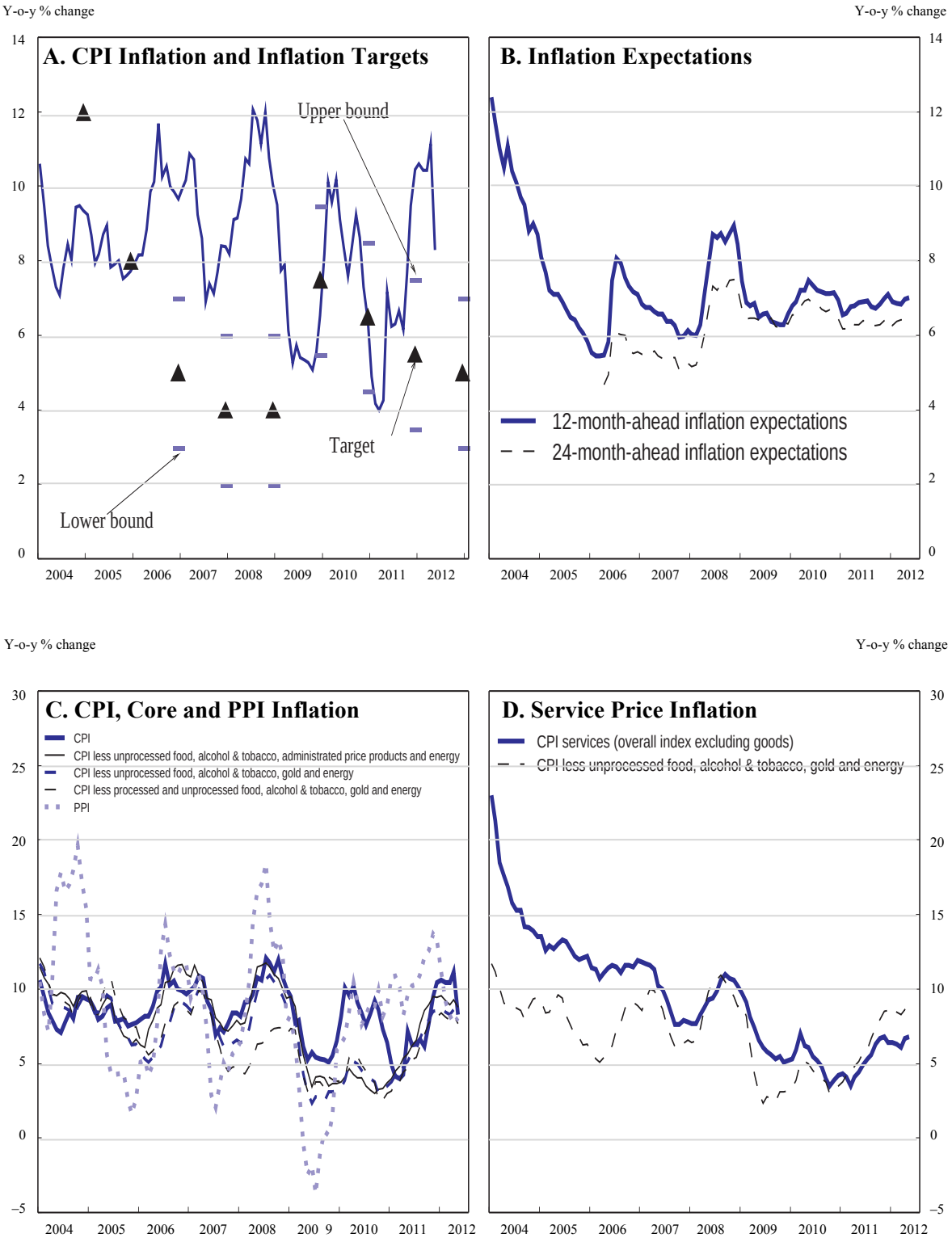
despite a mostly technical cut of the O/N lending rate to 11.5 per cent in late February 2012. With inflation declining, the CBRT allowed the market rate to fall to about 6 per cent since then but kept the main parameters of the monetary regime unchanged.

The unconventional monetary policy mix undertaken by the CBRT has to be seen against the backdrop of the constrained environment under which monetary policy is operating and of recent policy discussions about a broader set of monetary policy objectives besides price stability (Blanchard *et al.*, 2010), including an exchange rate goal in the case of emerging economies (Ostry *et al*., 2012). However, the early record of the new policy regime is mixed. On the positive side, it has contributed to the necessary depreciation of the Turkish lira, in particular between end-2010 and mid-2011, while helping to contain exchange rate volatility. This in turn has facilitated the ongoing rebalancing of growth from domestic to external demand.

However, the policy mix did not deliver low and stable inflation. After falling to a historic low of 3.99 per cent in March 2011, consumer price inflation rose sharply and reached 10.4 per cent in December 2011, far above the CBRT's (time-varying) 5.5±2 per cent target, and remained in high in the first half of 2012 (Figure 8A). The CBRT estimates that tax hikes on tobacco products contributed 1.1 percentage points and unprocessed food prices added another 2 percentage points to end-year inflation, although part of the latter should be considered as a contribution to trend inflation. Sizeable adjustments in administered prices, mostly for energy, in October 2011, also fuelled inflation. Core inflation, however, also started to veer up in late 2010 and exceeded 8 per cent by early 2012 (Figure 8C). The CBRT estimates that increased import prices (in foreign currency), notably for energy, and sharp nominal depreciation have contributed a further 5 percentage points to the inflation surge in 2011. Spare capacity, at the same time, was rapidly diminishing and could not mitigate these pressures.

Figure 8

Inflation Dynamics



Source: Central Bank of Republic of Turkey; OECD, *OECD Economic Outlook Database* and Eurostat.

Inflation expectations also remain well above the target. After falling steadily between 2002 and 2005, inflation expectations became more volatile, partly due to repeated overshooting of inflation targets. Since 2010, 12- and 24-month-ahead inflation expectations have stabilised, but above the CBRT's inflation forecast and well above the mid-point of its inflation target (Figure 8B). The CBRT began to set point inflation targets in 2002 and then in 2006 it shifted towards a fully-fledged inflation targeting regime with a medium-term mid-point target and a ±2 per cent uncertainty band. The inflation target, however, has been breached every year since 2006 except in 2009 and 2010, when the mid-point of the target was temporarily raised to 7.5 and 6.5 per cent respectively from a previously constant 4 per cent. This has likely contributed to pushing up inflation expectations.

Indeed, empirical analysis conducted for this paper (see Annex 2) suggests that inflation expectations are shaped by: *i)* past inflation; *ii)* the inflation target; *iii)* the exchange rate (through anticipated pass-through effects); *iv)* demand conditions; and *v)* risk perceptions, partly reflecting the fiscal position and stance. Over the entire January 2003 - April 2012 sample period, the inflation target appears to have a stronger impact on expectations than past inflation. However, the anchoring power of the inflation target appears to have weakened lately. Overall this indicates that to avoid unpleasant feedback loops from inflation expectations to actual inflation, actual inflation needs to align more closely with the target.

Moreover, persistent inflation differentials with trading partners can erode competitiveness, as they might not be fully compensated by exchange rate depreciation. In any case, chronic depreciation can undermine confidence. Monetary policy's overarching goal should thus remain the reduction of the inflation rate towards its target and eventually towards the levels observed in its main trading partners. To this end, it might be advisable to lower inflation targets in the medium term. For the years 2012, 2013 and 2014 the mid-point of the inflation target has been set at 5 per cent, well above other OECD countries, where it is usually around 1 per cent to 3 per cent. The CBRT (2009) argues that *inter alia* structural rigidities, the EU convergence process[7] and measurement problems in price indices related to rapid quality improvements[8] justify a higher target in Turkey. However, as structural rigidities and convergence effects decline over time and better measurement tools to appropriately capture quality improvements could be developed, a lower inflation target seems achievable in the medium term.

In addition, the complexity of the new regime has given rise to concerns that multiple goals may have reduced the transparency of monetary policy for market participants.[9] Therefore, stronger communication on the fundamental goals of the new regime and the link between instruments and goals appears advisable. Finally, increased market interest rate volatility, while having helped to deter short-term capital inflows, may be detrimental to investment and may complicate the formation of interest rate expectations which feed into inflation expectations.

Since October 2011 the CBRT appears to have put more weight again on the inflation target and responded to the surge in inflation with a considerable tightening of its monetary stance. Nevertheless, it continues to view the flexibility provided by the new monetary framework as appropriate given that heightened global uncertainty is likely to persist over the medium term and

---

7 Inflation differentials *vis-à-vis* the EU cannot be explained by faster productivity catch-up in the tradable relative to the non-tradable sector in Turkey as would be suggested by the Balassa-Samuelson hypothesis (Lopcu *et al*., 2012). However, the harmonisation of regulations with the EU does foster price level convergence.

8 Arslan and Ceritoglu (2011) estimate that over 2003-09 about 2.3 percentage points of measured annual consumer price inflation actually correspond to quality improvements.

9 In a March 2012 Survey of domestic and foreign investors, 30 per cent said that the predictability of the CBRT's actions had diminished recently, while 24 per cent found that it had increased and 46 per cent that it had not changed; 46 per cent felt that the CBRT was sufficiently focused on its inflation objective, whereas 48 per cent said this was not the case; and 50 per cent said that CBRT actions would be sufficient to deliver price stability, against 32 per cent who disagreed (Bloomberg HT, 2012).

Turkey will continue to face capital flow cycles challenging the conduct of monetary policy. Going forward the monetary authorities expect inflation to gradually fall to about 6.2 per cent by end-2012, within the target band but still above the target mid-point of 5 per cent (CBRT, 2012b). The CBRT sees inflation further abating towards 5 per cent by end-2013. The CBRT has indicated that it might induce tightening if the inflation outlook worsens (CBRT, 2012b). To this end it might be necessary to raise the one-week repo rate and to narrow the interest rate corridor by lifting the O/N borrowing rate, provided that domestic economic conditions do not worsen significantly. Once disinflation is on track, the remaining room for manoeuvre should be used to ensure that the real exchange rate stays on a sustainable path and does not depreciate or appreciate excessively. In the event of large capital inflows, sterilised interventions should be used to avoid excessive appreciation, thereby building up reserve assets – which are comparatively low – and helping to mitigate the trilemma trade-offs (Cortuk and Singh, 2011).

Box 3
Monetary Policy Recommendations

- Attaining the inflation target should be given more prominence to bring inflation expectations closer to the target, and, over time, reduce inflation differentials with trading partners.
- During capital inflow surges, appreciation pressures should be countered by sterilised intervention. This would appropriately increase foreign exchange reserves.
- Communication on the fundamental goals of the new regime and the link between instruments and goals should be strengthened. The success of the instruments in achieving these goals should be evaluated.
- Aim to move inflation targets closer to trading partners' in the medium term.

8.2 Financial market policy

Capital inflows have been mainly channelled through the banking sector in Turkey after the crisis, raising the risks of excessively rapid balance sheet expansion and credit growth. Leverage ratios have been increasing after the crisis, but remain low in international comparisons. Turkey has made remarkable progress in reforming its banking sector since 2001, with strong banking regulation and supervision in place. This progress should be consolidated and further enhanced and the authorities have been addressing these risks with both traditional micro-prudential and newly developed macro-prudential tools.

Both sets of tools should continue to be used to manage capital-inflow-driven credit growth cycles, necessitating close cooperation between monetary and financial market authorities to ensure that measures are employed in a coherent manner. The establishment in June 2011 of the Financial Stability Committee (FSC) – which comprises the CBRT, the BRSA, the Undersecretariat of Treasury, the Saving and Deposit Insurance Fund and the Capital Market Board – is a welcome step in this direction, given that the independence of participating institutions is not compromised. The main aim of the FSC is to detect and contain systemic risk in the financial sector.

The robustness of Turkish banks' balance sheets was well preserved during and after the global crisis. Yet, banks' short-term foreign exchange debt rose markedly and their capital ratios declined. The maturity of banks' foreign obligations remains relatively long but declined from an average of 4 years at the end of 2007 to 3.5 years at the end of 2011. Non-financial firms also accumulated sizeable additional foreign currency exposure (see above). In an interim assessment, the ongoing Financial Sector Assessment Programme (FSAP) review of Turkey suggests that banks' capital buffers are sufficient to absorb a short-lived macroeconomic shock, but that strains would be much greater if the shock were protracted (IMF, 2012).

According to the Turkish authorities, however, the sector remains well capitalised and resilient to all reasonable shock scenarios. They nonetheless started to act to increase capital adequacy ratios by limiting dividend pay-outs, and are phasing in new capital charges for maturity mismatches (applicable from July 2012). New regulations on credit risk management are also being prepared and the authorities re-confirmed their intentions to comply with Basel II guidelines in the course of 2012. Work has also started to converge with Basel III.

In June 2011 the BRSA imposed loan-to-value ceilings on housing, commercial and real-estate loans, rescinded the crisis-era easing of prudential standards on loan restructuring and provisioning (after the one-year extension decided in early 2010), and raised further provisioning requirements and risk weights on loans, together with tighter conditions for the use of credit cards. These measures helped bring credit growth back to more sustainable levels and below the 20 to 25 per cent target. Going forward, monitoring of credit quality risk remains key. Further extensions of credit instruments, in particular those targeted at low-income groups, should be monitored closely.[10]

Micro- and macro-prudential policies may have limitations when surges in capital inflows are channelled through the non-financial corporate sector. In this case temporary and targeted capital controls, provided they are in line with the provisions of the *OECD Code of Liberalisation of Capital Movements*, could be considered as an option. While their effectiveness to influence the level of inflows is controversial, well-targeted capital controls can affect the composition of flows towards longer-term maturities or towards "safer" inflows such as FDI and equity inflows (OECD, 2012b and below). Direct capital controls have not been favoured by the authorities to date. In fact, they would conflict with the long-term goal of promoting Istanbul as an international financial centre.

Box 4
Financial Policy Recommendations

- As planned, comply fully with Basel II banking supervision guidelines and converge in due course with Basel III guidelines.
- Continue to evaluate countercyclical financial policy measures which have the strongest leverage on aggregate demand, and focus on those.
- Closely monitor the cross-border funding of the non-financial corporate sector and, if and when capital inflows attain a pace incompatible with financial stability, as a last resort

[10] Research suggests that periods of strong credit growth are associated with a higher probability of financial crisis (OECD, 2012b, Kaminsky and Reinhart, 1999, Schularick and Taylor, 2012) especially if they involve a loosening of credit standards to risky clients (Mendoza and Terrones, 2008).

consider introducing temporary and targeted capital controls, provided they are in line with the provisions of the OECD's *Code of Liberalisation of Capital Movements*.

- Continue to administer regular banking stress tests, taking into account the full set of conceivable global and domestic shocks, including extreme scenarios of international turbulences and sudden stops.

8.3 Fiscal policy

The general government balance increased markedly between 2002 and 2006. After the counter-cyclical fiscal stimulus provided during the 2008/09 financial crisis, headline deficits shrank from 6 per cent of GDP in 2009 to 2.1 per cent in 2011, according to the latest Pre-accession Economic Programme estimate submitted to the European Commission, which approximates international standards (Government of Turkey, 2012), or 1 per cent of GDP according to the Medium-Term Programme (MTP), which includes privatisation and one-off revenues (Table 2). The outturn in 2011 was better than in the authorities' MTP, thanks to stronger-than-expected GDP growth and one-off factors. The improvement mainly stemmed from reduced interest payments, strong increases in VAT income, tax hikes on certain imported goods, as well as one-off revenues related to a comprehensive tax amnesty programme. While general government spending decreased as a share of GDP, primary expenditures remained about 3 percentage points of GDP above pre-crisis levels, mainly reflecting higher appropriations for personnel, transfers to social security institutions and capital expenditures. The IMF recently estimated a structural deficit accounting *inter alia* for transient revenues due to cyclical import growth as well as one-offs related to exceptional bank profits and the tax amnesty (IMF, 2012). The results suggest that the primary structural balance deteriorated since the mid-2000s and stood at –1 per cent of GDP in 2011. However, given a low public debt ratio, fiscal sustainability is not jeopardised at current levels of the structural primary balance.

The present fiscal stance is broadly appropriate and should remain tight. Given the trilemma faced by monetary policy, fiscal policy may need to play a more active countercyclical role and additional discretionary tightening may be required. In particular, in cyclical upturns such a tighter stance would restrain domestic demand and hence inflationary pressures and allow the CBRT to keep the interest rate lower than otherwise, thereby containing interest-rate-elastic capital inflows. This would also allow building up sufficient buffers to counteract a possible capital flow reversal and provide a further impetus to domestic saving.[11] A particular focus should be on expenditure restraint, and a multi-year spending ceiling could help preserve a tight fiscal stance in case of revenue surprises.

The power of fiscal action should, however, not be exaggerated. The general government sector is relatively small and so are fiscal multipliers (general government primary expenditures are about 33 per cent of GDP (OECD, 2010)). Fiscal restraint can therefore only partly compensate for private sector exuberance, especially during periods of strong capital inflows. In addition, over the longer run spending needs remain large in areas such as education, social services and physical infrastructure and room needs to be created for such additional spending through savings in existing expenditures (OECD, 2008). The ongoing shift to performance-based budgeting should

[11] Ricardian equivalence, which suggests that changes in public saving will be offset by changes in private saving, does not seem to hold for Turkey (Akbostanci and Tunc, 2001, World Bank, 2012), in line with research for other OECD countries (e.g., Röhn, 2010).

Table 2

General Government Balances
(Authorities' estimates, percent of GDP)

Year	Output Gap[1]	General Government Balance		Primary General Government Balance	
		Actual	Structural[2]	Actual	Structural[2]
1999	–1.6	–10.0	–9.6	1.3	1.5
2000	1.5	–9.9	–10.3	3.2	2.9
2001	–7.8	–12.6	–9.5	4.9	6.7
2002	–5.9	–11.8	–9.2	3.5	5.2
2003	–5.0	–8.4	–6.7	4.9	5.9
2004	–0.6	–4.4	–4.5	5.9	5.8
2005	3.0	–0.8	–1.8	6.4	5.6
2006	5.4	–0.4	–2.0	5.8	4.5
2007	5.6	–1.7	–3.5	4.2	2.7
2008	1.8	–2.5	–3.0	2.9	2.5
2009	–7.2	–6.0	–3.6	–0.3	1.7
2010	–3.1	–3.3	–2.3	1.2	2.1
2011	–0.3	–2.1	–2.0	1.4	1.4
2012	–0.8	–2.0	–1.8	1.7	1.9
2013	–0.2	–1.7	–1.6	1.8	1.9
2014	0.4	–1.1	–1.2	2.2	2.1

1 Percentage difference from potential GDP as estimated by the Ministry of Development.
2 As a ratio of potential GDP.
Source: Government of Turkey (2012).

help identify and exploit latent efficiency gains. At the same time, tax collection is improving and extra revenues can be expected if further progress is made in the formalisation of the economy and these revenues should be saved. Hence fiscal prudence is in order, lest the authorities find themselves forced to pro-cyclically tighten the fiscal stance in a possible cyclical downturn.

In this context, it is crucial to preserve a prudent fiscal stance which takes into account the full range of cyclical budget items. The new methodological approach suggested by the IMF is an interesting step in that direction. While the authorities have reservations regarding some aspects of this methodology and note that there is no agreement in the literature on how to calculate the structural fiscal balance and transient revenues (IMF, 2012), there is no alternative, comprehensive,

official Turkish estimate of the cyclical component of fiscal balances. In addition to monitoring general government accounts according to international standards, progress in this area would require further technical investigations. A *Fiscal Policy Report* (similar to the central bank's *Inflation Report*) encompassing all quasi-fiscal institutions and containing a full set of cyclical adjustments could be published to improve fiscal transparency. In a subsequent step, although the Medium-Term Programme provides an anchor for fiscal policy, the introduction of a permanent fiscal rule could be considered, drawing on earlier government efforts to develop a quantitative fiscal rule permitting the operation of automatic stabilisers (see OECD, 2010). An independent Fiscal Council, along the lines of those existing in a number of OECD countries, could be established to carry out these tasks.

In this context, Turkey's enduring shortcomings in fiscal transparency according to international standards should be remedied. Fiscal accounts at the general government level are not yet timely (OECD, 2010). Although welcome progress has been made on the major components of these accounts, notably through direct data reporting by local governments and social security institutions to the central government, standard general government accounts become available only with very long lags and are not yet fully compliant with international standards (OECD, 2010). Different general government accounting methodologies continue to be used across economic agencies. The financial balances and debt of a range of quasi-fiscal institutions are also not yet part of a systematic monitoring and reporting system. The prospective financial costs of the expanding social security system also call for close scrutiny, against alternative scenarios of growth, employment, revenue collection and pension and health spending. Such scrutiny is particularly important as the ongoing demographic window will close in about a decade, and the old-age dependency ratio will start to increase rapidly, entailing growing ageing costs.

Box 5
Fiscal Policy Recommendations

- The present fiscal stance is broadly appropriate and it should remain tight, not least to preserve room for action were the world economy to weaken. If warranted, stand ready to tighten the fiscal stance more.
- Long-term financial balances of the social security system should be investigated with the help of alternative scenarios of growth, employment, revenue collection, and pension and health spending.
- Improve fiscal data at general government level, on a unified accounting basis according to international standards. Publish these accounts at quarterly frequency.
- Adopt a general government spending ceiling within a longer-term fiscal framework. This would help avoid pro-cyclical loosening in case of positive revenue surprises.
- Publish a regular Fiscal Policy Report (similar in format to the central bank's Inflation Report) encompassing all major quasi-fiscal institutions and containing a full set of cyclical adjustments.
- An independent fiscal council could be established, in line with OECD best practices. It could monitor fiscal performance, participate in the design of a fiscal framework, develop alternative methodologies for estimating the cyclical sensitivity of revenues and publish the Fiscal Policy Report.

8.4 Policies to increase household saving and to channel them into productive uses

While the single most important reform area to increase household saving is to increase labour force participation and employment in the formal sector (Gönenç *et al*., 2012), other policies can help increase the level of savings or channel existing savings into the financial system and hence allocate them to productive investment.

Awareness of the need to save for the future appears low in Turkey and most savings are either held outside of the financial system in low-yielding investments (gold, jewellery, "under the mattress"), in real estate, including secondary residences, or in a limited variety of financial products (deposits, government securities) (World Bank, 2012). Informality is likely to be one of the key reasons for holding savings outside the financial sector. Thus, reducing informality would also contribute to an increased channelling of household (and corporate) savings through the well-developed banking sector, as demand for informal, unregistered and anonymous assets would be reduced. But raising awareness of the benefits of saving and improving financial literacy can also have important benefits (van Rooij *et al*., 2012). In this context, the CBRT has recently progressively raised the share of gold that may be held to meet Turkish Lira reserve requirements from 10 to 30 per cent, providing additional incentives for banks to channel household gold savings into the financial sector.

In addition, remaining tax distortions between different investment vehicles should be eliminated. Until recently investment in mutual funds and exchange traded funds was subject to a withholding tax whereas investment in individual stocks is tax free. This created disincentives both for suppliers of funds to increase product variety and for investors with insufficient knowledge to invest in individual stocks to participate in the stock market through mutual or exchange traded funds. In May 2012, a government decree was passed which exempts mutual funds with an equity share above 75 per cent from the withholding tax.

A voluntary private pension saving scheme was established in 2003 and has grown rapidly since, but it is still small as a share of GDP compared to other OECD countries. It is characterised by a relatively high rate of early withdrawals, high operational costs (probably due to still insufficient economies of scale), and portfolios highly skewed towards government bonds. Until recently a tax credit was granted, but in June 2012 the government legislated that this tax incentive will be replaced by a direct government contribution to the pension scheme of 25 per cent, capped the annual gross minimum wage. Since this incentive is independent from declared household income, the new system has a higher coverage and the authorities expect a considerable boost to household saving. Saving could also be raised through other tax-preferred mandatory or voluntary private saving schemes unrelated to pensions such as education-savings accounts and life insurance contracts. OECD research (OECD, 2007) shows that tax-preferred saving accounts can create additional saving but the efficiency of the system crucially depends on the participation of middle-income households. The potential to generate additional saving should in both cases be weighed against fiscal costs. Moreover, retirement benefit reform can boost private saving (Attanasio and Brugiavini, 2003). In Turkey early retirement benefits should be made more actuarially neutral and health insurance contributions for early retirees could be introduced (OECD, 2012a). However this effect is likely to be temporary as in the long run, the additional amount saved during the working period should at least partly be offset by lower saving in retirement (Kerdrain *et al*., 2010).

In this context, it would be useful to publish household accounts as part of the National Accounts on a timely basis and in line with international accounting standards. This would increase transparency, facilitate a better monitoring of household saving behaviour and help analyse the success of particular reform efforts.

8.5 Policies to improve the financing of the current account and decrease financial vulnerability

Recent OECD work (OECD, 2012b) investigated how structural policies can improve the financing structure of the current account and thereby reduce the risk of financial crisis. Findings relevant for Turkey suggest that:

- Restrictive regulations on FDI and more generally strict product market regulations increase financial vulnerability through a bias towards external debt. A previous *Economic Survey* (OECD, 2008) and recent OECD research (Kalinova *et al*., 2010) show that Turkey has made considerable progress in reducing formal restrictions on FDI inflows. According to the OECD FDI restrictiveness indicator, Turkey's legislation is less restrictive than the OECD average and much less so compared to non-OECD countries. Some room for improvement exists in reducing foreign equity limits, and restricted sectors include transport, media, business services and in particular the real estate sector. A larger effect on FDI inflows is likely to result if the overall business environment and product market regulations are improved. Moreover, reforms that strengthen the competitiveness of the tradable sector are likely to attract more FDI inflows into this sector thereby generating export revenues or reducing import bills.
- Tax systems that favour debt over equity finance bias corporate financing towards debt, including external debt through higher tax deductibility of interest payments compared to dividends or capital gains. High corporate income tax (CIT) rates could also discourage FDI inflows. In Turkey, the CIT rate has been lowered from 30 to 20 per cent in 2006 and is below the OECD average. A further shift away from CIT towards indirect taxes, while generally also associated with growth-enhancing effects (Arnold, 2008), appears difficult in Turkey's current circumstances, given the already heavy bias of tax revenues towards indirect taxes.
- While there is some evidence that stricter domestic banking supervision increases borrowing from foreign banks including short-term borrowing by taking advantage of regulatory arbitrage, overall stricter financial oversight is found to reduce investor-sentiment driven capital flow reversals. In addition, a less leveraged banking sector and lower credit/deposit ratios would reduce the risk of contagion-driven crises. More transparent financial markets are less affected by capital outflows in response to investor-sentiment driven capital flow reversals. Turkey scores well compared to other OECD and emerging countries in all of these indicators. However, capital adequacy ratios have been trending down and credit-to-deposit ratios increased after the crisis. These developments need to be monitored closely and the recent measures to increase capital adequacy ratios are welcome.
- While there is only weak evidence that capital controls can influence the level of inflows, strong evidence exists that differentiated capital controls can influence the structure of external liabilities. In particular, the OECD study finds that introducing restrictions on inflows from credit operations while removing them from FDI and equity inflows may reduce external bank debt by as much as 20 percentage points as a share of GDP. Such an approach would also likely improve the currency mismatch in the liabilities position as debt liabilities are often denominated in foreign currency in emerging markets while FDI and equity liabilities are denominated in domestic currency. Capital controls on credit operations may come at the price of distorting competition between domestic and foreign banks and thus macro-prudential measures might be preferable. The effectiveness of capital controls versus macro-prudential measures is likely to depend on whether capital inflows are driven by domestic (pull) factors or external (push) factors. Macro-prudential measures are likely to be more effective in the case of pull factors. While the Turkish authorities are committed to an open capital account, temporary and transparent capital controls, provided they are in line with the provisions of the *OECD Code of Liberalisation of Capital Movements*, might be worth considering in the event that a surge in short-term capital inflows threatens financial stability and if other policy instruments have been fully exhausted.

Box 6
Structural Policy Recommendations

- Raise awareness of the benefits of saving for retirement and step up initiatives to increase financial literacy. Reduce further tax distortions between different saving vehicles and consider the introduction of other tax-preferred saving accounts.
- Publish household accounts as part of the National Accounts on a timely basis and in line with international accounting standards and monitor and analyse the saving behaviour of different income groups.
- Strengthen incentives for FDI investment, in particular in the tradable sector, mainly through further improvements in external competitiveness and the business environment.

9 Conclusions

Turkey's growth performance over the past decade has been strong. However, it has increasingly drawn on foreign saving on the back of competitiveness losses, so that convergence to high-income countries may be interrupted by a slowdown in capital inflows. At the same time, inflation, while falling substantially in the early 2000s, has frequently overshot targets since 2006. Putting the growth process on a more balanced and sustainable path requires concerted economic policies. Monetary policy needs to strike a balance between steering inflation down without exacerbating short-term capital inflows. Fiscal and financial policies need to back monetary policy more resolutely when the economy shows signs of overheating. Structural reforms supporting macroeconomic policies are indispensable to durably improve competitiveness and private saving and can help bring down inflation (Gönenç *et al*., 2012). In addition, policy efforts are required to channel existing savings into more productive uses and improve the financing structure of the current account.

ANNEX 1
THE REAL EXCHANGE RATE AND THE CURRENT ACCOUNT

Real exchange rate changes affect the current account mainly through the trade balance. Theoretically, however, the effect on the trade balance is ambiguous. For instance, a real exchange rate depreciation will improve the export value through either increased export volumes or higher export prices (denominated in the home currency) or a combination of both. On the other hand import volumes will generally fall after a depreciation but import prices (denominated in domestic currency) will rise and the effect on the import value is ambiguous. More generally the effect of a real exchange rate change on the trade balance depends on *i)* the price elasticities of export and import volumes; *ii)* the pass-through from the nominal exchange rate and from domestic and foreign prices to import and export prices; and *iii)* the initial position of the trade balance. The overall effect is thus an empirical question.

Empirical studies for Turkey show that export and import volumes are elastic to real exchange rate changes. A real depreciation improves export volumes and reduces import volumes. However, the range of estimated export elasticities is relatively wide (Table 3). Moreover, the price elasticity of imports varies according to the type of good, with consumption goods typically having the largest elasticity and intermediate goods the lowest (according to unpublished Treasury estimates). To gauge the overall impact on the trade balance it is necessary to estimate price equations as well. To this end a Turkish trade model, which consists of four equations for the price and volume of exports and imports as described in the previous *Economic Survey* (OECD, 2010), has been updated and re-estimated. One special feature of this model is that it is augmented with a relative productivity term, following Sato (1977) and Gagnon (2007). This variable aims at capturing non-price competitiveness and other factors explaining international trade such as taste for variety, product differentiation and economies of scale. The intuition is that fast-growing countries are likely to raise the quality of their products and to encourage innovation, improving *ceteris paribus* their trade balances. The trade equations are estimated as an error correction model and the long-run relations are given below (standard errors in brackets):

$$mgsv = 42.17 + 2.57*gdpv - 0.53*rpm - 1.68*rpc \quad (1)$$
$$\qquad\qquad (0.18) \qquad (0.21) \qquad (0.45)$$

Adj. R^2: 0.80, sample 1993-2001

$$xgsv = 0.13 + 1.00*xmkt - 0.74*rpx + 0.37*rpc \quad (2)$$
$$\qquad (0.17) \qquad (0.13)$$

Adj. R^2: 0.61, sample 2001-11

$$(pmgs - pgdp) = 1.23 - 0.65*(pgdp - pmsh) \rightarrow pmgs = 1.23 + 0.35*pgdp + 0.65*pmsh \quad (3)$$
$$\qquad\qquad (0.15)$$

Adj. R^2: 0.68, sample 1990-2001

$$(pxgs - pgdp) = 0.99 - 0.55*(pgdp - pxc) \rightarrow pxgs = 0.99 + 0.45*pgdp + 0.55*pxc \quad (4)$$
$$\qquad\qquad (0.06)$$

Adj. R^2: 0.81, sample 1990-2001

Table 3

Trade Elasticities for Turkey

Study	Time Period	Variables	Elasticities	
			Short-term	Long-term
Exports				
Aydin *et al.* (2004)	1987q1-2003q4	Turkish real GDP	0.4	1.9
		Export price	–0.5	–1.1
		Unit labour costs	–0.2	–0.2
Sarikaya (2004)	1989q1-2003q3	Turkish real GDP	1.3	1.4
		Real exchange rate (CPI)	–0.7	0.6
		Real wages	0.4	–0.8
Aydin *et al.* (2007)	1987q1-2006q4	OECD real GDP	1.32 - 1.45	
		Real exchange rate (CPI)	–0.35 - –0.09	
		Real exchange rate (ULC)	–0.26 - –0.18	
Aydin and Eren (2011)	1997q1-2011q2	Global economic activity index	4.7	
		Real exchange rate (ULC)	–0.27	
Imports				
Aydin *et al.* (2004)	1987q1-2003q4	Real GDP	1.2	1.99
		Real exchange rate (CPI)	0.5	0.4

Source: Central Bank of Republic of Turkey.

where *mgsv* and *xgsv* are import and export volumes (goods and services), *gdpv* is Turkish real GDP, *rpc* is relative productivity defined as average labour productivity divided by the weighted average of Turkey's main trade partners', *xmkt* is weighted export demand, *pmsh* is the weighted export price of Turkey's trade partners (denominated in Turkish lira), *pxc* is the weighted export price of Turkey's main competitors in foreign markets (denominated in the Turkish lira), *pgdp*, *pmgs* and *pxgs* are Turkey's GDP, import and export deflators respectively, *rpm* is the relative import price (*pmgs* – *pgdp*), and *rpx* is the relative export price (*pxgs* – *pxc*). Small letters denote variables in logarithms. The estimated elasticities of the volume equations are broadly in line with previous studies but the export price elasticity is at the upper end of the range. The price equations suggest that import and export prices are mainly determined by foreign prices.

The trade balance is given by:

$$tb_t = pxgs_t * xgsv_t - pmgs_t * mgsv_t \quad (5)$$

Using equations (1)-(4), it is possible to calculate the elasticity of the trade balance to a change in the nominal exchange rate or domestic price level. The overall elasticity depends on the respective shares of exports and imports in GDP. Using current shares and taking the estimates at face value, a 1 per cent depreciation of the nominal exchange rate (or equivalently a 1 per cent reduction in the GDP deflator) would, *ceteris paribus*, reduce the trade deficit as a share of GDP by 1.4 per cent in the long run.

ANNEX 2
EMPIRICAL ANALYSIS OF INFLATION EXPECTATIONS IN TURKEY

To better understand the formation and evolution of inflation expectations in Turkey, a reduced-form inflation expectations equation similar to the one presented in Baskaya *et al*. (2008, 2010), Bevilaqua *et al*. (2007) and CBRT (2012, Box 7.2) was estimated:

$$\pi^{e}_{t+12} = \beta_0 + \beta_1 \pi_{t-1} + \beta_2 \pi^{T}_{t+12} + \beta_3 er_{t-1} + \beta_4 ip_{t-2} + \beta_5 embi_{t-1} + \beta_6 oil_{t-1} + \epsilon_t \quad (6)$$

The lag structure of the right-hand side variables is chosen to reflect the latest available information to survey respondents. π^{e}_{t+12} is the 12-month ahead CPI inflation expectation (from the Central Bank of the Republic of Turkey (CBRT) survey),[12] π_{t-1} the past month's annual CPI inflation rate to proxy for backward-looking behaviour[13] and π^{T}_{t+12} the 12-month ahead (time-varying) inflation target rate. Monthly inflation targets are constructed by interpolating official end-year inflation targets. Anticipated pass-through effects are captured by annual nominal changes of an exchange rate basket (equally weighted US dollar and euro), er, with a positive value indicating depreciation. Demand pressures are proxied by deviations of the seasonally-adjusted industrial production index, ip, from its trend (calculated using a Hodrick-Prescott filter). The potential influence of risk perceptions on inflation expectations is taken into account by adding a composite risk indicator "EMBI+ Turkey", $embi$, partly reflecting the fiscal position and stance. Finally, as Turkey imports a large share of the energy it uses, oil prices potentially affect inflation expectations and this is reflected by the inclusion of year-on-year changes of (North Sea crude) oil prices in US dollars, oil. Results from various unit root tests, while partly mixed, generally suggest the presence of a unit root in the time series of $embi$ and hence the first difference of this variable is used in the regressions.

The fit of the model is good as indicated by the high adjusted R^2 (Table 4). All coefficients have the expected sign, although the oil price coefficient is statistically insignificant. The inflation target appears to play a greater role than past inflation in the formation of inflation expectations – a result that is robust to a range of different combinations of the right-hand-side variables. Moreover, demand conditions, anticipated pass-through effects and risk perceptions also appear to influence inflation expectations. The coefficient of the latter implies that an increase in the EMBI by 100 basis points leads to a rise in inflation expectation by 0.2 percentage points.

To analyse whether the weight of the determinants of inflation expectations has changed over time, rolling regressions with a 36-months window are conducted (Figure 9). The results suggest that the role of past inflation remained relatively stable since 2009 with some weakening in the recent past. The jump of the coefficient at the end of 2006 could reflect the fact that at this time inflation overshot the target for the first time since the adoption of an (implicit) inflation targeting regime (see main text). This is consistent with the finding that the weight of the inflation target started to decline around the same time. The coefficients of the exchange rate and risk perceptions have fallen since 2008, while that of industrial production has increased, although some weakening occurred very recently. The only coefficient that has substantially gained weight over time is the intercept, which suggests that inflation expectations remained stable in the recent past, but at a level above the official inflation target.

---

[12] The use of market-based inflation expectations as the dependent variable resulted in partly counter-intuitive results, which may be due to the short time span of the series (available only since September 2009).

[13] Results using core inflation instead of headline inflation were broadly similar but led to a reduction in the fit of the regressions. Therefore the results are not reported.

Table 4

Inflation Expectations Estimation Results
(OLS estimates)

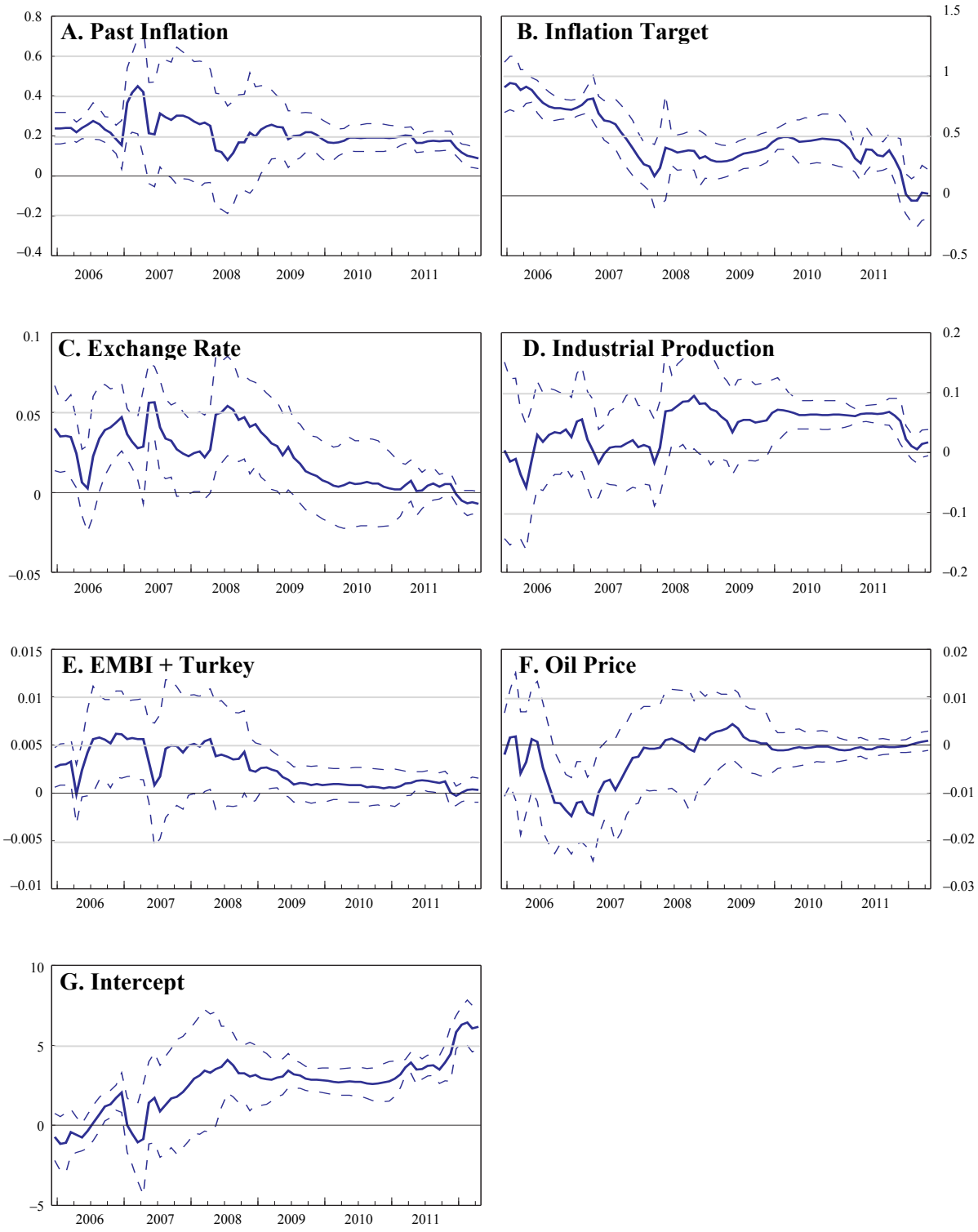
Variable	Coefficient
Constant	0.122
	(0.81)
Past inflation	0.311
	*(15.23)***
Inflation target	0.726
	*(20.76)***
Exchange rate	0.028
	*(5.10)***
Industrial production	0.093
	*(5.16)***
EMBI + Turkey	0.002
	*(1.86)**
Oil price	0.002
	(0.71)
Adjusted R^2	0.98
Number of observations	112
Time period	1/2003-4/2012

Notes: The dependent variable is the survey-based 12-months-ahead CPI inflation expectation. T statistics are in parentheses. Newey-West robust standard errors are used. *, ** and *** indicate significance at the 10, 5 and 1 per cent level, respectively.
Source: OECD estimates.

Using a panel data set with individual survey participants' expectations over time instead of average expectations as employed in the analysis above, Baskaya *et al.* (2012) are able to exploit greater variation of the dependent variable. They find a gradual fall of the weight of past inflation since 2010. This could be due to the high volatility of actual inflation or, as stressed by the authors, could signal improved effectiveness of central bank communication at convincing survey participants of the temporary nature of inflation surges. In addition, they find that the CBRT inflation forecast (for 12-month-ahead expectations) and the inflation target (for 24-month-ahead expectations) continue to serve as an anchor for inflation expectations.

Figure 9

Changing Impacts on Inflation Expectations
(coefficient estimates and 95 per cent confidence intervals from rolling regressions)[1]



[1] Using a 36-month rolling window running to the date marked on the x-axis.
Source: OECD estimates.

REFERENCES

Ahrend, R. and A. Goujard (2011), "Drivers of Systematic Banking Crisis", OECD, Economics Department, Working Paper, No. 902.

Akbostanci, E. and A.I. Tunc (2001), "Turkish Twin Deficits: An Error Correction Model of Trade Balance", Middle East Technical University, Economic Research Center, Working Paper.

André, C., S. Guichard, M. Kennedy and D. Turner (2007), "Corporate Net Lending: A Review of Recent Trends", OECD, Economics Department, Working Paper, No. 583.

Arnold, J. (2008), "Do Tax Structures Affect Aggregate Economic Growth? Empirical Evidence from a Panel of OECD Countries", OECD, Economics Department, Working Paper, No. 643.

Arslan, Y. and E. Ceritoglu (2011), "Quality Growth versus Inflation in Turkey", CBRT, Working Paper, No. 11/21.

Atoyan, R. (2010), "Beyond the Crisis: Revisiting Emerging Europe's Growth Model", IMF, Working Paper, No. 10/92.

Attanasio, O. and A. Brugiavini (2003), "Social Security and Household Saving", *Quarterly Journal of Economics*, Vol. 118, pp. 1075-79.

Aydin, F., U. Ciplak and E. Yücel (2004), "Export Supply and Import Demand Models for the Turkish Economy", CBRT, Working Paper, No. 04/09.

Aydin, F., H. Saygili and M. Saygili (2007), "Empirical Analysis of Structural Change in Turkish Exports", CBRT, Working Paper, No. 07/08.

Baskaya, Y. and T. Hülagü (2011), "Informal-formal Worker Wage Gap in Turkey: Evidence From A Semi-parametric Approach", CBRT, Working Paper, No. 11/15.

Baskaya, Y., H. Kara and D. Mutluer (2008), "Expectations, Communication and Monetary Policy in Turkey", CBRT, Working Paper, No. 0801.

Baskaya, Y., E. Gülsen and M. Orak (2010), "2008 Hedef Revizyonu Oncesi ve Sonrasinda Enflasyon Beklentileri" (Inflation Expectations Before and After the Target Revision in 2008), CBRT, Economic Notes, No. 1001.

Baskaya, Y., E. Gülsen and H. Kara (2012), "İletişim Politikası ve Enflasyon Beklentileri" (Communication Policy and Inflation Expectations), CBRT, Economic Notes, No. 12/14.

Bayoumi, T., H. Tong and S.J. Wei (2010), "The Chinese Corporate Savings Puzzle: A Firm-level Cross-country Perspective, NBER, Working Paper, No. 16432.

Bevilaqua, A., M. Mesquita and A. Minella (2007), "Brazil: Taming Inflation Expectations", Central Bank of Brazil, Working Paper, No. 129.

Blanchard, O., M. Das and H. Faruqee (2010), "The Initial Impact of the Crisis on Emerging Market Countries", *Brookings Papers on Economic Activity*, Vol. 41, pp. 263-307.

Blanchard, O., G. Dell'Ariccia and P. Mauro (2010), "Rethinking Macroeconomic Policy", *Journal of Money, Credit and Banking*, Vol. 42, Supplement.

Blanchard, O. and G.M. Milesi-Ferretti (2012), "(Why) Should Current Account Balances Be Reduced?", *IMF Economic Review*, Vol. 60, pp. 139-50.

Bloomberg, H.T. (2012), "Piyasada Merkez Bankasi Algisi Kutuplasiyor" (Polarisation in the Reading of Central Bank Actions by the Market – A Survey), 2 April, available at:

http://www.bloomberght.com/haberler/haber/1113637-piyasada-merkez-bankasi-algisi-kutuplasiyor

Bussière, M., M. Ca'Zorzi, A. Chudik and A. Dieppe (2010), "Methodological Advances in the Assessment of Equilibrium Exchange Rates", ECB, Working Paper, No. 1151.

Caballero, R. and G. Lorenzoni (2007), "Persistent Appreciations and Overshooting: A Normative Analysis", NBER, Working Paper, No. 13077.

CBRT (2009), *Monetary and Exchange Rate Policy for 2010*, Central Bank of the Republic of Turkey, 10 December.

——————(2011), *Financial Stability Report – Vol. 13*, Central Bank of the Republic of Turkey, November.

——————(2012a), *Financial Stability Report – Vol. 14*, Central Bank of the Republic of Turkey, May.

——————(2012b), *Inflation Report 2012-III*, Central Bank of the Republic of Turkey, July.

Cline, W. and J. Williamson (2011), "The Current Currency Situation", *Peterson Institute for International Economics Policy Brief*, No. PB11-18, November.

Cortuk, O. and N. Singh (2011), "Turkey's Trilemma Trade-offs: Is There a Role for Reserves?", MPRA, Paper, No. 33887.

Gagnon, J. (2007), "Productive Capacity, Product Varieties and the Elasticities Approach to the Trade Balance", *Review of International Economics*, Vol. 15, pp. 285-318.

Government of Turkey (2012), *Pre-accession Economic Programme Submitted to the European Commission*, January, Ankara.

Gönenç, R., O. Röhn, V. Koen and S. Saygili (2012), "Structural Reforms to Boost Turkey's Long-term Growth", OECD, Economics Department, Working Paper, No. 987.

Hausmann, R. and R. Rigobon (2003), "IDA in UF: On the Benefits of Changing the Currency Denomination of Concessional Lending to Low-income Countries", mimeo, World Bank.

IMF (2010), *Turkey: 2010 Article IV Consultation and Post-program Monitoring*, IMF, Country Report, No. 10/278, Washington (D.C.).

——————(2012), *Turkey: 2011 Article IV Consultation,* IMF, Country Report, No. 12/16, Washington (D.C.).

J.P. Morgan (2011), "Turkey Remains Dependent on Bond Inflows", *Economic Research Note*, November 25.

Kalinova, B., A. Palerm and S. Thomsen (2010), "OECD's FDI Restrictiveness Index: 2010 Update", OECD, Working Papers on International Investment, No. 2010/3.

Kaminsky, G. and C. Reinhart (1999), "The Twin Crisis: The Causes of Banking and Balance-of-payments Problems", *American Economic Review*, Vol. 89, pp. 473-500.

Kerdrain, C., I. Koske and I. Wanner (2010), "The Impact of Structural Policies on Saving, Investment and Current Accounts", OECD, Economics Department, Working Paper, No. 815.

Kesriyeli, M., E. Özman and S. Yigit (2011), "Corporate Sector Liability Dollarization and Exchange Rate Balance Sheet Effect in Turkey", *Applied Economics*, Vol. 43, pp. 4741-47.

Lopcu, K., A. Burgac and F. Dülger (2012), "Can Productivity Increases Really Explain the Lira Appreciation: Questions for the Central Bank of the Republic of Turkey", paper prepared for the *32nd Annual Meeting of the MEEA*, ASSA, January 5-8, Chicago (IL).

Medina, L., J. Prat and A. Thomas (2010), "Current Account Balance Estimates for Emerging Market Economies", IMF, Working Paper, No. 10/43.

Mendoza, E. and M. Terrones (2008), "An Anatomy of Credit Booms: Evidence from Macro Aggregates and Micro Data", IMF, Working Paper, No. 8226.

OECD (2007), "Encouraging Savings Through Tax-preferred Accounts", OECD, Tax Policy Studies, No. 15.

——————(2008), *OECD Economic Surveys: Turkey*, Vol. 2008/14, OECD, Paris.

—————— (2010), *OECD Economic Surveys: Turkey*, Vol. 2010/13, OECD, Paris.

—————— (2012a), *Economic Policy Reforms 2012: Going for Growth*, OECD, Paris.

—————— (2012b), "International Capital Mobility: Which Structural Policies Reduce Financial Fragility?", OECD, Economic Policy Paper, No. 02.

Ostry, J., A. Ghosh and M. Chamon (2012), "Two Targets, Two Instruments: Monetary and Exchange Rate Policies in Emerging Market Economies", IMF, Staff Discussion Note, No. 12/01.

Özlale, Ü. and E. Cunedioglu (2011), "Turkey's Export Performance I: Weaker Competitiveness, Faster Adaptation", TEPAV, Policy Note, No. 201124.

Radalet, S. and J. Sachs (1998), "The Onset of the East Asian Financial Crisis", NBER, Working Paper, No. 6680.

Rodrik, D. (2006), "Industrial Development: Stylized Facts and Policies", mimeo, Kennedy School of Government, August.

Rodrik, D. and A. Velasco (1999), "Short-term Capital Flows", NBER, Working Paper, No. 7364.

Rogoff, K. (1999), "International Institutions for Reducing Global Financial Instability", *Journal of Economic Perspectives,* Vol. 13, pp. 24-42.

——————(2011), "Global Imbalances Without Tears", speech, March, available at: www.project-syndicate.org/commentary/rogoff78/English

Röhn, O. (2010), "New Evidence on the Private Saving Offset and Ricardian Equivalence", OECD, Economics Department, Working Paper, No. 762.

——————(2012), "Current Account Benchmarks for Turkey", OECD, Economics Department, Working Paper, No. 988.

Sarikaya, C. (2004), "Export Dynamics in Turkey", *Central Bank Review*, Vol. 4, No. 2, Central Bank of the Republic of Turkey.

Sato, K. (1977), "The Demand Function for Industrial Exports: A Cross-country Analysis", *Review of Economics and Statistics*, Vol. 65, pp. 456-64.

Schularick, M. and A. Taylor (2012), "Credit Booms Gone Bust: Monetary Policy, Leverage Cycles and Financial Crisis, 1870-2008", *American Economic Review*, Vol. 102, pp. 1029-61.

van Rooij, M., A. Lusardi and R. Alessie (2012), "Financial Literacy, Retirement Planning and Household Wealth", *The Economic Journal*, Vol. 122, pp. 449-78.

World Bank (2012), *Turkey CEM Synthesis Report: Sustaining High Growth: The Role of Domestic Savings*, Report No. 66301-TR.

Yilmaz, G. and R. Gönenç (2008), "How Did the Turkish Industry Respond to Increased Competitiveness Pressures, 1998-2007?", CBRT, Working Paper, No. 08/04.

FISCAL CHALLENGES TO A LONG-RUN SUSTAINABLE GROWTH IN BRAZIL

Ana Teresa Holanda de Albuquerque[*]

This paper addresses the recent fiscal policy undertaken in Brazil and its perspectives. The public sector net debt will tend to keep to its lowest levels, positively affecting the cost of capital and stimulating private investment in the medium and long terms. Recent decisions made by the government regarding the increase of state-owned banks supply of credit and the control of utility prices raise fiscal risks and pose a threat to higher long-term growth. In this context, the main contribution of the fiscal policy is to combine primary surpluses with an increase in public savings, in order to offset contingent liabilities and to expand domestic investment as a share of GDP.

1 Introduction

After the 2010 rebound, when the Brazilian economy reached 7.5 per cent of GDP growth in real terms – from a negative growth of 0.3 per cent of GDP in 2009 – it started losing momentum. This was due to the impact of the international scenario and to structural domestic constraints, such as full employment rates, inadequate incentives to private investment and the slow pace of public investment in infrastructure. Since August 2011, financial conditions have eased and interest rates were lowered to an historical level to stimulate household consumption and investment. However, the high rate of borrowings to household income, the increase in bad loans and the uncertainties about the future of the economy have limited the expansion of the credit market to a moderate pace. Although the government has provided a number of incentives to foster private investment, including reducing tax rates in the labor market and to some industries and lowering the basic interest rate to below its equilibrium, the perspective is that the activity will remain below potential in 2013.

The government decided to shift the balance of the public sector from neutral to expansionary. The near-term prospects for the public sector is to keep its net debt at a record low of 35 per cent of GDP with a primary surplus of 2.4 per cent of GDP, below the 3.1 per cent of GDP set by law. However, the imbalance between the pace of revenues and mandatory expenditures may hinder the fiscal policy efficacy on the promotion of economic stability and poses a threat to a higher pace of growth in the long term.

Recent measures taken by the government involves new fiscal risks to be considered when looking to long-term growth prospects. The government has decided to enhance State-owned Banks (SOBs) influence over the financial sector, by increasing the amount of Treasury inflows to the National Development Bank (BNDES), to be lent to specific sectors at below-market interest rates. In 2013, it also decided to control gas and energy prices to compensate demand pressures on inflation, under an economic environment where interest rates are below its equilibrium and the labor market is still heated.

Fiscal risks posed by SOBs are associated with the quality of loans that will eventually demand new capitalizations by the Treasury. Also, while government financing can encourage savings and capital accumulation, the projects the government finances through its banks are likely to be inefficient and have an adverse effect on productivity growth.

---

[*] General manager to the Central Bank of Brazil in Sao Paulo. Special thanks to Francisco Carneiro (World Bank), who provided useful comments on a previous version of the paper.

The views and interpretations in this document are those of the author and should not be attributed to the Central Bank of Brazil.

In the energy sector, the control of gas and utility prices has compromised the perception of the governance of State-owned Enterprise (SOEs). Losses resulted from policies that affect SOEs net worth negatively would also require capitalization by the Treasury in the future. The perception that the SOE oil company Petrobras will not be able to comply with all of its planned investment, combined with the market reaction to recent decisions over the extension of long-term contracts of concession in the electricity sector, has left uncertainties about the government's ability to provide a more stable and attractive environment to long-term investment.

In this context, the fiscal management must be more focused on a current expenditure-based policy in order to contribute to domestic savings and to offset contingent liabilities, such as the recent fiscal risks aforementioned. Moreover, the control of mandatory expenditure growth, together with measures towards removing the red tape on public and private investment, will permit the fiscal policy to contribute to the promotion of higher growth in the long term.

This paper is divided in five sections: the second presents an overview of the recent economic environment and growth perspectives for the near term; the third addresses the fiscal policy undertaken in 2012; the fourth refers to fiscal risks resulted from recent measures taken by the government and their consequences to growth; the last section addresses the long-term outlook and conclusions.

2 Recent economic environment

According to recent analyses, the advanced and developing economies are expected to grow at a slower pace in 2013, compared to last year. In the USA, a more moderate fiscal adjustment may allow fiscal stimulus on growth, although the sluggish labor market and the European crisis continue to affect the pace of economic activity. In Europe, debt renegotiations have advanced and there has been progress regarding structural reforms. However, the narrow room for the use of counter-cyclical policies, the weak labor market, wealth destruction and a still restrictive credit market, all point to a scenario of low economic growth in mature economies. In the emerging market economies, the perspectives also point to a moderate pace of activity, partly echoing the low growth rates in developed economies.

In Brazil, external flows were below expectations in 2012, closing the year 74 per cent below 2011. For 2013, it is expected that the reduction in the trade balance accounts and the deterioration in the current account deficit will continue (Figure 1). The stimuli to capital formation, through negative real interest rates, the increase of public investment and the acceleration of projects for the World Cup may foster investment in 2013. Meanwhile, the unemployment rate remains at its record lows, implying that the economy would remain below its potential throughout 2013. There is a consensus on the resumption of economic activity in 2013, although the strength of the recovery is still uncertain and has raised some concerns in the short term. The figures for the Q3 GDP, the only moderate recovery of global growth and the issues with competitiveness of the Brazilian economy reinforce these fears (Figure 2).

In the credit market, the high level of non-performing loans remains resilient. In 2012, requests for judicial reorganization jumped 47 per cent and bankruptcies shifted 11 per cent, from 2011. In a scenario of credit recovery in 2013, and with a labor market already heated, consumption tends to accelerate, encouraging investment. As a result, the interest rate should move up toward a neutral level throughout the year, even if that the government makes every effort to control SOEs' utility prices and reduces taxes to tame inflation.

For 2013, the Brazilian economy will tend to recover – from 0.9 per cent of GDP in real terms in 2012 – to around 3 per cent of GDP in 2013 and keep this pace in the medium-term.

Figure 1

External Accounts/GDP in 12 Months
(percent)

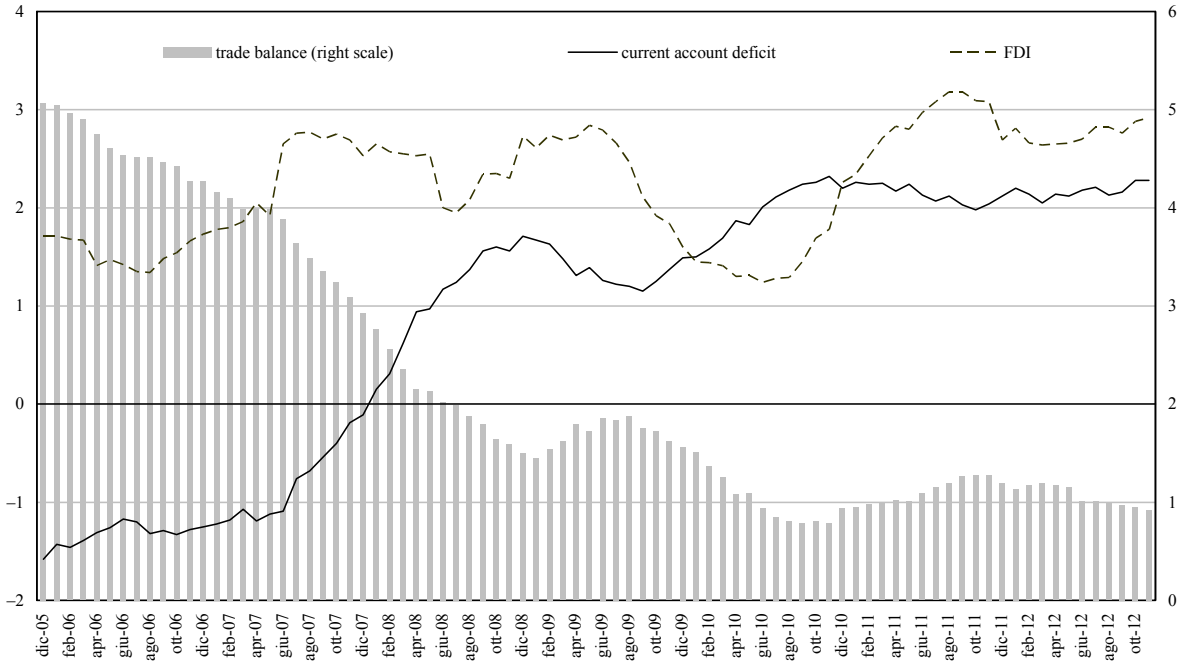


Figure 2

Quarterly GDP and Investment
(seasonally-adjusted data)

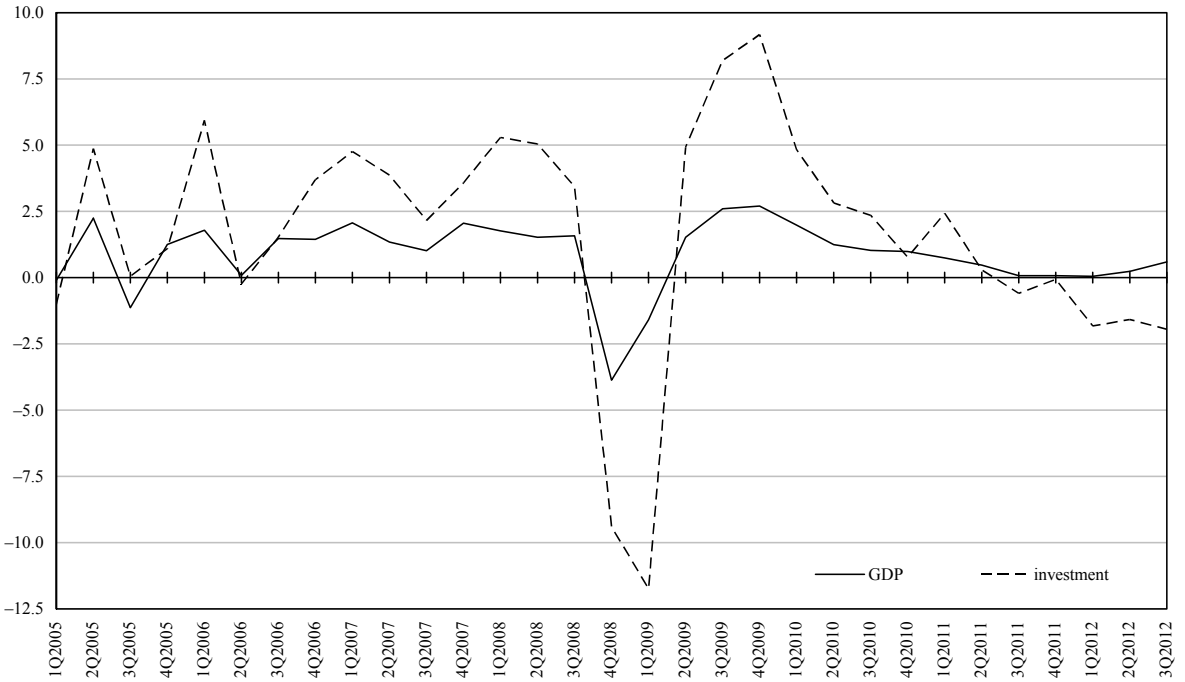
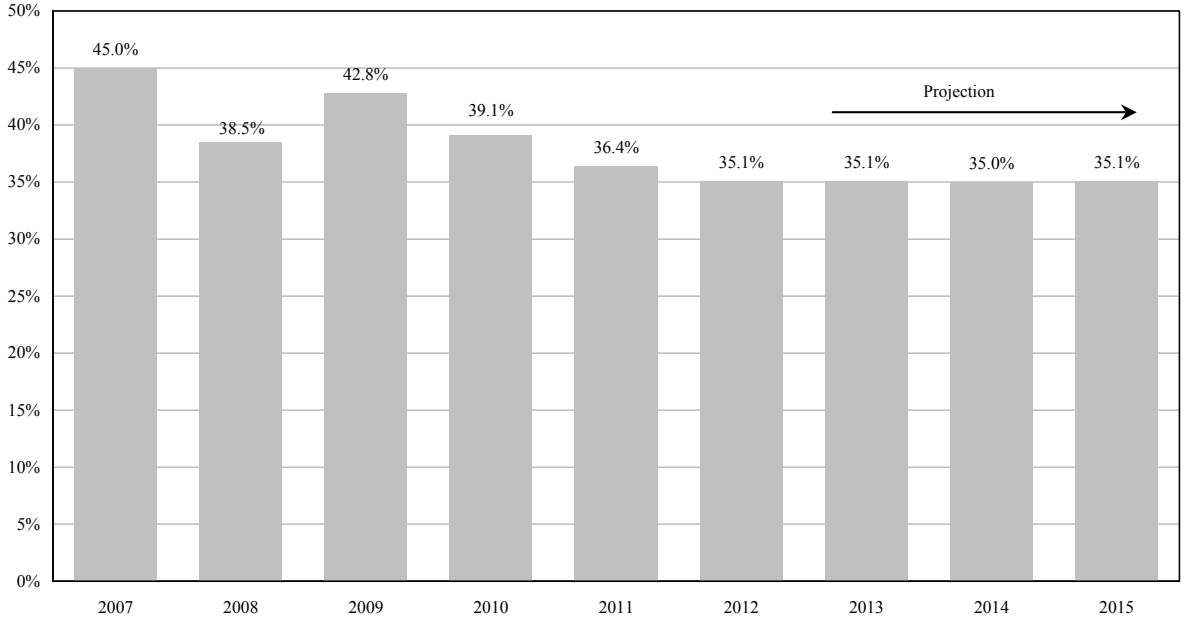


Figure 3

Public Sector Net Debt
(percent of GDP)



Source: Central Bank of Brazil.

Changes in this perspective will hinge on a steady pace of growth of the Chinese economy and how fast the activity constraints will be removed by mature economies.

3 Fiscal policy in 2012

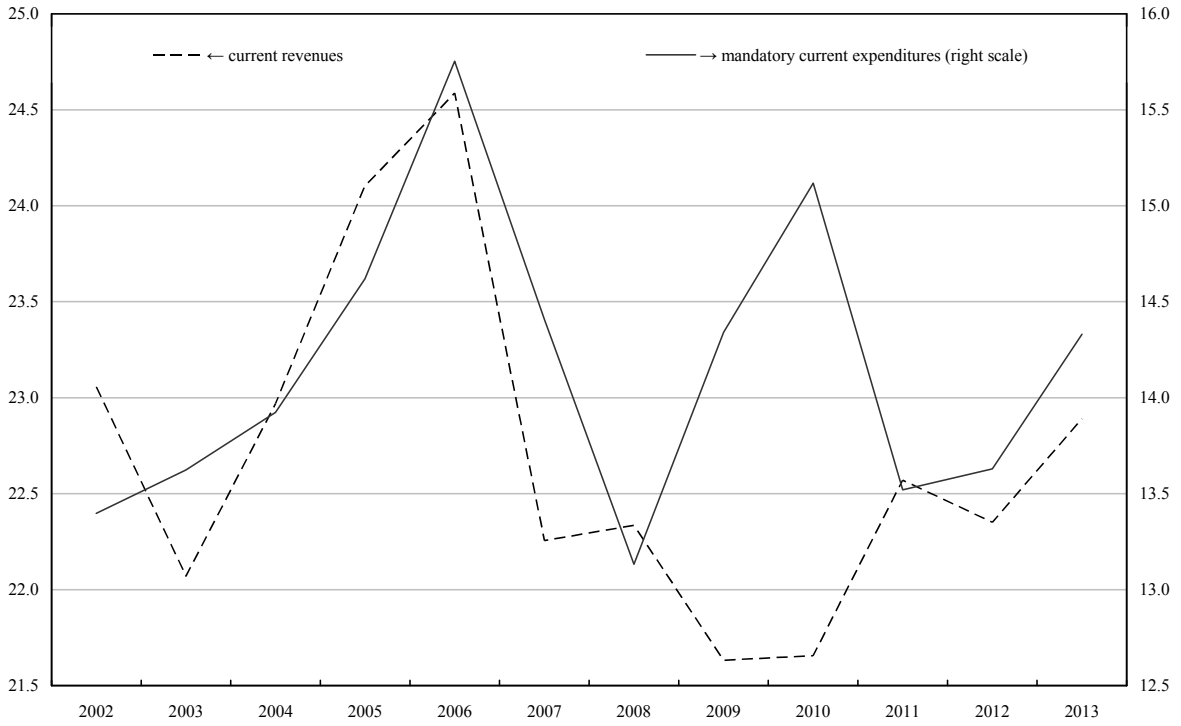
In 2012, the public sector achieved a primary surplus of 2.4 per cent of GDP and a PSBR of 2.5 per cent of GDP. Although the primary surplus stayed well below the target of 3.1 per cent of GDP set by law, the deficit was enough to keep the net debt to its record low of 35.1 per cent of GDP.

The main reason for the fiscal balance deterioration compared to the annual target is a combined effect of loss of revenues (due to strong policy of tax benefits to strategic sectors and to lower activity growth) and increase in expenditures, mainly mandatory ones. In a baseline scenario, where there are no great fluctuations of exchange rates, a gradual raising of interest rates to its equilibrium, below-potential growth and a primary surplus of 2.4 per cent of GDP, the net debt will tend to remain low.

The problems concerning fiscal policy management are of another matter. The first is the imbalance between the pace of revenues and expenditures. Fiscal policy is in line with efforts to stimulate growth in the demand side, towards household consumption. The increasing participation of mandatory outlays in total expenditure, mainly transfers to households, may undermine the efficacy of the fiscal policy in offsetting a looser monetary policy when needed. The other is the increasing perception that the government has changed the policy regarding fiscal targets. In 2012, instead of proposing a change in law, it decided to use off-budget revenues and extra dividends

Figure 4

Central Government Current Revenues and Expenditures
(percent of GDP)



from SOEs to meet the target set by law, most of them with no impact on aggregate demand. For 2013, a huge inflow of other off-budget revenues is underway.[1]

Figure 4 shows the growth of current revenues and current mandatory expenditures over the years, in terms of GDP. While the revenues have decreased 0.71 percentage point of GDP from 2002 to 2012, due to recent lower GDP and tax deductions, mandatory expenditures have risen 0.23 percentage point of GDP. Most of these expenditures were transfers to households, such as pensions from the basic social security system and social assistance programs.

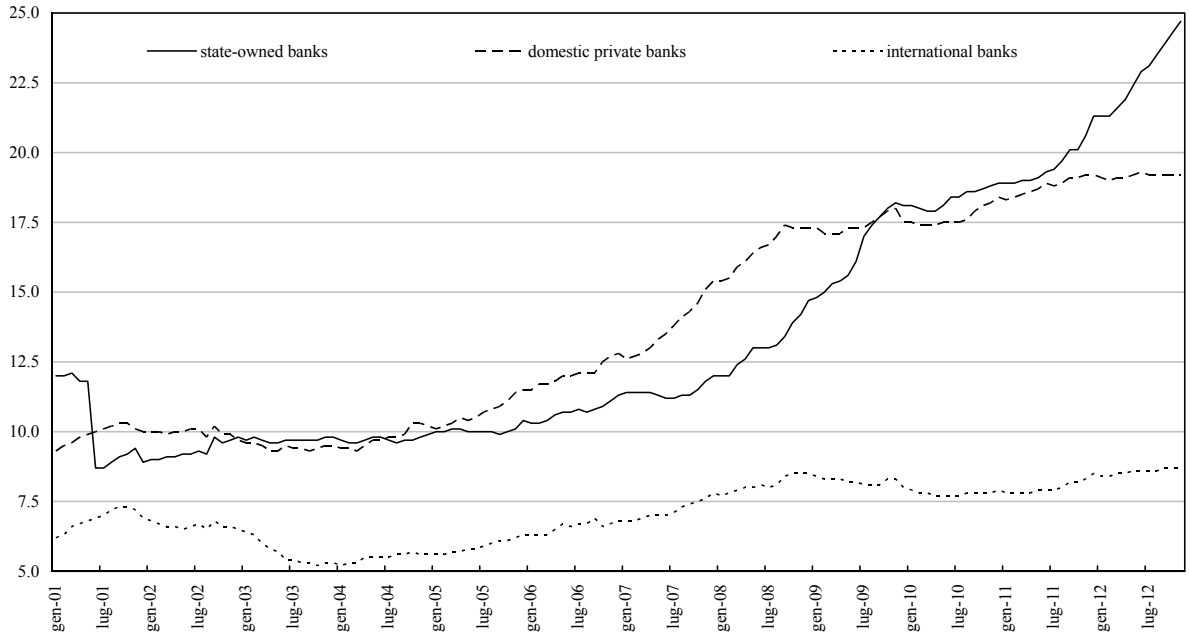
The fiscal policy framework should channel its priority to the control of the pace of spending, such as civil servants payroll and social security benefits. A clear medium-term fiscal policy would help to anchor the expectations of agents and contribute to foster domestic savings throughout the years, since the private sector can do little in a period when investment is expanding. Thus, it is up for the public sector to increase domestic savings through the maintenance of positive primary surpluses, along with an increasing participation of public investment in total expense.

---

[1] In December, the Government unloaded USD 6 billion from the sovereign wealth fund and received USD 3.5 billion in anticipated dividends from SOEs. Also, around USD 18 billion in public investment were deducted from the fiscal target, as allowed by law, and USD 3 billion in mandatory expenditures were pushed to January. Finally, the government decided to bring forward the USD 15 billion payoff from the hydro-electric company Itaipu borrowings from the Treasury, by selling those credits to the BNDES. Since those credits are not registered in the net debt, the payment will have a positive impact on the PSBR flows. Part of this amount will be used to fund the energy prices cut announced for 2013.

Figure 5

Financial Institutions Loans
(percent of GDP)



4 Fiscal risks ahead

Apart from the fiscal risks already pointed out by literature and Brazilian budgetary documents, there are new risks worth to mention, since they have been increasing in recent years. Those risks have merged as a robust approach of the government towards a more interference of the government in the economy, as a means of fostering growth. Some examples are enhancing the role of SOBs in the financial market and the change of public concession framework in the electricity sector.

4.1 Contingent liabilities due to the increase of the Treasury subsidized loans to companies through SOBs.

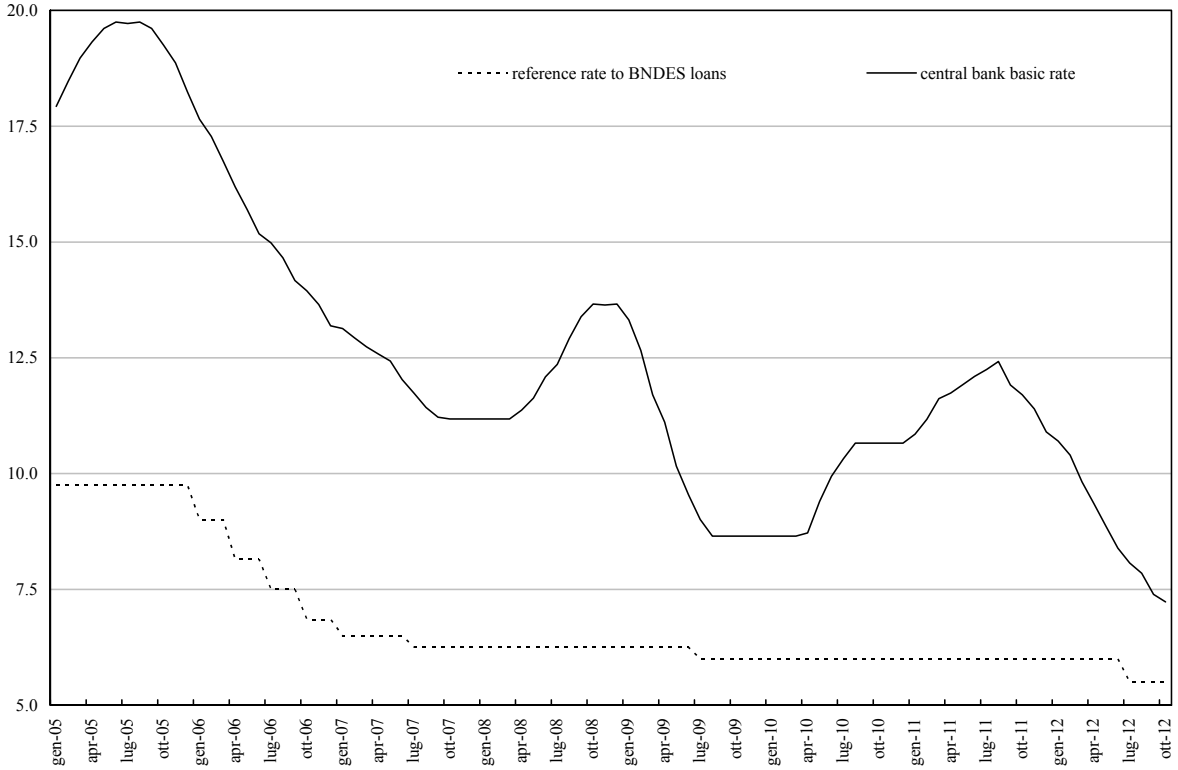
After 2005, a continuous shift in SOBs loans took place, following the credit expansion by the private banks. When the crisis erupted in 2008, those loans soared from 13.4 per cent of GDP in September 2008 to 18.9 per cent of GDP in December 2010. Since then, SOBs loans kept increasing, reaching 24.7 per cent of GDP in November 2012.

Most BNDES loans went to big companies: around USD 13 billion to the state-owned oil company Petrobras, USD 12 billion to the hydroelectric power plant of Belo Monte and USD 4 billion to the hydroelectric power plant of Santo Antonio (both in Amazon), USD 4 billion to the nuclear power plant of Angra III, USD 4 billion to the Vale mining company, USD 3 billion and USD 2 billion to the communication companies Oi and Vivo, respectively.

The SOB credit growth is funded by long-term Treasury loans to BNDES, which has reached 51.4 per cent of its total funding since 2009. Most of those resources are transferred from BNDES to the private banks to be destined for specific sectors with below market interest rates (Figure 6).

Figure 6

Monthly Interest Rates in Annual Terms



The difference between the Treasury fund rate (banking cost of capital) and the loan interest rates to the companies is allocated in the budget and transferred to the SOB, following the borrowers' payoff schedules. The Treasury has lent 9.2 per cent of GDP to the BNDES and has borrowed 11.3 per cent of GDP from the financial market to fund it as of December 2012 (Figure 7).

There are two views about the impact of state ownership of banks in the economy. The classic "development view" is that government can stimulate growth through SOBs by directing them toward strategic long-term projects that can generate aggregate demand and other beneficial externalities. The alternative premise is that political objectives take primacy over the quest for growth and development. In this "political view," SOBs are used as instruments to finance inefficient but politically desirable projects.[2]

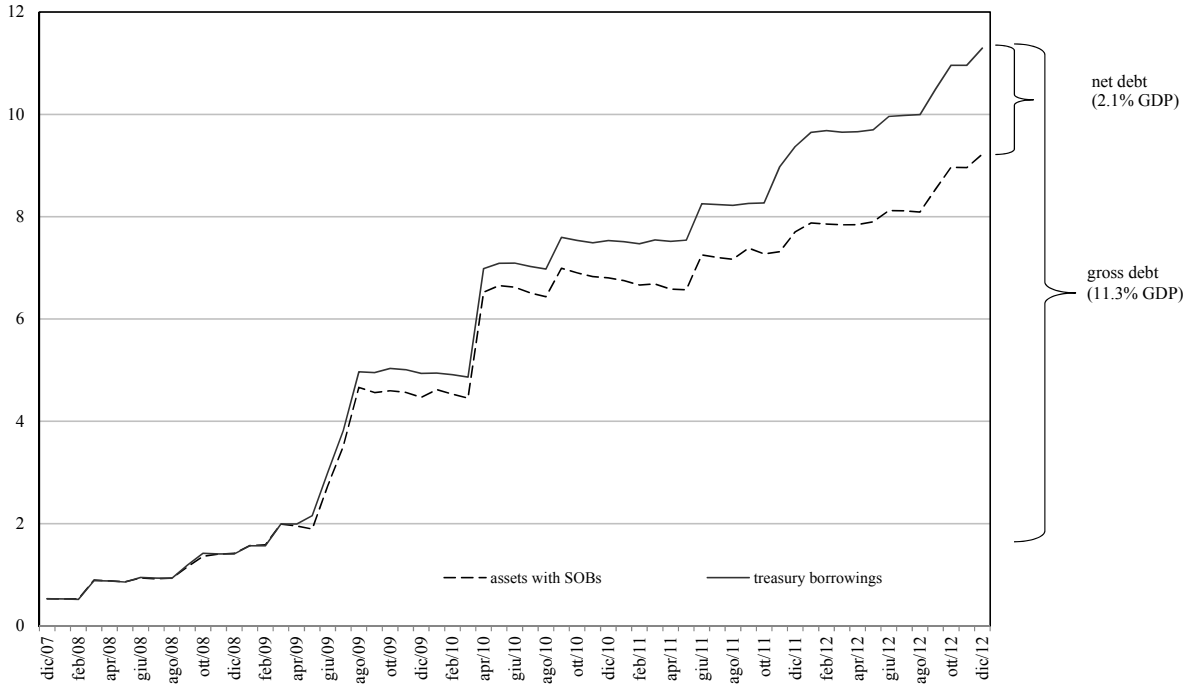
In both views, the rationale for SOBs is to finance projects that otherwise would not be funded. The difference is that, in the development view, the motivation is to fund economically desirable projects that the private sector neglects due to market failures, rather than politically desirable projects without regard to economic viability. The fast pace of SOBs loans in Brazil since before the 2008 crisis and beyond shows that the policy of strengthening the SOBs role in the economy is not only to offset short-term downturns; it is also a strategy to stimulate growth. However, according with studies such as in La Porta *et al.* (2002), government ownership of banks is associated with lower subsequent economic growth and politicians use SOBs to further their own political goals.

---

[2] For a complete definition of views on state ownership of banks, see La Porta *et al.* (2002).

Figure 7

Impact of the Treasury Financing to State-owned Banks on Gross and Net Debt
(percent of GDP)



Fiscal risks associated with SOBs loans are the financing of loss-making SOEs, or companies in non-commercial terms, to stimulate growth in specific regions or sectors. SOB may have a cost of funds advantage over privately owned banks due to an implicit or explicit government guarantee. If these funds are used to finance inefficient projects, the result can be a crowding out of private intermediation.

The recent increase of Treasury loans to SOBs in Brazil are also strongly related to the need of meeting the primary balance target set by law. Treasury loans are not registered as expenditures above the line, as they are considered Treasury financial assets to the financial sector. When the transaction is done, the gross debt increases in the same amount of the loan (financial asset), thus not affecting positively the net debt, nor the primary balance.

Non-performing loans are contingent liabilities, as they may increase the net debt in the future through capitalization or loss recognition by the Treasury. Figure 7 shows the potential increase of up to 9.2 points percentage of GDP in the central government net debt, being the difference between its gross debt of 11.3 per cent of GDP and the net debt of 2.1 of GDP, as of December 2012.[3]

While the presence of SOBs may be advantageous in a time of crisis, it should be reduced once stability has return to avoid crowding out private sector loans. The increasing Treasury outlays to SOBs has already raised comparisons with the policy undertaken in the 1980s, when the Treasury account in the *Banco do Brasil* was used as a blanket guarantee to its loans, a major setback in fiscal controls and transparency.

---

[3] The central government gross debt was calculated as the amount lent to the SOBs minus amortizations, adjusted by the average cost of Treasury domestic securities.

Table 1

Petrobras Stock Performance

Petrobras ON	Profitability % *(end of year)*	Price Closing
2009	55.60	41.65
2010	–24.30	30.55
2011	–22.20	23.00
2012	–13.00	19.55

Source: BMF & Bovespa.

Table 2

Eletrobras Stock Performance

Eletrobras ON N1	Profitability % *(end of year)*	Price Closing
2009	48.10	36.34
2010	–13.10	22.24
2011	–61.40	6.33
2012	–16.30	17.84

Source: BMF & Bovespa.

4.2 Deepening of government intervention in strategic sectors

The year of 2012 was marked by the increase of a more interventionist approach in the energy sector, aiming at controlling or lowering prices under an economic environment where interest rates are below its equilibrium and the labor market is still heated. These interventions have raised some concerns about the SOEs future performance.

In the case of Petrobras, which represents 90 per cent of national oil production and almost 40 per cent of the domestic fuel market, the government has decided not to adjust oil prices since 2009, which are currently around 20 per cent below market prices. The perception of the lack of autonomy to make market decisions by the SOE has compromised its value in the stock market (Table 1).

The policy of controlling gas prices has been offsetting a great part of the effort made to capitalize the Company in 2010, in order to provide leverage to raise the borrowings needed to fund the investment in the sub-salt oil fields. In December 2012, the rating agency Moody's reviewed the company perspectives from neutral to negative, due to recent debt increases and uncertainties over delivery of production according to the company's plan and to the estimated cash flow, considering the huge amount of capital to be invested in the subsequent years. According to the Agency, the increase on the pace of imports and the control of fuel prices by the government hinder the company's capacity to undertake those planned investments.

Also, in Sept, 2012, the government changed the concessions framework in the electricity market. Most contracts with the utility companies were to end by 2015, but the government allowed them to extend them for 30 more years. The investment realized by the companies during the time of concession would be reverted to the government, which would have to compensate them, considering the levels of amortization and depreciation. Since most of the investment has been already amortized and depreciated, and considering a new set of subsidies created to low-income families, the government determined a cut in energy prices up to 18 per cent for households and to 32 per cent for companies. The estimated cost of the measure to the Treasury is around USD 4.2 billion.

Brazil's electricity sector has quite technical and institutional complexities and most bidders are SOEs with issues of efficiency, overstaffed with civil servants and positions defined by political appointment. Investment and guarantee of energy supply depend on the government's ability to act in technical, economic and political coordination. Historically, this coordination has meant negotiating with industry agents and segments of society to adjust the rules according to the evolution of economic, organizational and technological context.

The measure has a positive impact regarding the urge to overhaul the companies' inefficiency in order to absorb the cut in electricity prices. However, its first impact was a turmoil in the stock market, as it was not foreseen by the market (Table 2). Questions were raised about government calculations of the compensations, of prices and estimated losses, which shifted the risk perception of investment in the sector. The market value of companies dropped, increasing the cost of its funding and compromising the investment required for energy supply in the long run.

The government's more interventionist approach has exposed the fiscal accounts to a risk of future capitalizations, as it has compromised confidence in SOEs' governance and future performance. This perception may undermine capital inflows to the companies and private investment in the sector and therefore a higher long-term growth.

5 Long-term outlook and conclusions

The international scenario shows a trend of global GDP growth at a pace somewhat lower than observed in the years before the financial crisis of 2008-09. Two factors tend to contribute to that: (i) the need for the mature economies to adjust their fiscal accounts; and (ii) the structural changes that must occur in the composition of Chinese growth, by reducing its reliance on investment and increasing the importance of domestic consumption. Demography is another long-term structural factor that signals a gradually decreasing rate of expansion in mature economies. Other emerging economies should keep a higher pace of expansion compared to the mature economies, accelerating the convergence of their per capita GDP towards their levels.

With this scenario, it has become widely accepted that boosting aggregate demand is insufficient to ensure a long-term growth in Brazil. At some point, other reforms will be needed to foster growth, through incentives to invest and by reducing the dependence on external savings. However, the increasing participation of current mandatory expenditures in total spending and the government intervention in several sectors may have the opposite effect. In the first case, it may compromise the efficiency of fiscal policy to the economic stabilization and its contribution to domestic savings. In the second case, it raises uncertainties due to volatility of rules and fiscal risks.

The large increase of Treasury loans to companies through its SOBs exposes the Treasury to contingent liabilities, as non-performing loans may come due. Also, the larger is the credit offered by the national banks with subsidized interest rates, the more limited is the impact of the basic interest rate on the economy. Finally, there is no evidence that the existence of SOBs is associated with higher economic growth.

Other policies that affect long-term investment by the private sector should also provide a friendly economic environment to business. The recent shift to a more interventionist approach in the energy sector in order to control or reduce prices had the opposite effect of delaying private investment in the long run, whether by instabilities created by the changing of rules or by contingent liabilities that underlines the SOEs risk of non-performance. The use of SOEs as instrument of economic policy should take into account their impact on the government's overall risk exposure.

Nevertheless, Brazil has acquired some strengths throughout the years to a sustainable long term economic growth: i) the country has reached a high level of political stability; ii) it has huge comparative advantages in metal and raw commodities; iii) the domestic financial sector is solid, well regulated and capitalized; and iv) economic stability is still a priority.

In the fiscal area, since the projections indicate historical low net debt overtime, one of the challenges is to mitigate the mandatory current expenditures pressure on fiscal accounts. This

would make room for a looser monetary policy and promote positive public savings. For several years, current expenditures have increased at a faster pace than revenues, and the government has yet to overhaul all legal and technical constraints to foster public investment. The policy of increasing transfers to families through the social security scheme or directly to individuals raised a permanent cost to be funded by revenues, not always as permanent themselves. In the short term, the behavior of public expenditure puts pressure on monetary policy by raising the inflationary risk, especially in a scenario of global economic instability. In the long run, the upward trend in spending hinders the expansion of domestic savings and a more favorable combination of foreign exchange and interest rates. Similarly, a high level of spending reduces the room for a tax reform that would simplify the system and, most importantly, reduce the tax burden.

Other long-term challenges are: how reduce and simplify taxes; how to tackle the impact of the change in the demographic structure on the social security accounts; how to overhaul the microeconomic restrictions associated with costs and red tape to do business in Brazil; how to improve education and encourage technological innovation; and finally, how to defeat corruption, considered a severe problem within the structure of Brazilian society and political system.

REFERENCES

Freedman, C., M. Kumhof, D. Laxton, D. Muir and S. Mursula (2009), "Fiscal Stimulus to the Rescue? Short-run Benefits and Potential Long-run Costs of Fiscal Deficits", IMF, Working Paper, No. 9255, November.

Araujo, P., G. Jr. Borça and A. Sant'Anna (2009), "Mercado de crédito no Brasil: evolução recente e o papel do BNDES (2004-08)", *Revista do BNDES*, Rio de Janeiro, Vol. 16, No. 31, pp. 41-60, June.

Andrews, M. (2005), "State-owned Banks, Stability, Privatization, and Growth: Practical Policy Decisions in a World Without Empirical Proof", IMF, Working Paper, No. 510, January.

La Porta, R; F. López-de-Silanes and A. Shleifer (2000), "Government Ownership of Banks", John F. Kennedy School of Government, Department of Economics, Harvard University, Working Paper, No. 01-016, February.

Dinç, S. (2005), "Politicians and Banks: Political Influences on Government-owned Banks in Emerging Markets", *Journal of Financial Economics*, No. 77, pp. 453-79.

Federal Law No. 12.783, January 11, 2013.

MME (2012), *Concessões de Geração, Transmissão e Distribuição de Energia Elétrica: Perguntas e Respostas*, September, available at: http://www.mme.gov.br/mme/galerias/arquivos/noticias/2012/Perguntas_e_respostas_-_Concessxes_10_09_12_final.pdf

CYCLICALITY OF FISCAL POLICY IN INDIA

Atri Mukherjee[*]

This paper examines the cyclicality of fiscal policy in India at the Union government level through three alternative approaches. The analysis covering the time period 1970-71 to 2012-13 reveals that the government expenditure in India is, by and large, pro-cyclical. There are, however, significant differences in the degree of pro-cyclicality across different components of expenditure. Capital outplay displayed the highest pro-cyclicality, particularly in the short run, implying government's tendency to cut the same at the time of business cycle downswing to save resources. Revenue expenditure, on the other hand, was found to be inelastic with respect to output in the short run, reflecting the underlying rigidity in cutting these expenditures at bad times. Developmental expenditure was found to be far more pro-cyclical compared to non-developmental expenditure. The Government's tendency to cutback capital outlay and developmental expenditure at the time of economic slowdown works as detrimental to economic growth and development. Going forward, the main challenge for the Government would be to meet its fiscal deficit targets without hurting the economic growth.

1 Introduction

Cyclicality of fiscal policy indicates whether the government's revenues and expenditures move in the same direction or in the opposite direction with output. A fiscal policy is called pro-cyclical if it is expansionary in good times (economic booms) and contractionary in bad times (economic recessions). Opposite is the case for a counter-cyclical policy. It is generally perceived that while the fiscal policies in the advanced economies tend to be counter-cyclical, the same in the developing countries are to a large extent pro-cyclical in nature.

The issue of cyclicality of fiscal policy received considerable attention during the global financial crisis. The large scale economic downturn accompanying the financial crisis led to activation of counter-cyclical fiscal policy measures of unprecedented magnitude. The fiscal measures focused on improving the balance sheet of the financial and corporate sectors as reflected in large scale bailouts in the US and other advanced economies. In addition, several countries used discretionary fiscal policy measures to boost economic growth. For instance, most of the OECD countries had adopted broad ranging stimulus programmes involving tax and expenditure adjustments. There was, however, a general tendency towards preferring tax cuts over boosting expenditure. Most common among the expenditure measures were increased expenditure on investment in infrastructure and provision of safety net through transfers (RBI 2009). The contagion from the global financial crisis also warranted swift monetary and fiscal policy responses in emerging market economies (EMEs) for ensuring orderly functioning of markets, preserving financial stability, and moderating its adverse effects on growth (Mohanty 2011). Like elsewhere, the Indian government also responded with counter-cyclical measures including tax cuts and increases in expenditures to combat the rapid slowdown of economic growth.

---

* Reserve Bank of India. E-mail: atrimukherjee@rbi.org.in

The views expressed in the paper are those of the author and do not necessarily reflect the views of the Reserve Bank of India.

The author is grateful to B.M. Misra, Balbir Kaur and Deepa S. Raj for motivation and support. The author acknowledges with thanks Teresa Ter-Minassian, Muneesh Kapur and Somnath Chatterjee for their valuable comments on the previous version of the paper.

The objective of this paper is to examine the cyclicality of government expenditure in India at the Union/Central government level. Accordingly, an attempt has been made to find out whether different components of central government's expenditure move in a pro-cyclical or counter-cyclical manner through alternative measures of fiscal cyclicality. The analsysis has been extended further to spot whether there has been any change in cyclicality in the post-reform period. The organization of the paper is as follows. A review of select literature is provided in Section 2. The major components of government expenditure in India are discussed in Section 3. The methodology and data sources are described in Section 4. The estimation results are discussed in Section 5. The conclusions are drawn in Section 6.

2 Review of select literature

The Keynesian view supports the role of discretionary fiscal policy as a counter-cyclical measure to boost aggregate demand and support growth. From a Keynesian perspective, public expenditure should act as a stabilizing force and move in a counter-cyclical direction. This implies that ideally, the fiscal policy should lower taxes and increase expenditure during the downswing of business cycle, to increase the aggregate demand. On the other hand, it should reduce expenditure and increase savings during the upswing of the business cycle. In reality, however, evidence of pro-cyclicality in fiscal policy has been covered in a number of studies (Lane, 2003).

Empirical evidence reveals that there is significant variation across countries in terms of fiscal cyclicality. Variation in cyclicality has been observed across different components of fiscal policy *viz.* government expenditure and revenue as well. The findings of the empirical studies in this regard are discussed below.

2.1 Cyclicality across countries

Empirical findings reveal that in the advanced economies, the fiscal policy tends to be counter-cyclical, while in the developing countries, it tends to be pro-cyclical. Kaminsky *et al*. (2004) found that fiscal policies in the OECD countries are counter-cyclical or anti-cyclical in nature. Telvi and Vegh (2005), on the other hand, showed that government spending and taxes are highly pro-cyclical in the less developed economies. Halland and Bleaney (2011) generated the cyclicality estimates for 85 advanced and developing countries for the period 1980-2004 and found that pro-cyclicality is higher on an average, with a much wider range of variation, in developing countries than in OECD countries.

Various hypotheses have been put forward by economists to explain variations in fiscal cyclicality between advanced and developing economies. As per those hypotheses, the differential in the cyclicality in fiscal policy between advanced and developing economies arises from: (i) restrictions on access to domestic (Caballero and Khrishnamurthy, 2004) and/or international credit markets (Gavin and Perotti, 1997; Calderón and Schmidt-Hebbel, 2008); (ii) institutions or political structures (Alesina *et al.*, 2008; Thornton, 2008; Talvi and Végh, 2000); and (iii) the polarization of preferences associated with social inequality (Woo, 2009).

According to the credit restrictions hypothesis, developing countries find it difficult to smooth the business cycle due to limited access to international credit markets, which prevents them from borrowing during bad times. Regarding institutional structure, *Alesina et al.* (2008) found that fiscal policy is more pro-cyclical in countries where corruption is more widespread. In contrast, Thornton (2008) finds that less corruption actually leads to more pro-cyclical fiscal policy in a sample of 37 African countries. Telvi and Végh (2000) found that the ability to run budget surpluses in good times is severely hampered in the developing countries due to political pressures

to spend more. As a result, fiscal resources may be wasted, in favour of *inter alia* government agencies, state-owned enterprises, and rent seekers, rather than being used to retire debt. The implicit low propensity to save in good times translates into contractionary fiscal policy in bad times, since there is less saving available for smoothing the business cycle, thereby accentuating fiscal pro-cyclicality. Woo (2005) presented evidence that social polarization as measured by income or educational inequality is consistently positively associated with pro-cyclicality of fiscal policy and aggressiveness in using discretionary policy.

2.2 Cyclicality across components

Cyclicality across various components of government revenue and spending differ significantly within and across countries. Generally, it has been observed that cyclicality of certain components of fiscal policy is fixed almost by definition, due to automatic stabilizers. For example, tax revenue tends to increase during business cycle upturns and fall during recessions, reflecting pro-cyclicality. This is because GDP acts as a major determinant of collection of tax revenue during a year. During business cycle upturns, tax revenues tend to rise because of larger base, and possibly because of higher tax rate introduced to reduce the public deficit. On the other hand, during recessions, tax revenues tend to fall because of narrower base and possibly because of tax rate cuts made by the government to stimulate the economy. Government transfer is another example of automatic stabilizer. In the case of government transfer, which is a major component of government's current spending, in-built automatic stabilizers tend to generate a counter-cyclical pattern as the number of claimants falls during expansions and rises during recessions. This component, however, tend to be less relevant for developing countries, where social safety networks are less developed (Halland and Bleaney, 2011).

Among the other components of public expenditure, according to Keynesian demand management principle, public investment should move counter-cyclically. The cyclical behaviour of interest payments depends both on the cyclical behaviour of interest rates and the design of the public debt. Regarding the latter, strategic debt managers may attempt to induce a pro-cyclical pattern in debt payments, since the government can better afford high debt payments during boom periods (Missale 1999). Arreaza *et al.* (1999) generated panel-based estimates of the degree of cyclicality in government consumption, transfers, subsidies and (indirect and direct) tax revenues in OECD and EU countries and found that fiscal surpluses are on average pro-cyclical and government consumption is also weakly pro-cyclical.

3 Major components of central government expenditure in India

Empirical analyses of cyclicality of fiscal policy are generally focused on government expenditure. There is less number of studies analyzing cyclicality of government revenue, mainly on account of scarcity of data on tax revenues and tax rates, particularly, for the developing countries (Halland and Bleaney, 2011). In the present paper, an attempt has been made to examine the cyclicality of major components of central government expenditure in India.

Revenue expenditure, which represents current or consumption expenditure incurred on civil administration, defence forces, public health and education, maintenance of government machinery *etc* and is recurring in nature, accounts for over 85 per cent of central government's total expenditure in India. Almost half of the revenue expenditure is made towards payments of interest, subsidy and defence (Table 1). While there has been a decline in the share of defence in the recent years, the shares of interest payments and subsidies continue to remain high.

Table 1

Major Components of Central Government Expenditure in India
(percent of total expenditure)

Year	Revenue Expenditure				Capital Expenditure		
	Total	Defence	Interest Payments	Subsidies	Total	Loans and Advances	Capital Outlay
1970-71	55.7	18.7	10.8	1.7	44.3	27.6	16.7
1980-81	63.3	14.4	11.4	8.9	36.7	23.2	13.5
1990-91	69.8	10.3	20.4	11.5	30.2	18.7	11.5
2000-01	85.3	11.4	30.5	8.2	14.7	7.1	7.6
2005-06	86.9	9.5	26.2	9.4	13.1	2.2	10.9
2006-07	88.2	8.9	25.8	9.8	11.8	1.5	10.3
2007-08	83.4	7.6	24.0	10.0	16.6	1.6	15.0
2008-09	89.8	8.3	21.7	14.7	10.2	1.6	8.6
2009-10	89.0	8.9	20.8	13.8	11.0	1.5	9.5
2010-11	86.9	7.7	19.5	14.5	13.1	2.1	11.0
2011-12	87.8	7.9	20.9	16.7	12.2	1.6	10.6
2012-13 RE	88.3	7.6	22.1	18.0	11.7	1.5	10.2
2013-14 BE	86.2	7.0	22.3	13.9	13.8	1.2	12.6

Note: RE indicates revised estimates; BE indicates budget estimates.
Source: Reserve Bank of India, *Handbook of Statistics on Indian Economy*.

Capital expenditures are non-recurring type of expenditures, which generally take the form of capital investments on building durable assets, like highways, dams, irrigation projects, buying machinery and equipment *etc.* Such expenditures are expected to improve the productive capacity of the economy. Central government's loans and advances used to be the major component of capital expenditure till the 1990s. The share of loans and advances in total expenditure declined sharply with the creation of National Small Savings Fund (NSSF) in 1999 and channelisation of small savings collection through this fund rather than being intermediated by the centre. The share of capital outlay has remained broadly stable over the years.

Apart from revenue and capital expenditure, central government's total expenditure can be classified into developmental and non-developmental expenditure. All expenditures that promote economic growth and development are termed as developmental expenditure. In India, central government's developmental expenditure includes expenditures on railways, posts and telecommunication, social and community services, general economic services, agriculture and allied services, power, irrigation, transport and communication, *etc*. Non-developmental expenditures, which are generally unproductive in nature, mainly includes expenditures on defence services, interest payments, fiscal services (tax collection, currency, coinage, mints, *etc*.), administrative services (police, external affairs, *etc.*), pension and other retirement benefits, food subsidy, social security and welfare, *etc*. The share of central government's non-developmental expenditure continues to remain higher than the developmental expenditure in India, though the gap between the two has narrowed down substantially in the recent period (Figure 1).

Figure 1

Central Government Expenditure in India
(percent)

Source: Government of India, *Indian Public Finance Statistics*.

Seven categories of government expenditure have been considered in the present study. Those are: revenue expenditure, primary revenue expenditure (revenue expenditure excluding interest payments), capital expenditure, capital outlay, total expenditure, developmental expenditure and non-developmental expenditure.

4 Methodology and data sources

In economic literature, there is no consensus on how fiscal cyclicality should be measured. Authors have used different methods to empirically estimate cyclicality of fiscal policy. As observed from the literature, the simplest way to measure fiscal cyclicality is to work out the correlation between the cyclical component of output and that of the relevant fiscal variable (Kaminsky *et al.*, 2004; Talvi and Végh, 2005). Cyclical components of the output and fiscal variables are generally extracted based on the Hodrick Prescott (HP) filter method. It has been observed that HP-based measures of cyclicality may be misleading when variables have different levels of volatility (Forbes and Rigbon, 1998; Akitoby *et al.*, 2004). In view of this problem, many of the researchers have preferred regression-based measures, which are generally considered to be more precise (Lane, 2003; Woo, 2009).

For empirical estimations, the researchers have used different measures of fiscal policy. Some of them have used the growth rate of the fiscal variable, defined as the first difference of the logarithmic value. Others have used first difference of the fiscal variable as a share of GDP. Output

has also appeared in different forms in different models. Two of the most common measures of output are the growth rate of real GDP and the output gap, which is defined as the deviation from a HP trend.

Three different approaches have been used in this paper to measure the cyclicality of the selected components of government expenditure in India. A description of each of the three approaches has been provided below.

i) Fiscal cyclicality: a correlation-based approach

The first approach is to analyse the business cycle properties of the selected components of government expenditure in terms of correlation between cyclical components (HP filtered) of government expenditure and output. Real GDP at market prices has been used to measure the output. All components of government expenditure have been converted into real terms using the GDP deflator.

ii) Cyclicality coefficients: an elasticity-based approach

The second approach involves estimation of the elasticity of each of the selected expenditure variables with respect to output through time series regression. The analysis in this section is based on a simple specification of a test of cyclicality of fiscal policy as suggested by Lane (2003) and Fatás and Mihov (2003), which examines the response of rate of change of government expenditure to rate of growth of output:

$$D(\log(G_t)) = \alpha + \beta D(\log(Y_t)) + \varepsilon_t \quad (1)$$

Here, G is the government expenditure in real term; Y is the real GDP. The coefficient β represents cyclicality of fiscal policy. It measures the elasticity of government expenditure with respect to output growth. Therefore the terms cyclicality coefficient and elasticity coefficient have been used inter-changeably in the analysis. A positive value of β implies pro-cyclical behaviour; a value above unity implies a more than proportionate response of government expenditure to output fluctuations.

iii) Distinction between long-run and short-run elasticity: an error-correction approach

In the third approach, the co-movements between expenditure variables and output are estimated by using the two stage method adopted by Akitoby *et al*., (2004) for estimating cyclical and long-term behaviour of government expenditures in developing countries. In this model, the co-movements that are temporary in nature are distinguished from the co-movements that reflect a steady-state or long-run path. To begin with, it is assumed, that there is a steady-state relationship between government expenditure and output, such that:

$$G = AY\delta \quad (2)$$

Here G represents government expenditure (in real terms) and Y represents real output. δ is the long-run constant elasticity of government expenditure with respect to output. Equation (2) can be presented in a linear form as follows:

$$\log G = \alpha + \delta \log Y \quad (3)$$

Here $\alpha = \log A$.

The underlying assumption for the model is, if adjustment of the government expenditure (G) to its steady-state ($\overline{G}$) is gradual, then the level of expenditure will respond to transitory changes in output, and G will move gradually toward its steady-state or equilibrium level. To capture this gradual move, Akitoby *et al*., (2004) specified a general autoregressive distributed lag model for the government expenditure variable i in period t, such that:

$$\log G_{it} = \mu + \alpha \log G_{i,t-1} + \beta_0 \log Y_t + \beta 1 \log Y_{t-1} + \varepsilon_t, \quad |\alpha|<1 \tag{4}$$

This can be solved for the static, steady-state equilibrium by assuming that output is at its steady state level, $\overline{Y}$, and ignoring the error term:

$$\log (\overline{G_i}) = \mu / (1-\alpha) + \{(\beta_0 + \beta_1) / (1-\alpha)\} \log \overline{Y} \tag{5}$$

To reflect the steady state, equation (4) can be rearranged as an error-correction model:

$$\mathrm{D} (\log G_{it}) = \mu + \beta_0 \mathrm{D} \log Y_t + \gamma [\log G_{i,t-1} - \delta \log Y_{t-1}] + \varepsilon_t \tag{6}$$

Here (β_0 D log Y_t) may be interpreted as the short-term impact of output on government spending and β_0 as the short-run elasticity of the relevant expenditure variable with respect to output.

The error-correction term γ[log $G_{i,t-1}$ – δ log Y_{t-1}] captures the deviations from the steady-state, or the long-run equilibrium, where δ is the long-run elasticity of government spending with respect to output. γ is the rate at which government spending adjusts to past disequilibrium. Moreover, equation (6) can be used to test if there is a long-run relationship between government spending and output. If such relationship exists, then, output and government spending would be co-integrated, in which case, γ will be significantly different from zero. If output and government spending are non-stationary and there is a co-integrating relationship between them, then a simple OLS regression of government spending on output as in equation 3 would yield the long-run elasticity of spending with respect to output, (δ) which is consistent.

Accordingly, equation (6) is estimated in two stages. First, an OLS regression of each of the government expenditure variable has been conducted on a constant term and output and the residuals are collected. Second, these residuals are placed as the error-correction term in equation (6). The underlying assumption is that there is a constant elasticity relationship between output and expenditure, while the transitory deviations are random. In cases where γ is insignificant, there is no steady-state relationship between fiscal variable and output, and $\beta 0$ is best estimated by omitting the error-correction term such that:

$$\mathrm{D} (\log G_{it}) = \mu + \beta_0 \mathrm{D} (\log Y_t) + \varepsilon_t \tag{7}$$

4.1 Data sources

Annual data on output (GDP) and different components of central government's expenditure for the period 1970-71 to 2012-13 have been used for the analysis. Time series data on GDP, central government's revenue expenditure, primary revenue expenditure, capital expenditure, capital outlay and total expenditure have been taken from the *Handbook of Statistics on Indian Economy*, Reserve Bank of India. The data on central government's developmental and non-developmental expenditure have been taken from the *Indian Public Finance Statistics*, Ministry of Finance, Government of India. GDP at constant market prices (2004-05 base) has been used as the measure for output. GDP deflator has been used to convert the fiscal variables into constant prices.

5 Discussion of Results

5.1 Correlation-based approach

The correlation coefficients between cyclical components of government expenditure and output, estimated for the period 1970-71 to 2012-13, are presented in Table 2. The results indicate

Table 2

Business Cycle Properties of Government Expenditure
(constant prices)

Expenditure Items	Correlation Coefficients with Respect to Output (1970-71 to 2012-13)
Revenue expenditure	*0.38**
Primary revenue expenditure	0.37*
Capital expenditure	*0.11*
Capital outlay	0.41*
Total expenditure	*0.40**
Developmental	0.49*
Non-developmental	0.27

Note: * indicates significant at 1 per cent level.

that during this period, all the components of government expenditure considered in the study, were largely pro-cyclical, with a positive correlation with output. The correlation coefficients were found to be statistically significant in case of five out of the seven expenditure categories. Among the expenditure components, developmental expenditure displayed the highest co-movement with output, followed by capital outlay. The central government's non-developmental expenditure and capital expenditure (which includes loans and advances apart from capital outlay), on the other hand, showed weak co-movement with output.

5.2 Elasticity-based approach

Before proceeding to estimate the elasticities, all the variables were first tested for their stationary properties. Augmented Dickey Fuller (ADF) unit root test was conducted to find out whether the time series used for the analysis are stationary or not. The test results indicate that the null hypothesis of a unit root cannot be rejected in case of GDP and the expenditure variables. It was also found that all the series are stationary in their first differenced form, *i.e.*, they are integrated of order 1 (Table 3). Accordingly, estimations are done using the first differenced form, which is in line with the model specification provided in equation 1.

To obtain the cyclicality coefficients of the selected components of government expenditure, equation 1 is estimated by OLS for each of the expenditure components, with a correction for first order autoregressive error term for the period 1970-71 to 2012-13. Cyclicality coefficients represent the elasticity of the respective expenditure variable with respect to output growth.

The estimation results for equation 1 are presented in Annex 1. The estimated cyclicality coefficients for the fiscal variables are furnished in Table 4. It may be observed from Table 4 that all the components of government expenditure show pro-cyclical behaviour during the period under study, as in the case of the correlation-based analysis. Six of the estimated cyclicality coefficients, *viz.* revenue expenditure, primary revenue expenditure, capital outlay, total expenditure developmental expenditure and non-developmental expenditure were found to be statistically significant.

Table 3

Unit Root Test

Variable (*X*)	ADF	
	log *X*	**D log (*X*)**
GDP	3.02	–5.85*
Revenue expenditure	–0.30	–5.92*
Primary revenue expenditure	–0.50	–6.75*
Capital expenditure	–2.03	–7.40*
Capital outlay	0.40	–8.06*
Total expenditure	–0.15	–6.32*
Developmental expenditure	–0.37	–6.10*
Non-developmental expenditure	–0.50	–7.30*

Note: * denotes significant at 1 per cent level.

Total expenditure of the central government had a cyclicality coefficient just above 1, reflecting pro-cyclicality. Among the expenditure components, capital outlay displays the highest pro-cyclicality with the estimated cyclicality coefficient with respect to output exceeding 2. This implies that the government cuts and expands this expenditure more than proportionately with output at the time of business cycle downswing and upswing, respectively. In contrast, revenue expenditure has a much smaller elasticity (cyclicality coefficient), reflecting the underlying rigidity in cutting these expenditures during bad times. As expected, the elasticity of primary revenue expenditure, which excludes interest payments, is slightly higher than the elasticity of revenue expenditure with respect to output. The cyclicality coefficient for capital expenditure, which also includes loans and advances apart from capital outlay, lacked statistical significance. Like in the case of correlation-based analysis, developmental expenditure is found to be far more pro-cyclical compared to non-developmental expenditure.

The higher pro-cyclicality of capital outlay and developmental expenditure indicate that during the times of economic slowdown, the central government in India tend to cut back these expenditures in order to contain fiscal deficit. A cut in these expenditures, which are non-obligatory in nature, work towards offsetting the impact of declining tax revenues on fiscal deficit. This policy, however, works against the Keynesian demand management principle that government should increase expenditure at the time of economic recession to boost aggregate demand. Accordingly, the reduction of capital outlay (which represent government investment) and developmental expenditure at the time of recession work as detrimental to economic growth and development.

5.2.1 Inter-temporal analysis

In order to find out, whether there has been a change in the cyclicality of the government expenditure during the post-reform period, the entire period of 1970-71 to 2012-13 has been broken

Table 4

Cyclicality Coefficients of Select Expenditure Categories

Expenditure Items	Full Period (1970-71 to 2012-13)
Revenue expenditure	*0.67***
Primary revenue expenditure	0.78**
Capital expenditure	*1.51*
Capital outlay	2.44*
Total expenditure	*1.09**
Developmental	1.32*
Non-developmental	0.75**

Note: * and ** indicate significant at 1 per cent and 5 per cent levels, respectively.

into two sub-periods: pre-reform Period I (1970-71 to 1990-91) and post-reform Period II (1991-92 to 2012-13). The cyclicality coefficients for the selected expenditure categories have been estimated separately for each of the two sub- periods. The results reveal significant differences between the estimated coefficients for Period I and Period II (Table 5).

It may be observed from Table 5 that during Period I, all the components of government expenditure displayed pro-cyclical movements with respect to output with a positive cyclicality coefficient. The estimated cyclicality coefficients were statistically significant in the case of five out of the seven expenditure categories *viz.* revenue expenditure, capital expenditure, capital outlay, total expenditure and non-developmental expenditure. Most of the estimated cyclicality coefficients in period II were lower than in Period I. The cyclicality coefficients for three of the expenditure categories *viz.* revenue expenditure, primary revenue expenditure and non-developmental expenditure have turned negative in Period II, reflecting counter-cyclical behavior. All of the cyclicality coefficients in Period II, however, were found to be statistically insignificant.

5.3 Distinction between long-run and short-run elasticity: error-correction approach

Equation 6 has been estimated by OLS for each of the expenditure categories (the results are presented in Annex 2). In the cases, where γ was found to be statistically significant (at least at 5 per cent level), a co-integrating relationship between output and the respective expenditure variables was perceived. For those expenditure variables, having a co-integrating relationship with output, the estimated β_0 from equation 6 gives the short-run elasticity with respect to output. The long-run elasticity coefficient δ is then derived through a simple OLS regression of the expenditure variable and the output. In cases, where the error-correction term was found to be insignificant, the short-run elasticity coefficients were obtained by estimating equation 7. The short-run and long-run elasticity of the selected government expenditure variables with respect to output are reported in Table 6.

Table 5

Inter-temporal Comparison of Cyclicality Coefficients

Expenditure Items	Period I (1970-71 to 1990-91)	Period II (1991-92 to 2012-13)
Revenue expenditure	*1.07***	*–0.59*
Primary revenue expenditure	1.02	–0.97
Capital expenditure	*2.16**	*0.33*
Capital outlay	2.25**	2.57
Total expenditure	*1.43**	*0.09*
Developmental	1.04	1.48
Non-developmental	1.26**	–0.40

Note: * and ** indicate significant at 1 per cent and 5 per cent levels, respectively.

It may be observed from Annex 2 and Table 6 that 6 out of the 7 expenditures categories have a long-run relationship with output. The estimated γ was found to be statistically insignificant only in the case of non-developmental expenditure. All the estimated elasticity coefficients were found to be positive both in the long and short run. While 6 of the estimated elasticity coefficients were found to be statistically significant in the long run, 5 were found to be statistically significant in the short run.

The short-run elasticity for revenue and primary revenue expenditure were lower than their long-run elasticity, reflecting the difficulty in adjusting such expenditures with business cycle fluctuations in the short run. Opposite is the case for capital outlay, which seems to be highly elastic in the short run indicating that the government adjusts these expenditures to business cycle fluctuations in the short run. The elasticity for total expenditure and developmental expenditure remain largely similar both in the short and the long run.

6 Conclusions

The findings of the study reveal that as perceived, the central government expenditure in India is largely pro-cyclical. There are, however, substantial variations in cyclical behaviour across different components of expenditure. Both correlation-based and elasticity- based analysis covering the time period 1970-71 to 2012-13 reveal that among the components of government expenditure, capital outlay tends to be far more pro-cyclical compared to revenue expenditure. This implies that the government cuts and expands capital outlay proportionally more during the times of recession and expansion, respectively. Revenue expenditure, on the other hand, showed lower response to changes in output, reflecting the underlying rigidity in cutting these expenditures during bad times. Similarly, developmental expenditure was found to be more pro-cyclical compared to non-developmental expenditure.

Table 6

Long-run and Short-run Elasticity

Expenditure Items	Elasticity	
	Long-run	Short-run
Revenue expenditure	*1.11**	*0.63***
Primary revenue expenditure	1.10*	0.68
Capital expenditure	*0.36**	*1.38*
Capital outlay	0.89*	2.44*
Total expenditure	*0.96**	*0.95**
Developmental	1.05*	1.16**
Non-developmental		0.75**

Note: * and ** indicate significant at 1 per cent and 5 per cent levels, respectively.
In case of non-developmental expenditure, a long-run steady-state relation with output was not found.

During the period from 1990-2012, the fiscal policy in India went through many significant developments, like introduction of fiscal reforms (1990s), rule based fiscal policy regime (mid-2000s), counter-cyclical fiscal stimulus to combat the crisis (2008-09 and 2009-10) and gradual withdrawal of stimulus measures since 2010-11. Inter-temporal analysis revealed that the fiscal policy in India has generally become less pro-cyclical during the post-reform period, with most of the components of government expenditure showing lower elasticity with respect to output compared to the pre-reform period.

An analysis of short-run and long-run elasticity of expenditure variables was taken up to distinguish the expenditure movements which are temporary in nature from those which are more permanent in nature. The short-run elasticity for revenue and primary revenue expenditure were lower than their long-run elasticity, reflecting the difficulty in adjusting such expenditures with business cycle fluctuations in the short run. Opposite is the case for capital expenditure and capital outlay. These expenditures seem to be highly elastic in the short run indicating that the government adjusts these expenditures to business cycle fluctuations in the short run. The elasticity for total expenditure and developmental expenditure remain largely similar both in the short and the long run.

The higher pro-cyclicality of capital outlay and developmental expenditure, particularly in the short run, indicates that during the times of business cycle downswing, the central government in India tends to cut back these expenditures in order to contain fiscal deficit. A cut in these expenditures, which are non-obligatory in nature, works towards offsetting the impact of declining tax and non tax revenues on fiscal deficit. This policy, however, works against the Keynesian demand management principle that government should increase expenditure at the time of economic recession to boost aggregate demand. Accordingly, the reduction of capital outlay (which represent government investment) and developmental expenditure at the time of recession work as detrimental to economic growth and development.

Going forward, the main challenge for the government would be to meet its fiscal deficit targets without hurting the economic growth. On the expenditure front, a cut down in overall expenditure without sacrificing the quality would assume importance. Accordingly, while a cut in the non-plan revenue expenditure is likely to prove beneficial to the economy, a cut down in capital and developmental expenditure would be damaging to growth.

ANNEX 1

Estimation Results for Cyclicality Coefficients (Equation 1)

1 Full Period (1970-71 to 2012-13)

Dependent Variable	Constant	D log (GDP)	AR (1)	Adjusted R^2	DW
1	2	3	4	5	6
Revenue expenditure	0.03	0.67**	0.09	0.07	1.93
Primary revenue expenditure	0.02	0.78**	0.07	0.06	1.96
Capital expenditure	–0.05	1.51		0.04	2.06
Capital outlay	–0.08	2.44*	–0.24	0.21	1.97
Total expenditure	–0.00	1.09*	0.11	0.17	1.97
Developmental expenditure	–0.00	1.32*	0.02	0.10	2.04
Non-developmental expenditure	0.02	0.75**	–0.02	0.07	1.69

Note: * and ** denote significant at 1 per cent and 5 per cent level, respectively.

2 Period I (1970-71 to 1990-91)

Dependent Variable	Constant	D log (GDP)	AR (1)	Adjusted R^2	DW
1	2	3	4	5	6
Revenue expenditure	0.02	1.07**	–0.01	0.12	2.03
Primary revenue expenditure	0.02	1.02	–0.03	0.07	2.06
Capital expenditure	–0.05	2.16*		0.36	2.14
Capital outlay	–0.05	2.25**		0.17	2.04
Total expenditure	0.00	1.43*		0.26	2.02
Developmental expenditure	0.03	1.04		0.03	2.16
Non-developmental expenditure	0.01	1.26**		0.19	2.04

Note: * and ** denote significant at 1 per cent and 5 per cent level, respectively.

3 Period II (1991-92 to 2012-13)

Dependent Variable	Constant	D log (GDP)	AR (1)	Adjusted R^2	DW
1	2	3	4	5	6
Revenue expenditure	0.11*	–0.59	0.45	0.07	1.85
Primary revenue expenditure	0.14*	–0.97	0.48**	0.06	1.98
Capital expenditure	0.01	0.33		–0.05	2.21
Capital outlay	–0.10	2.57	–0.43	0.19	1.92
Total expenditure	0.06**	0.09	0.67	0.35	1.80
Developmental expenditure	–0.02	1.48	0.15	0.05	2.05
Non-developmental expenditure	0.08	–0.40	–0.22	–0.04	1.85

Note: * and ** denote significant at 1 per cent and 5 per cent level, respectively.

ANNEX 2

Estimation Results for Short-run Elasticities (Equation 6): Error-correction Model

Dependent Variable	Constant	D log (GDP)	Adjustment Coefficient (γ)	Adjusted R^2	DW
1	2	3	4	6	7
Revenue expenditure	0.04	0.63**	–0.18**	0.13	1.57
Primary revenue expenditure	0.03	0.68	–0.26*	0.18	1.55
Capital expenditure	–0.04	1.38	–0.45*	0.25	1.75
Capital outlay	–0.08	2.44*	–0.20**	0.22	2.13
Total expenditure	0.01	0.95*	–0.23*	0.24	1.59
Developmental expenditure	0.01	1.16**	–0.16**	0.16	1.77
Non-developmental expenditure	0.02	0.69	–0.08	0.05	1.84

Note: * and ** denote significant at 1 per cent and 5 per cent level, respectively.

Estimation Result for Long-run Elasticities (Equation 3)

Dependent Variable	Constant	Log (GDP)	AR (1)	Adjusted R^2	DW
1	2	3	4	5	6
Revenue expenditure	–3.23*	1.11*	0.82*	0.99	1.67
Primary revenue expenditure	–3.51*	1.10*	0.74*	0.99	1.60
Capital expenditure	2.94*	0.36*	0.54*	0.72	1.85
Capital outlay	–2.93	0.89*	0.80*	0.92	2.24
Total expenditure	–1.46**	0.96*	0.77*	0.99	1.63
Developmental expenditure	–3.38*	1.05*	0.84*	0.98	1.79

Note: * and ** denote significant at 1 per cent and 5 per cent level, respectively.

REFERENCES

Akitoby, B., B. Clements, S. Gupta and G. Inchauste (2004), "The Cyclical and Long-term Behaviour of Government Expenditures in Developing Countries", IMF, Working Paper, No. WP/04/202.

Alesina, A. and G. Tabellini (2005), "Why is Fiscal Policy Often Procyclical?", CESifo, Working Paper, No. 1556.

Alesina, A., G. Tabellini and F.R. Campante (2008), "Why Is Fiscal Policy Often Procyclical?", *Journal of the European Economic Association*, Vol. 6, No. 5.

Arreaza, A., B.E. Sorensen and O. Yosha (1999), "Consumption Smoothing Through Fiscal Policy in OECD and EU Countries", in J.M. Poterba and J. von Hagen (eds.), *Fiscal Institutions and Fiscal Performance*, University of Chicago Press.

Caballero, R. and A. Krishnamurthy (2004), "Fiscal Policy and Financial Depth", NBER, Working Paper, No. 10532.

Calderón, C. and K. Schmidt-Hebbel (2008), "Business Cycles and Fiscal Policies: The Role of Institutions and Financial Markets", Central Bank of Chile, Working Paper, No. 481.

Fatás, A. and I. Mihov (2003), "The Case for Restricting Fiscal Policy Discretion", *The Quarterly Journal of Economics*, MIT Press, Vol. 118, No. 4.

Forbes, K. and R. Rigobon (1998), "No Contagion, Only Interdependence: Measuring Stock Market Co-movements", NBER, Working Paper, No. 7267.

Gavin, M. and R. Perotti (1997), "Fiscal Policy in Latin America", in B. Bernanke and J. Rotemberg (eds.), *NBER Macroeconomics Annual 1997*, MIT Press.

Halland, H. and M. Bleaney (2011), "Explaining the Procyclicality of Fiscal Policy in Developing Countries", CREDIT, Research Paper, No. 11/09.

Kaminsky, G.L., C.M. Reinhart and C.A. Végh (2004), "When it Rains, It Pours: Procyclical Capital Flows and Macroeconomic Policies", NBER, Working Paper, No. 10780.

Lane, P.R. (2003), "The Cyclical Behaviour of Fiscal Policy: Evidence from the OECD", *Journal of Public Economics*, Vol. 87, No. 12.

Missale, A. (1999), *Public Debt Management,* Oxford (UK), Oxford University Press.

Mohanty, D. (2011), "Lessons for Monetary Policy from the Global Financial Crisis – An Emerging Market Perspective", paper presented at the *Central Banks Conference of the Bank of Israel*, Jerusalem, April 1.

Reserve Bank of India (2009), *Annual Report 2008-09*.

Talvi, Ernesto and C. Végh (2000), "Tax Base Variability and Procyclical Fiscal Policy", NBER, Working Paper, No. 7499.

Talvi, E. and C. Végh (2005), "Tax Base Variability and Procyclical Fiscal Policy", *Journal of Economic Development*, Vol. 78, No. 1.

Thornton, J. (2008), "Explaining Procyclical Fiscal Policy in African Countries", *Journal of African Economies*, Vol. 17, No. 3.

Woo, J. (2005), "The Behaviour of Fiscal Policy: Cyclicality and Discretionary Fiscal Decisions", available at: http://folk.uio.no/sholden/fiscal/woo-fiscal-volatility-jan20051.pdf

Woo, J. (2009), "Why Do More Polarized Countries Run More Procyclical Fiscal Policy?", *The Review of Economics and Statistics,* Vol. 91, No. 4.

MACROECONOMIC EFFECTS OF STRUCTURAL FISCAL POLICY CHANGES IN COLOMBIA

Hernando Vargas, Andrés González and Ignacio Lozano[*]

In the past decade the Colombian Economic Authorities undertook a series of measures that reduced the structural fiscal deficit, decreased the Government currency mismatch and deepened the local fixed-rate public bond market. This paper presents some evidence suggesting that these improvements had important effects on the behavior of the macroeconomy. They seem to have permanently reduced the sovereign risk premium, increased the reaction of output to Government expenditure shocks and strengthened the response of market interest rates to monetary policy shocks.

1 Introduction

Over the last decade the Colombian Government and Congress undertook a series of measures and reforms that significantly shifted the trend of public debt, reduced the financial fragility of the Government and deepened the domestic public bond market. First, starting from a rising, unsustainable debt path, several structural fiscal reforms were instrumental in the decline of the public debt-to-GDP ratio between 2003 and 2008, and its more recent stability. Second, an explicit policy of diminishing the currency mismatch of the public finances decreased their vulnerability in the face of a sharp depreciation following an adverse external shock. Third, there has been an effort to shift the composition of public debt toward fixed-rate, peso-denominated bonds and to lengthen its maturity.

One would expect that this set of prudent policies had important effects on the behavior of the macroeconomy both in the long term and in response to exogenous shocks. After briefly highlighting some aspects of fiscal policy and public debt management in the past ten years, this paper assesses some of those effects. Specifically, the influence of fiscal policy changes on the country's sovereign risk premium, the short-run response of output to a fiscal shock and the transmission of monetary policy shocks to market interest rates are evaluated.

2 Fiscal policy in Colombia

The adoption of a new Constitution in 1991 implied a strong expansion of the size of Government in Colombia. Increased demand for public spending in health, education and justice drove Central Government primary expenditure from 7.2 in 1990 to 12.4 per cent of GDP in 2000. At the same time, the Constitution of 1991 and the Law extended fiscal decentralization and imposed a regime in which an increasing fraction of Central Government current revenues was transferred to local governments. The tax increases adopted to pay for the additional expenditure were not sufficient and had to be shared with local governments, which, in turn, increased their spending. In addition, the intertemporal solvency of the pay-as-you-go national pension system was in doubt, given its prevailing parameters and the coexistence of a defined-contribution private pension fund system.

---

[*] Deputy Governor, Director of Macroeconomic Modeling and Senior Researcher of Banco de la República (Central Bank of Colombia), respectively.

The authors are grateful to Pamela Cardozo, Juan Manuel Julio, Karen Leiton, Enrique Montes, José D. Pulido, Jorge Ramos and Sebastián Rojas for useful suggestions about some variables and indicators used in this paper.

By the end of the nineties fiscal sustainability in Colombia was uncertain. Central Government debt-to-GDP ratio was rising fast and several local governments were over-indebted. The external shocks of that period (especially the Russian crisis) triggered the largest output drop in Colombia since the Great Depression and a financial crisis. The cost of the latter had to be absorbed by the Government, thus worsening an already weak fiscal situation. In the early 2000s an adjustment had to be implemented that included four tax reforms; two reforms to the transfers to sub-national governments;[1] a reform to the general pension regime; and other measures that substantially reduced the Non-financial Public Sector (NFPS) deficit from 4.9 per cent of the GDP in 1999 to a balanced position in 2008. During this period, the deficit of the central government was reduced from 6 to 2.3 per cent of the GDP while the remaining NFPS recorded surplus balances. As a result, the Central Government debt-to-GDP ratio declined throughout the 2000s and has been stable in recent years (Figure 1).

Since 2003, Colombia has been implementing its fiscal policy through a qualitative rule: Law 819 on transparency and fiscal responsibility. Under this mandate, the Central Government must prepare every year a *Medium-term Fiscal Framework* as its main tool for financial programming (*Marco Fiscal de Mediano Plazo,* MFMP for its acronym in Spanish). The MFMP sets a numerical target for the primary balance of the NFPS for the following year as well as some indicative targets for the subsequent ten years, so that public indebtedness remains in line with a sustainable path. Among other aspects, the MFMP includes an assessment of the contingent liabilities of the public sector, the cost of tax benefits, and some sections on the fiscal programming of sub-national governments. Fiscal forecasts are made based on macroeconomic assumptions jointly formulated by the Ministry of Finance (MoF), the Central Bank (CB), and the National Planning Department (NPD).

Even though the MFMP is a valuable tool for fiscal stance programming, it has some constraints from a macroeconomic perspective. On the one hand, the multi-annual primary balance targets are adjusted repeatedly for diverse reasons, thus lessening the initial commitments of the Government. On the other hand, it does not assess explicitly the effects of the business cycle on tax revenues and expenditures, which increases the risk of pro-cyclicality in fiscal policy. In general, pro-cyclicality has been a feature of fiscal policy in Colombia at least over the past two decades, as illustrated by the statistically significant negative correlation (–0.052) between the change in the cyclically-adjusted balance (ΔCAB) and the output gap (Figure 2).[2]

To overcome the MFMP limitations, Law 1473, by which the Central Government adopted a quantitative fiscal rule, was passed by mid-2011. In addition to ensuring the sustainability of public debt and promoting a counter-cyclical fiscal policy stance, it is expected to alleviate the effects of exchange rate volatility on the economy's tradable activities, for it would foster a better management of the resources generated by the mining and energy sectors. Furthermore, the framework of fiscal policy in Colombia was supplemented with a royalty-law for the exploitation of natural resources approved in 2011. This law aims at distributing royalty funds more equitably among the country's several regions and at saving their transitory component.

---

[1] At a sub-national level, during the second half of the 90s, Colombia implemented a set of reforms, which currently comprise its fiscal regime. In 1997, Law 358, known as the "traffic-light law", introduced quantitative criteria to limit territorial governments from borrowing beyond their ability to pay. Thereafter, in 1998 and 1999, two additional regulations were respectively sanctioned: Law 488, aimed at increasing sub-national tax revenues; and Law 549, which created the pension fund at a territorial level. Finally, in 2000, Law 617, the territorial responsibility law, laid down quantitative principles to limit the increase of the current expenditures of sub-national governments. These reforms contributed to strengthen the country's regional public finances, thus prompting better fiscal results for the NFPS over the last decade.

[2] We computed the cyclically-adjusted fiscal balances using the OECD methodology. For details on the application of this technique to Colombia, see Lozano and Toro (2007).

Figure 1

Central Government Debt-to-GDP Ratio

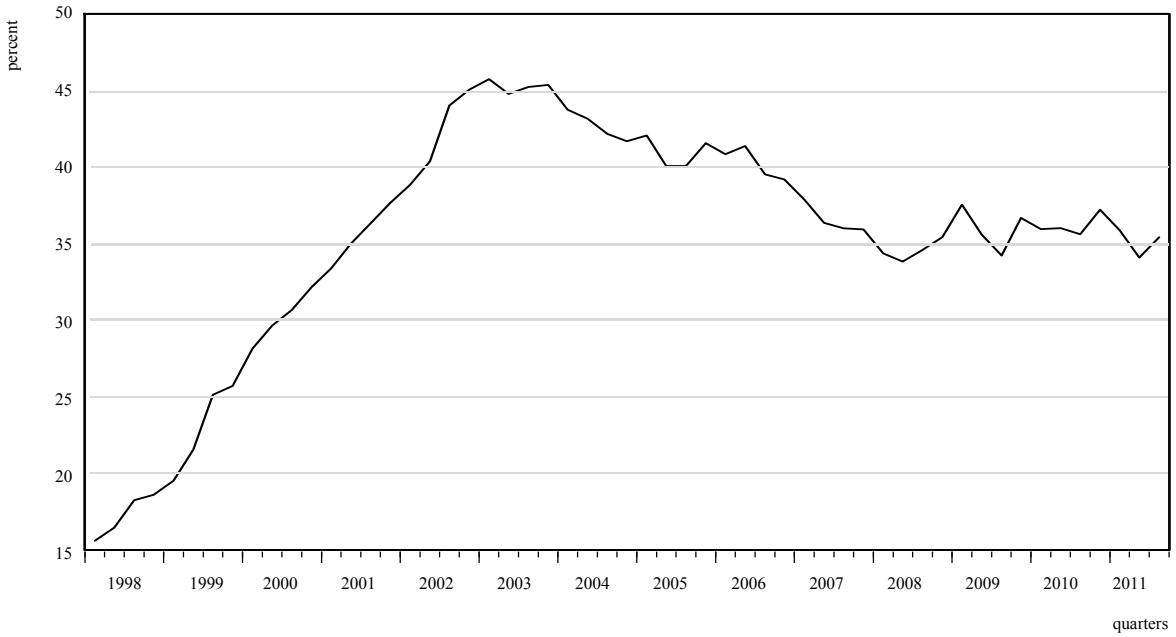
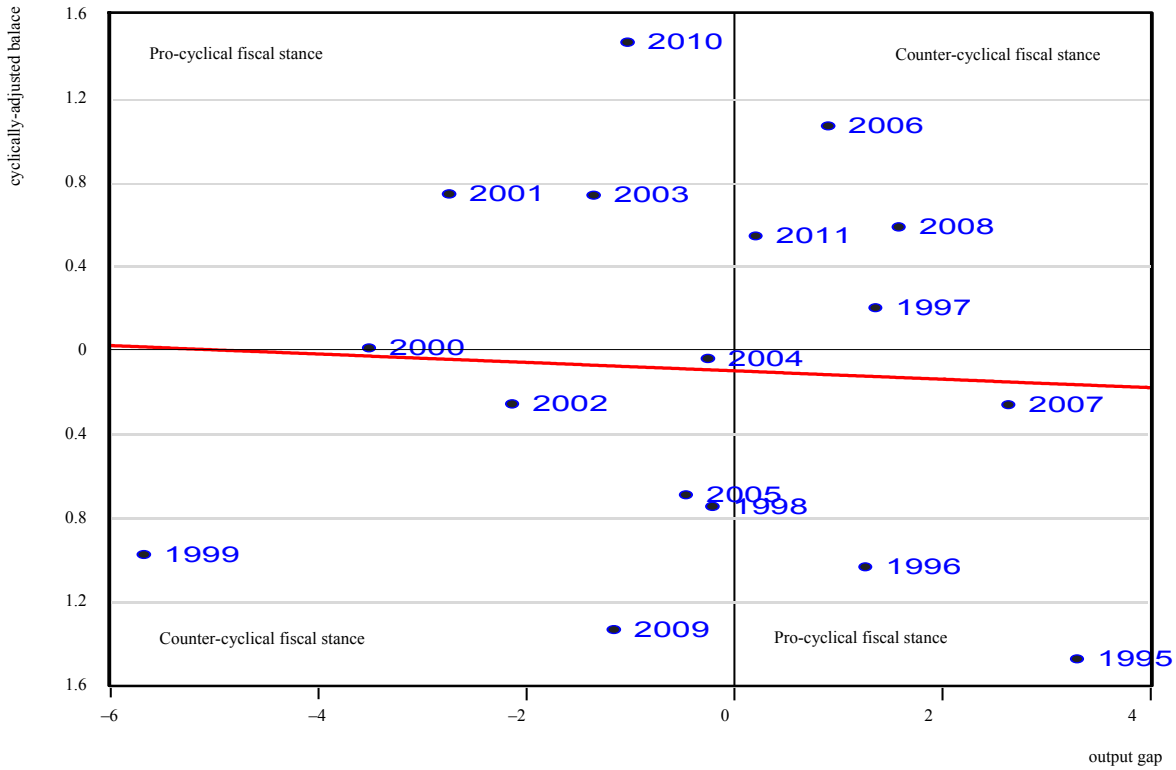


Figure 2

Fiscal Policy Stance and Output Gap



3 Public debt management in Colombia

Along with fiscal consolidation, in the last decade the Colombian Authorities have sought to improve the composition of public debt to reduce the financial fragility of Government and to encourage the development of capital markets in the country. To that end steps were taken to decrease the currency mismatch of the public sector, by shifting the composition of its debt from foreign currency denominated bonds and loans (mostly external debt) toward local currency denominated bonds (mostly internally issued). As a result, a substantial drop in a currency mismatch indicator was achieved for the Central Government (Figure 3).[3]

In turn, an effort has been made to change the composition of domestic debt from inflation or dollar indexed bonds toward fixed-rate peso denominated bonds (Figure 4). This process began in the late nineties with the inception of a market makers program, but was greatly enhanced by fiscal consolidation, the achievement of single digit inflation and a consistent convergence toward the long term inflation target (3 per cent) in the 2000s. In September 2011 the stock of local, fixed-interest, peso denominated bonds (TES) accounted for 51.4 per cent of total Central Government debt and represented 18.3 per cent of GDP.

Besides increasing the participation of these instruments in total debt, Government policy has successfully extended the maturity of the new issues throughout the last decade (Figure 5), a sign of credibility in both fiscal and monetary policy (Hamann and González, 2011). The share of the outstanding stock of bonds with less than one year residual maturity has declined in the past ten years in favor of issues with maturity greater than five years, while the share of issues with residual maturity between three and five years has remained stable (Figure 6). Today the longest maturity in the TES market is fifteen years. This attainment has been important for the development of a fixed rate mortgage loan market in the 2000s (Galindo and Hoffstetter, 2008, and Hamann *et al.*, 2010), and may have influenced the transmission of monetary policy shocks to other financial system interest rates, as will be discussed below.

4 The macroeconomic effects of the fiscal policy changes

The aforementioned improvements in fiscal and public debt management policy were large enough to have an impact on the behavior of the macroeconomy both in the long term and in response to exogenous shocks. This section explores some of those effects.

a) Effects on the sovereign risk premium

Among the most important goals of the structural adjustment process undertaken since the early 2000s were ensuring the sustainability of the public debt and strengthening the resilience of the economy in the face of external shocks. Specifically, the correction of structural imbalances and the shift in the trend of the public debt-to-GDP ratio must have reduced the probability of default of the Colombian Government and the vulnerability of the latter to shocks hitting its revenues and expenses. Further, the fall of its currency mismatch must have reinforced the ability of the

---

[3] The indicator, inspired by Goldstein and Turner (2004) and Rojas-Suárez and Montoro (2011), attempts to capture the ability of the Central Government to serve its foreign currency-linked debt on the basis of its foreign currency-linked revenues. It is constructed as the ratio: (FCD/TD) / (FCR/TR) for the Central Government. FCD = Foreign Currency Debt. TD = Total Debt. FCR = Foreign-currency-linked revenue, which includes external VAT, import tariffs, Ecopetrol (the state oil company) dividends, income taxes paid by mining companies and other exporting firms, and income derived from external assets. TR = Total revenue. Data sources: Banco de la República, DANE, DIAN, Ecopetrol, Supersociedades and Hamann, Lozano and Mejía (2011).

Figure 3

Currency Mismatch Indicator for Central Government

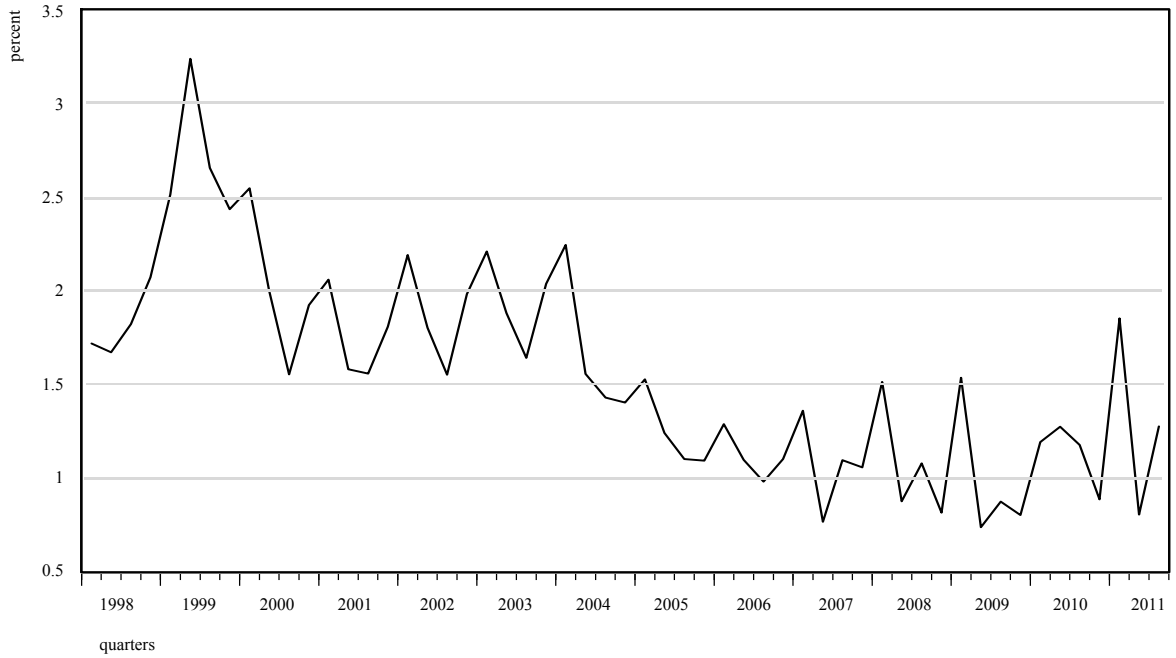


Figure 4

Composition of the Domestic Public Debt

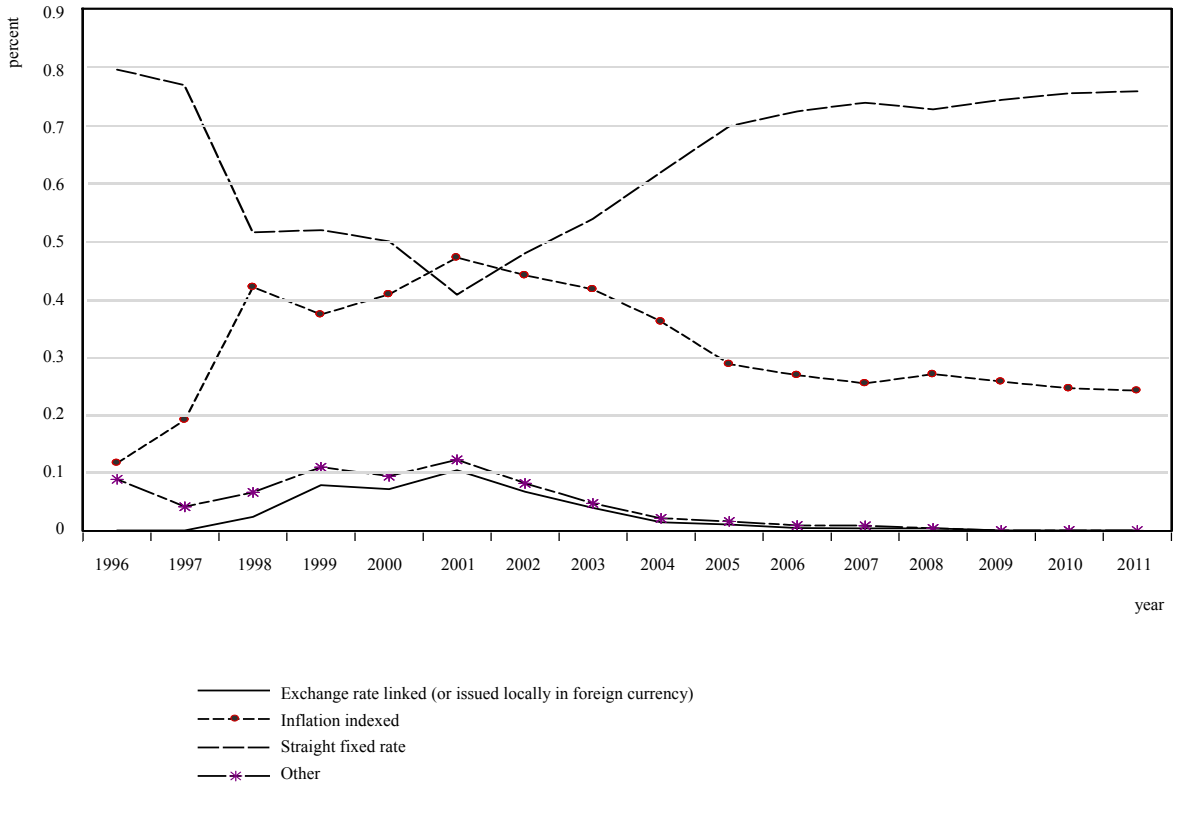


Figure 5

Average Maturity of New Issues of TES

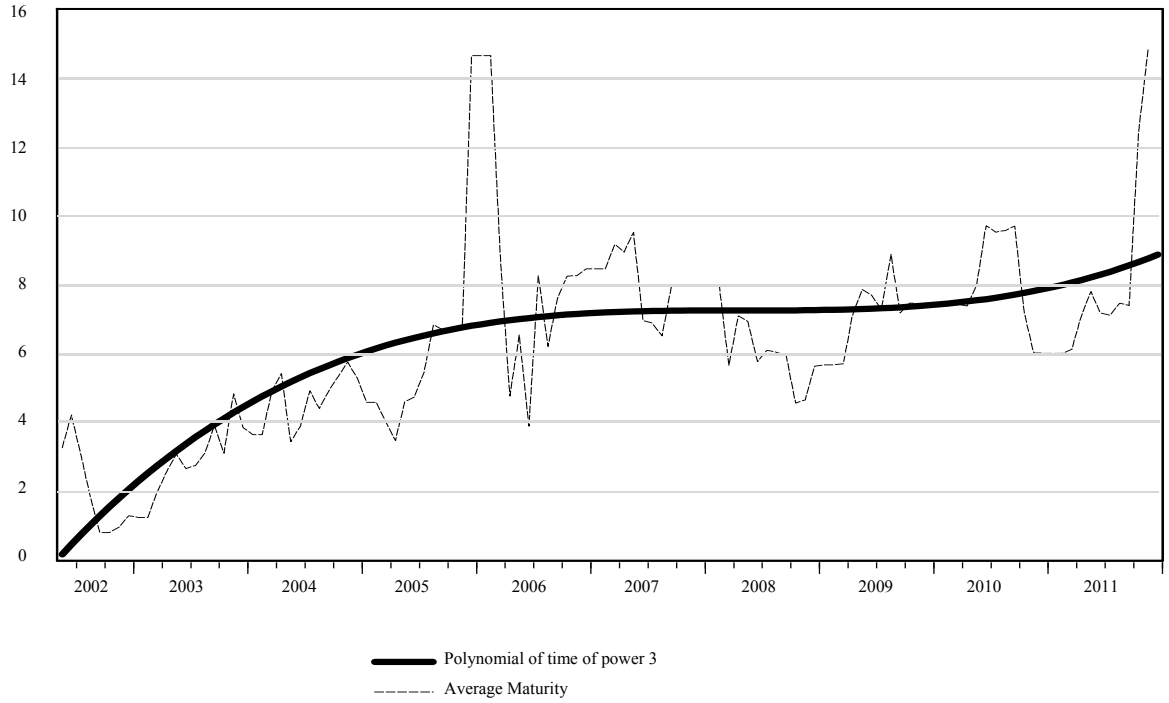
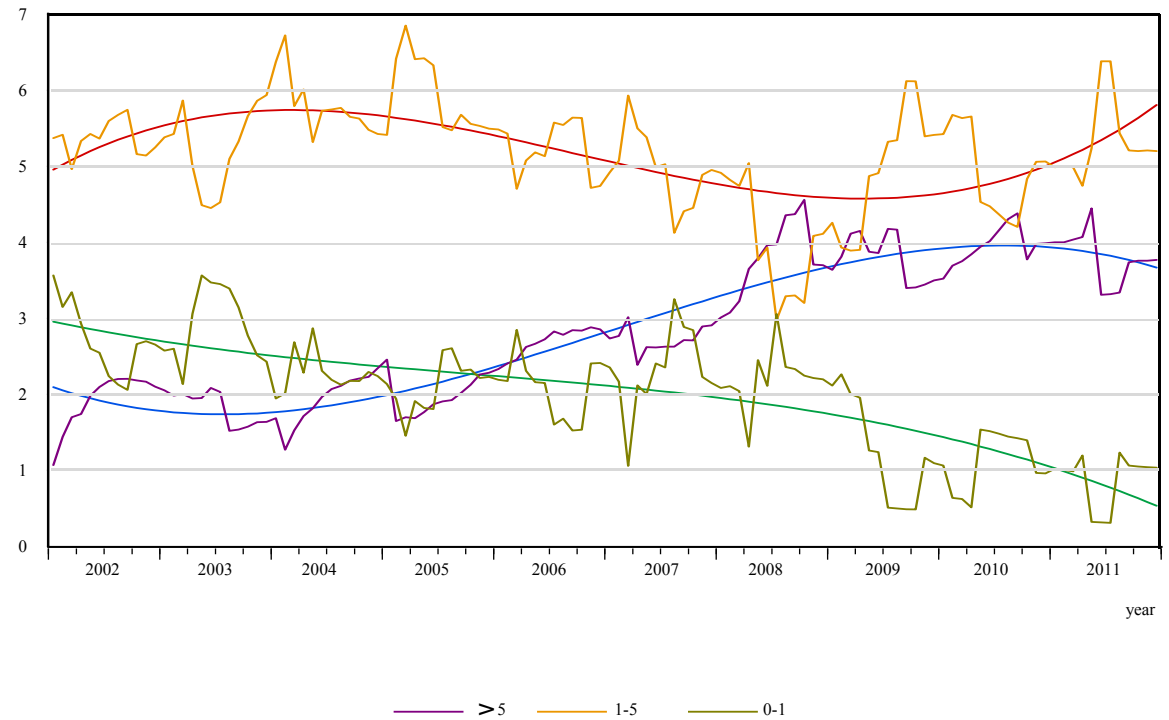


Figure 6

Maturity Composition of the Fixed-rated TES Stock

(percent)



Government to withstand a depreciation shock. At a more aggregate level, the decline in the Government currency mismatch was part of a general trend that also included the private sector and allowed a greater scope for exchange rate flexibility and the possibility of a counter-cyclical monetary policy response to external shocks. This, in turn, moderated the effect those shocks on output and fiscal revenues.

Overall, the reduction in the public debt-to-GDP ratio and Government currency mismatch must have decreased the credit risk of the Government and the country. Hence, they must have contributed to a permanent drop in the sovereign risk premium and to a decline in its sensitivity to global risk aversion shocks.

To test the first implication, we estimated a model for the Colombian sovereign risk premium, measured by the EMBI Colombia, based on the following specification:

$$embic_t = \alpha_0 + \alpha_1 gra_t + \alpha_2 (d/y)_t + \alpha_3 cm_t + \varepsilon_t$$

embic is the EMBI Colombia, *gra* is a measure of global risk aversion, *d/y* is the Central Government debt-to-GDP ratio and *cm* is the currency mismatch indicator calculated above. As measures of global risk aversion, the VIX and the 5-year high yield spread were used. All variables were expressed in logs and were non-stationary in the sample 1999.Q2-2011.Q4 (quarterly data). Cointegration was found for these systems based on the Hansen test (Hansen, 1992).

The long run relationships presented in Table 1 confirm the importance of local fiscal variables in the determination of the Embi Colombia, beyond the effect of global risk aversion. In both specifications (with the VIX and the high yield spread as measures of global risk aversion) the Government currency mismatch appears significant and with the expected positive sign. The debt-to-GDP ratio is also significant and with the expected positive sign in the specification that uses the VIX as the global risk aversion variable (Table 1, upper panel). It is positive, but not significant in the specification that includes the high yield spread as the measure of global risk aversion (Table 1, lower panel).

The second implication, changing sensitivity of the sovereign risk premium to global risk aversion as a result of improved fiscal policy, is tested by Julio *et al.* (2012). Following Favero and Giavazzi (2004), these authors estimate a model in which the response of the Embi Colombia to the spread between the US BAA corporate bonds and the 10-year US Treasury Bonds depends on the difference between the observed Government primary surplus and the value of the primary surplus that would stabilize the debt-to-GDP ratio at each point in time. They posit a non-linear relationship in which large observed primary surpluses relative to their debt ratio-stabilizing values drive the sensitivity of the Embi Colombia to global risk aversion toward zero, while the opposite situation increases that sensitivity.

Working on a monthly sample between 1998 and 2010, Julio *et al.* (2012) find that the sensitivity of the Embi Colombia to their measure of global risk aversion does depend significantly on their fiscal health indicator. Furthermore, they find a structural break in the sensitivity function around mid-2006. After this period, there seems to be a substantial reduction of the sensitivity function, which the authors associate both to a permanent and marked improvement in the Colombian fiscal health indicators, and to the deterioration of public debt ratios in advanced economies.

In sum, the evidence presented in this section and in Julio *et al.* (2011) supports the hypothesis that the aforesaid improvements in fiscal policy and public debt management did reduce permanently the sovereign risk premium in Colombia and its sensitivity to global risk aversion shocks. The macroeconomic implications of this result are important.

Table 1

Determination of the EMBI Colombia: Long-run Relationships

Dependent Variable: EMBI Colombia

Variable	Coefficient	Std. Error	*t*-Statistic	Prob.
gra: LVIX	0.6266	0.1700	3.6847	0.0006
log(*d/y*)	0.8529	0.3850	2.2153	0.0321
log(*cm*)	1.2614	0.1669	7.5569	0.0000
c	0.4002	1.6093	0.2487	0.8048
Cointegration Test Hansen (1992) LM = 0.392339, *p*-value > 0.20				

Dependent Variable: EMBI Colombia

Variable	Coefficient	Std. Error	*t*-Statistic	Prob.
gra: LSPREAD	0.5565	0.1229	4.5281	0.0000
log(*d/y*)	0.5061	0.3247	1.5586	0.1264
log(*cm*)	1.3208	0.1446	9.1328	0.0000
c	2.5258	1.2213	2.0681	0.0447
Cointegration Test Hansen (1992) LM = 0.474112, *p*-value > 0.20				

First, it means that, *ceteris paribus*, the long term level of the real interest rate must be lower today than a decade ago. Based on the long run relationship presented in Table 1 (upper panel), on average, local factors (the decline in the Government currency mismatches and the debt-to-GDP ratio) would imply roughly a 60 per cent decrease in the Embi Colombia between 2002.Q1-2006.Q4 and 2007.Q1-2011.Q4.[4]

Also, a permanent decrease in the risk premium entails a permanent adjustment in the long run level of the real exchange rate. Hence, it could be argued that part of the real appreciation of the COP in the past decade could be attributed to better fiscal policy. The permanent movement of the long run level of both the real interest rate and the real exchange rate has important consequences for the design and operation of monetary policy. It implies that the mean value of the *natural* interest rate must be lower than ten years ago and that indicators of trend real exchange rates that give large weights to values from the early 2000s are probably biased.

Second, the empirical results suggest that the economy is generally less vulnerable to global risk aversion shocks because of the reduced sensitivity of the risk premium to them. This implies lower responses of the exchange rate and capital flows to those shocks, and, consequently, lower pressure on inflation, output and monetary policy.

---

[4] We computed the changes in the logarithm of the average Government currency mismatch indicator and the debt-to-GDP ratio between 2002.Q1-2006.Q4 and 2007.Q1-2011.Q4, and multiplied them by the corresponding elasticities from Table 1. We then added the calculated impacts.

b) Effects on the short-run response of output to Government expenditure shocks

It is likely that the perception of households, firms and investors about the sustainability of the public debt and the financial fragility of the Government influences their reaction to fiscal policy shocks. An unexpected increase in public expenditure may prompt an expectation of higher taxes in the short run in a dire financial situation of the Government, thereby offsetting its possibly expansionary effect on output. Moreover, a similar shock in a small, open economy may sharply raise the sovereign risk premium, bringing about a tightening response of the monetary authority to curb currency depreciation and inflation, or a contraction of external finance and credit (Ilzetzki *et al.*, 2009). When public debt sustainability is more certain or Government currency or liquidity mismatches are low, the expansionary effects of a public expenditure shock may be greater.

To explore this hypothesis the empirical strategy must carefully consider the problems of identification of a fiscal shock (finding the movement of fiscal variables that are *not* contemporaneous responses to output) and the anticipation of fiscal policy by the private sector. The first issue is crucial to avoid a bias in the estimation of the response of output to an exogenous fiscal shock and requires isolating the part of the movement in the fiscal variables that are purely discretionary, non-output related changes. The second issue is important because an anticipated fiscal policy shift may induce an anticipated response by the private sector consumption or output, so that the estimated response after the realization of the shift could be biased (Perotti, 2007).

SVAR models have been widely used in the literature to identify fiscal shocks.[5] Another technique, the so called "narrative approach", uses dummy variables to measure the effects of fiscal policy shocks that are not related to movements of output (e.g., wars, "ideological" policy shifts, output-independent cross sectional effects etc.).[6] In Colombia SVAR models used to estimate the effect of fiscal policy shocks on output have rendered results that range from negligible impacts (Restrepo and Rincón, 2006) to positive expenditure multipliers between 1.1 and 1.2 (Lozano and Rodríguez, 2011). However, these studies include a relatively long sub-period in which the exchange rate was not as flexible as after 1999 (crawling peg or target zone regimes). Consequently, their estimated impacts may be affected by a structural break related to the adoption of a floating exchange rate regime.[7]

Our approach differs from the previous work in three important dimensions. First, our sample covers only the floating exchange rate period (1999-2011). Second, we are interested in capturing a possibly changing effect of public expenditure shocks, as fiscal policy became sounder throughout the 2000s. This implies the use of a non-linear technique that allows for a smooth transition between regimes that are defined according to indicators of fiscal health. Third, since we do not estimate a SVAR, we identify the Government expenditure shock based on innovations on the publicly known spending announces for the Central Government.[8]

Following Auerbach and Gorodnichenko (2012), instead of estimating a SVAR and deriving standard impulse response functions, we approximate the non-linear impulse-response function by the following linear projection:

$$Y_{t+h} = G(z_t)\,(\Psi_1^h\ F_t + \Lambda_1(L)\ Y_{t-1}) + (1-G(z_t))\,(\Psi_2^h\ F_t + \Lambda_2(L)\ Y_{t-1}) + \varepsilon_t$$

---

5 See for example Blanchard and Perotti (2002) for the U.S.; Perotti, (2004), and Caldara and Kamps (2008) for the OECD countries.

6 See Perotti (2007) and Romer (2011).

7 Standard Mundell-Fleming theory suggests that the exchange rate regime makes a difference regarding the effect of fiscal policy shocks in a small open economy. See Itzletzki *et al.* (2009) for some evidence about the differences of output responses to fiscal shocks in economies with flexible and pegged exchange rates.

8 We do not study the effects of tax shocks due to the difficulties involved in their identification and the problems derived from the sensitivity of the theoretical results to the time profile of distortionary tax responses (Perotti, 2007).

The impulse response function of output (Y_{t+h}) to an unexpected government expenditure shock (F_t) is estimated directly by $G(z_t)\ \Psi_1^h + (1–G(z_t))\ \Psi_2^h$ where Ψ_1^h and Ψ_2^h are estimated by least squares (see for details Jordà, 2005).

Notice that the impulse response function depends on the value of the variable z_t. In our case, z_t is a fiscal health indicator. At a given point in time the impulse response function may be understood as combination or "average" of the functions corresponding to the extreme states of the fiscal health indicators (e.g., "High Debt" vs. "Low Debt", or "High Currency Mismatch" vs. "Low Currency Mismatch"). The weight of each extreme state will be given by the transition function $G(z_t) = e^{-\gamma zt}/(1+e^{-\gamma zt})$, which measures how close the fiscal health indicator of the moment is to one extreme state or to the other.

The above technique requires the definition of an exogenous Government spending shock, F_t, outside the model that meets the criteria of no anticipation and no contemporaneous correlation with output. To do so, we define the shock as the difference between the Central Government actual primary expenditures (overall spending without interest payments on public debt) and the forecast made of this variable. For the OECD countries, these predictions are typically taken from professional forecasting surveys. Since this type of information is not available for Colombia, we derived it from the Ministry of Finance announced Financial Plans as explained in the Appendix 1. The fiscal shocks so computed are not anticipated by construction, nor are they correlated with current output because of the lag with which output and other real activity data are available, and the lag with which expenditure decisions are executed.[9]

As fiscal health variables, z_t, we used the Central Government debt-to-GDP ratio, the Government currency mismatch and the difference between the observed Government primary surplus and the value of the primary surplus that would stabilize the debt-to-GDP ratio at each point in time (Figure 7).[10] The impulse response functions of output to a Government expenditure shock are estimated using quarterly data for the 1999-2011 sample.

The results in Figures 8 and 9 suggest that there were important changes in the response of output to the fiscal shock throughout the decade, as fiscal health indicators improved markedly.[11] The responses in the beginning of the decade were, when positive, small and short-lived; in other cases, they were negative on impact and non-significant afterwards. When the debt-to-GDP ratio stopped rising or the primary surplus deviation from its debt-stabilizing level increased (2002-03), output responses turned positive and remained significantly different from zero for several periods. Interestingly, the positive reactions seem to be clearer and larger when the primary surplus is higher (2007-08) (Figure 9), although in no case the estimated conditional Government expenditure multipliers exceed one. Similarly, the output responses related to low Government currency mismatches (2005-11) were in general significantly positive for several quarters, unlike the responses observed in years of high currency mismatches (1999-2004) (Figure 10).[12]

---

[9] A potential drawback of our measure of expenditure shock is that we cannot separate public consumption and investment expenses, since the Government Financial Plans do not disaggregate the outlays in these categories. We are then capturing the effects of a shock to the aggregate Central Government expenditure. This may be a problem if the macroeconomic effects of public consumption and investment shocks are very different, and if the composition of the aggregate shocks changes significantly from year to year.

[10] See Julio *et al.* (2012) for details on the construction of this series.

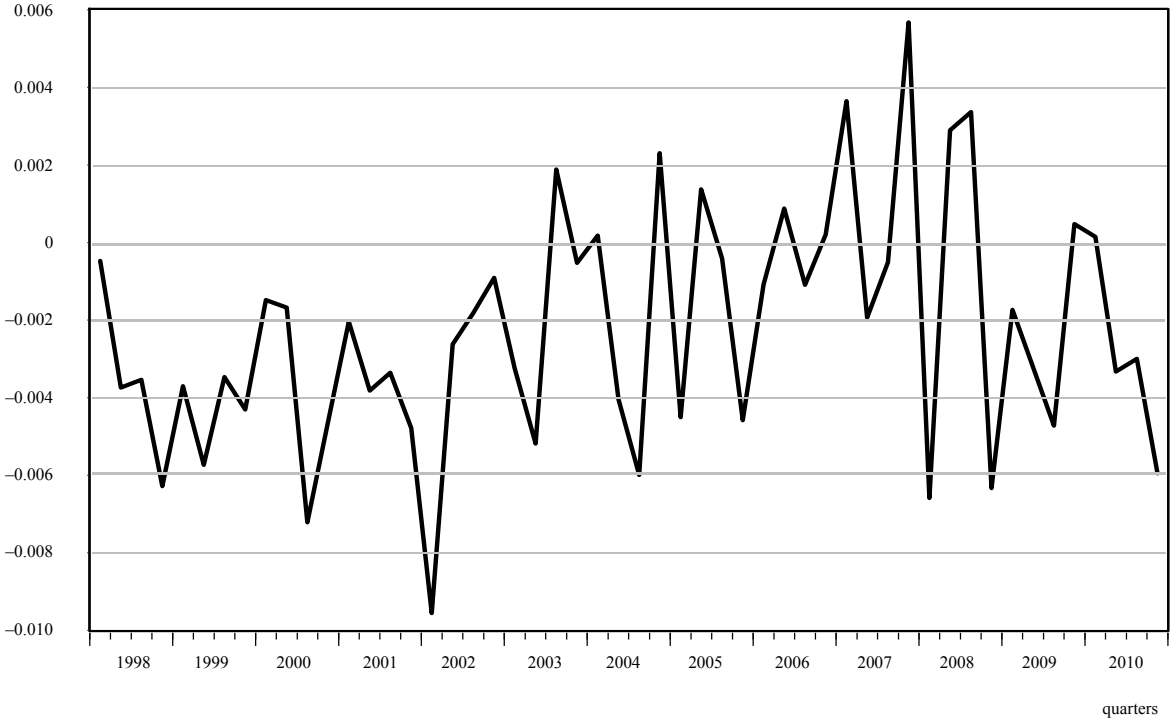
[11] The technique used allows us to estimate the impulse response functions with confidence intervals for each quarter in the sample. The results presented in Figures 8 to 10 correspond to the average responses for each year with the confidence interval calculated appropriately. We used four lags of the GDP in the estimation.

[12] When interpreting the impulse response functions presented in Figures 8-10, it must be recalled that they are *conditional* on the state of the fiscal variable used to define the regime. For example, in 2004 the responses of output to the fiscal shock were generally positive when the fiscal variable regime is measured by the difference between the primary surplus and its debt-stabilizing level, but essentially zero when the fiscal variable regime is measured by the Government currency mismatch. This means that the response of output *conditional* on the surplus variable of that year was significantly positive, but the response *conditional* on the currency

(continues)

Figure 7

Difference Between Actual and Debt-stabilizing Primary Balances
(percent of GDP)



Hence, the power of fiscal (expenditure) policy to affect output is greater, the stronger the financial position of the Government. The implication of this result for the assessment of the convenience of counter-cyclical fiscal policy is apparent. For instance, a sound public finance situation not only has benefits in terms of permanently lower real interest rates and lower vulnerability of the economy to global risk aversion shocks, but also seems to enhance the effectiveness of counter-cyclical fiscal policy.

c) Effects on the transmission of monetary policy shocks to market interest rates

As the fiscal situation improved structurally and monetary policy gained credibility throughout the 2000s (Hamann and González, 2011), the transmission of monetary policy shifts to financial market interest rates may have been strengthened. To begin, under a more credible monetary policy regime, a movement in overnight policy rates is likelier to be incorporated in longer-term public bonds and financial system interest rates because the policy change will most probably be perceived by market participants as a persistent signal on the policy stance, instead of a noisy policy error to be undone in the near future.

mismatch observed in the same year was non-significant. Overall, it may be concluded that the probability of a positive impact of a fiscal shock on output increased in 2004 with respect to previous years in which all conditional responses were non-significant, but is smaller than in later years, when all conditional responses were statistically positive.

Figure 8

Fiscal Policy Shock: Output Responses Conditional on the Debt-to-GDP Ratio

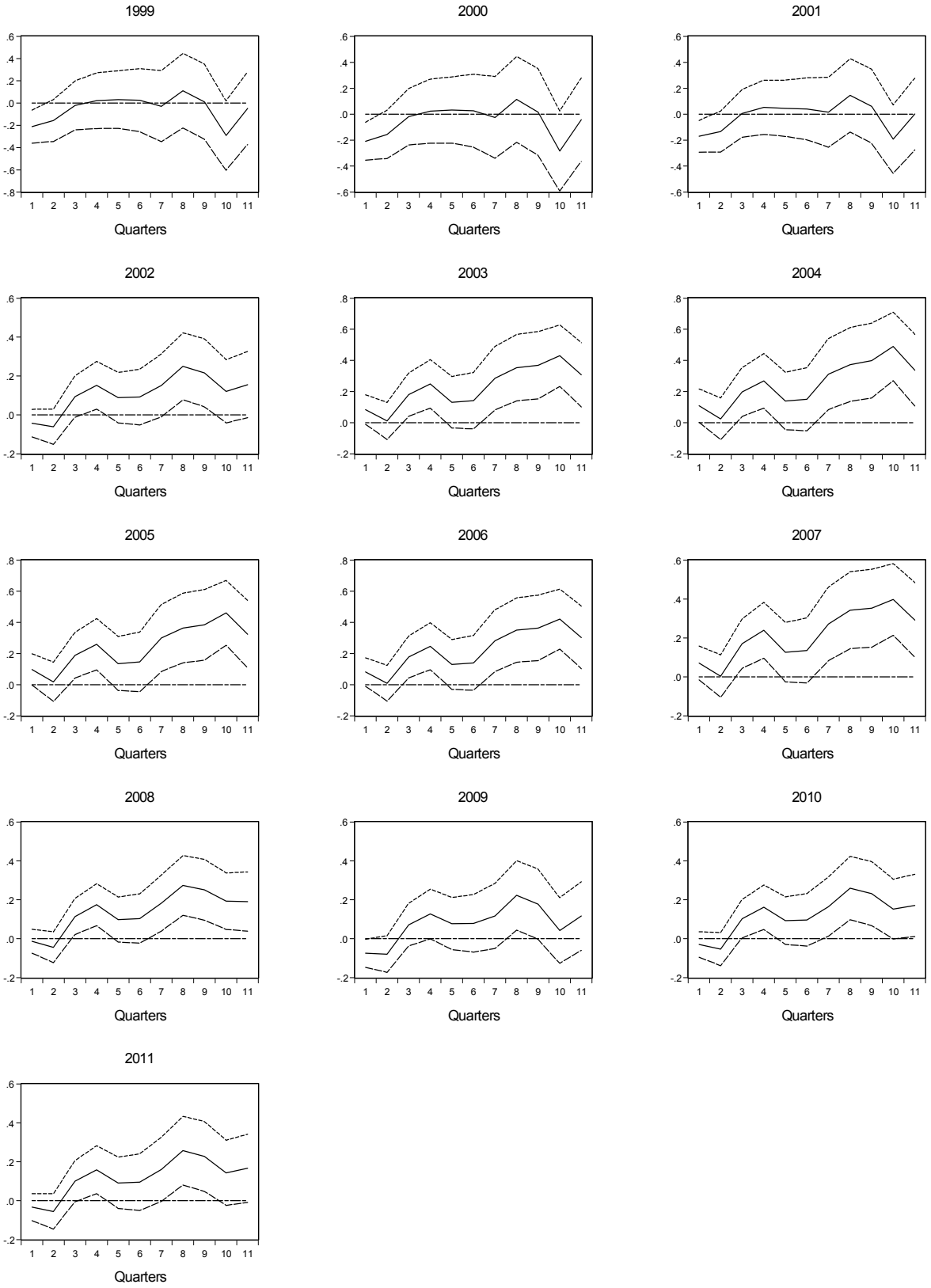


Figure 9

Fiscal Policy Shock: Output Responses Conditional on the Difference Between Actual Primary Balance and its Debt-stabilizing Level

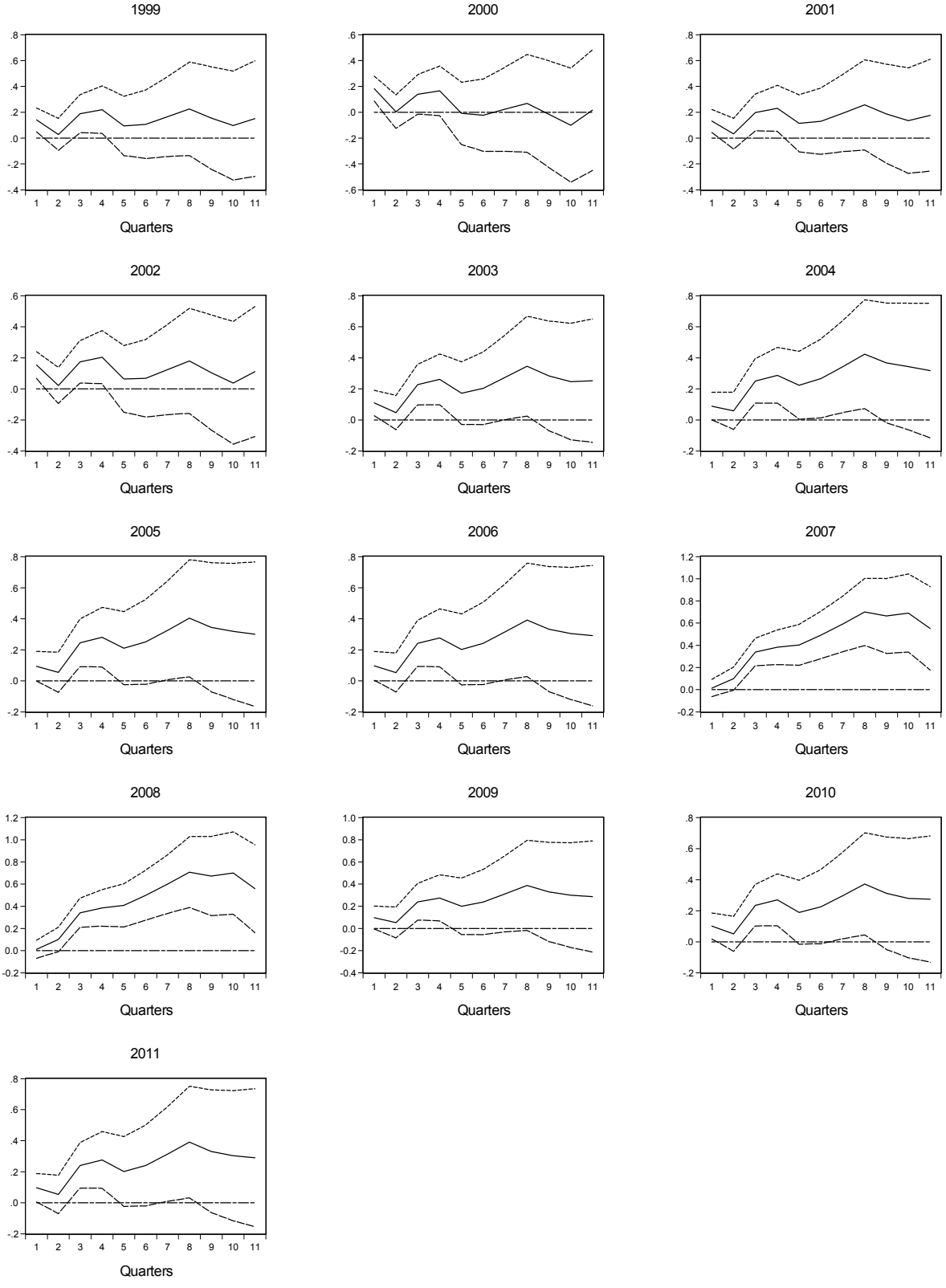
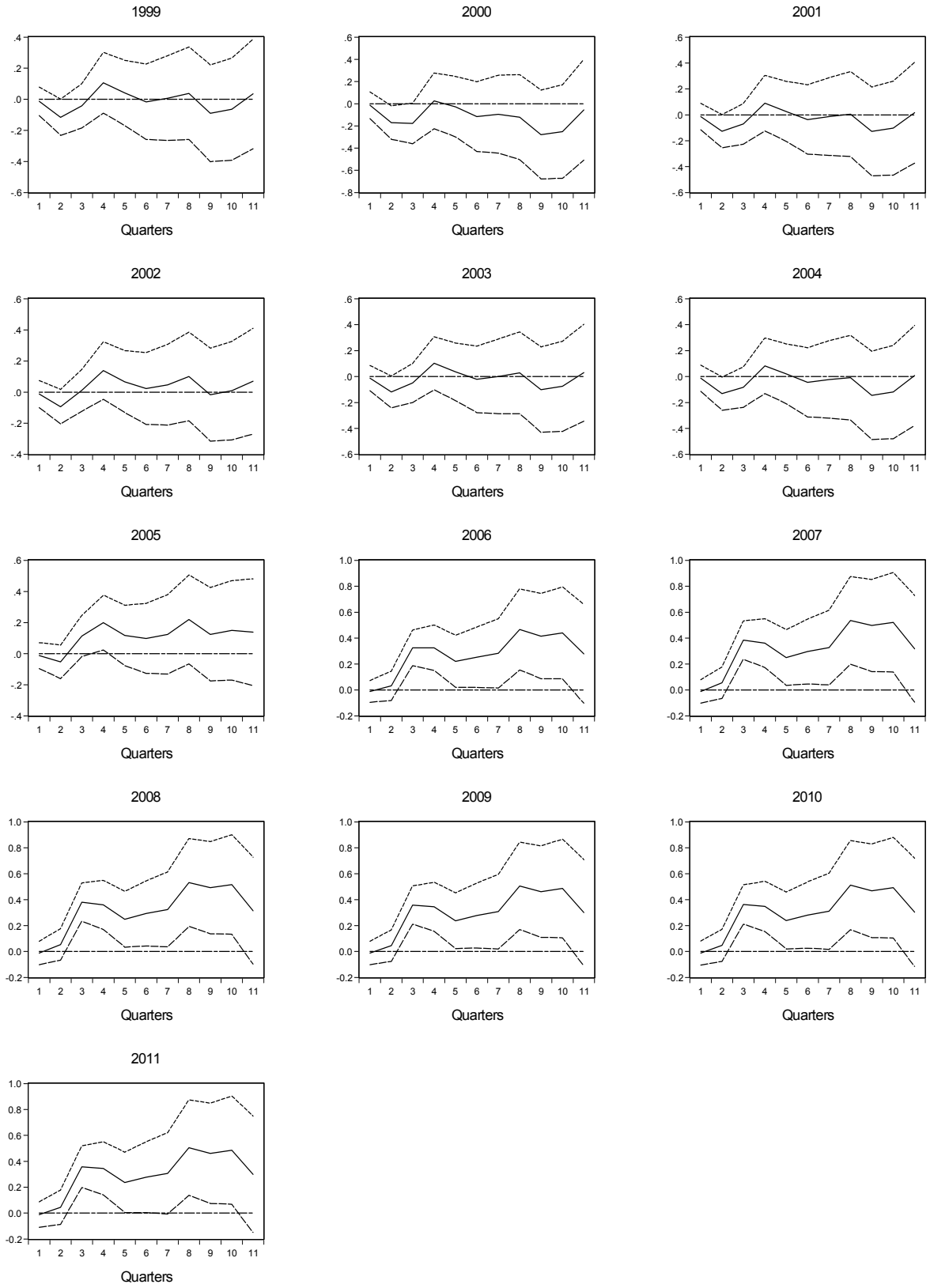


Figure 10

Fiscal Policy Shock: Output Responses Conditional on the Currency Mismatch Indicator



Furthermore, as mentioned above, the enhanced credibility of a low and stable inflation rate as well as a stronger perception of public debt sustainability permitted the extension of the maturity of fixed-rate public bonds. Consequently, the depth and liquidity of longer-term public bond markets may have been increased, thereby making their prices a better guide to interest rate setters in the financial system and allowing them to better filter the news from a monetary policy shock.

To explore the relevance of these hypotheses we use the same non-linear model of the foregoing section to test whether the transmission of monetary policy shocks to public bond interest rates (TES) and deposit or loan rates changed as the maturity of the Government fixed income market was expanded throughout the 2000s. Specifically, we estimate the following monthly models for TES and market interest rates:

$$ites_{t+h} = H(z_t)\,(\Pi_1^h M_t + \Gamma_1(L)\, ites_{t-1} + \Sigma \rho_t) + (1-H(z_t))\,(\Pi_2^h M_t + \Gamma_2(L)\, ites_{t-1}\, \Sigma \rho_t) + \varepsilon_t$$

$$im_{t+h} = J(z_t)\,(\Phi_1^h M_t + B_1(L)\, im_{t-1} + K_1(L)\, ites_{t-1}) + (1-J(z_t))\,(\Phi_2^h M_t + B_2(L)\, im_{t-1} + K_2(L)\, ites_{t-1}) + \varepsilon_t$$

The response of TES rates, $ites_{t+h}$, to an unanticipated monetary shock, M_t, is approximated directly by $H(z_t)\ \Pi_1^h + (1-H(z_t))\ \Pi_2^h$ in a linear projection estimated by least squares (Jordà, 2005).[13] Notice that this response is allowed to change as a function of the maturity of the new issues of fixed rate TES (z_t = long-term component of the average maturity of new issues) (Figure 5). A similar model is estimated for the response of market (deposit or loan) interest rates, im_{t+h}, to an unanticipated monetary shock, M_t, but the controls include lagged values of both market and TES rates with similar maturities.

The definition of monetary shock is crucial to minimize the bias of the estimated impulse response functions. If a change in the policy interest rate is anticipated by market participants, then it would be incorporated in longer-term TES or financial system interest rates before it happens. When the change occurs, the reaction of longer interest rates will be null, leading to an estimated negligible transmission of monetary policy. Therefore, the estimated monetary policy shock must be unanticipated and, so, orthogonal to all information that might be relevant to predict the policy rate at each point in time. Appendix 2 provides some details on the estimation of the monetary policy shock that is used in our estimations.

The results for the transmission of policy rates to TES interest rates are shown in Figures 11 to 14.[14] There seems to be two clearly different regimes: one between 2002 and 2003, the other between 2005 and 2011, and a transition year in 2004. Between 2002 and 2003 there were *negative* monetary shocks (Figure 30), meaning that the market expected policy rate increases that did not happen. According to Figures 11 to 14, 0-5 year TES rates increased and the zero coupon curve steepened up to the sixth month after the shock. TES rates for maturities greater than five years, slightly declined on impact, but rose sharply afterwards.[15] In contrast, between 2005 and 2011, the monetary shock took both positive and negative values and its volatility was substantially smaller (Figure 30). In this period all TES rates rose with a positive monetary shock, while the zero coupon curve generally flattened afterwards, as can be seen by comparing the impacts across time and maturity.

---

[13] The equation for the TES rates controls for the influence of the Embi Colombia, ρ_t.

[14] The technique used allows us to estimate the impulse response functions with confidence intervals for each month in the sample. The results presented in Figures 11 to 14 correspond to the average responses for each year with the confidence interval calculated as before. We used one lag of TES rates in the estimation.

[15] Given the units of the TES rates and the monetary shock, an impulse response value of 100 corresponds to a one-on-one transmission of the monetary shock.

Figure 11

Monetary Policy Shock: Response of TES with Maturity Less Than 1 Year Conditional on the Average Maturity of New Issues of Fixed-rated TES

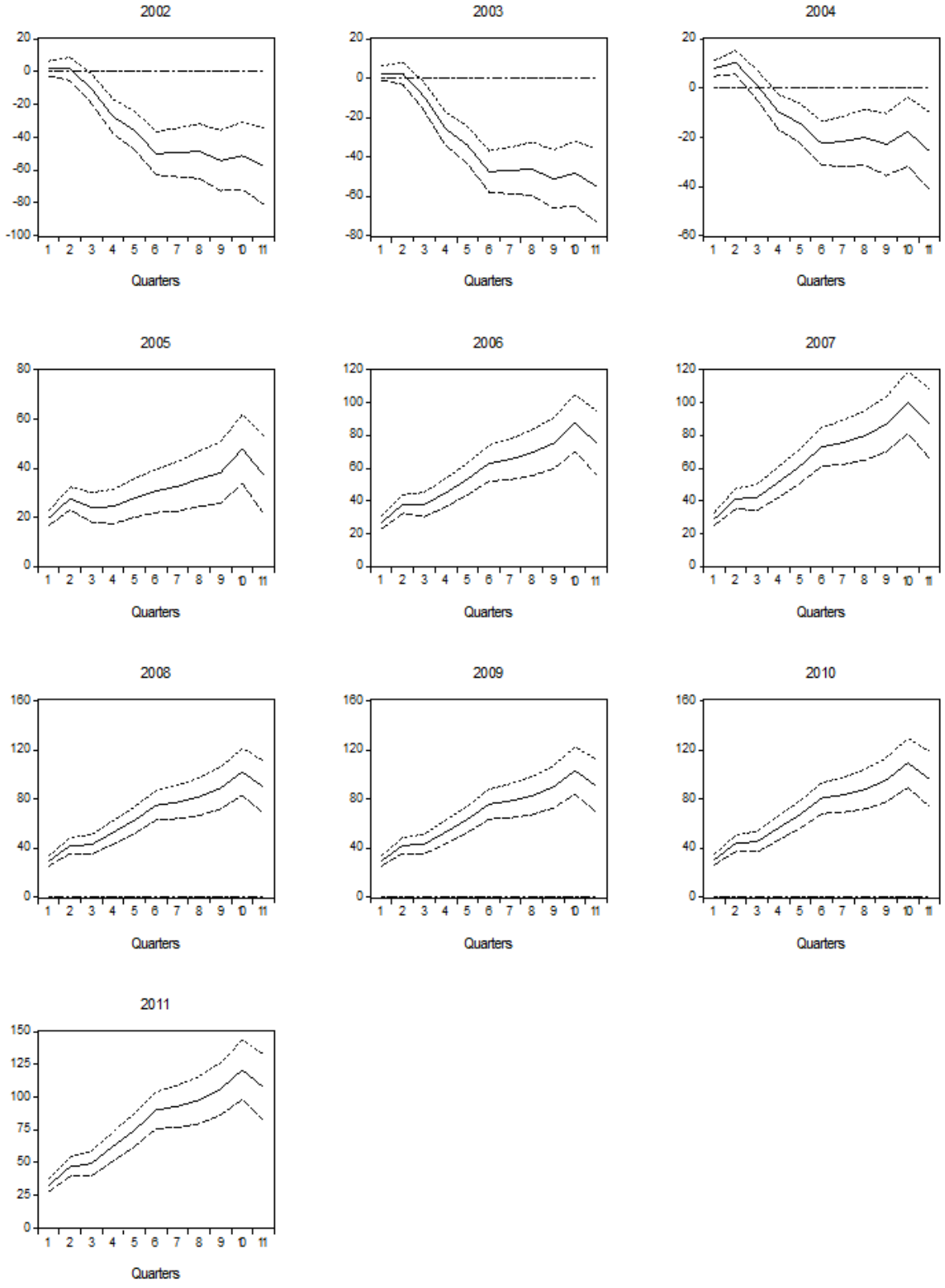


Figure 12

Monetary Policy Shock: Response of TES with Maturity Between 1 and 3 Years Conditional on the Average Maturity of New Issues of Fixed-rated TES

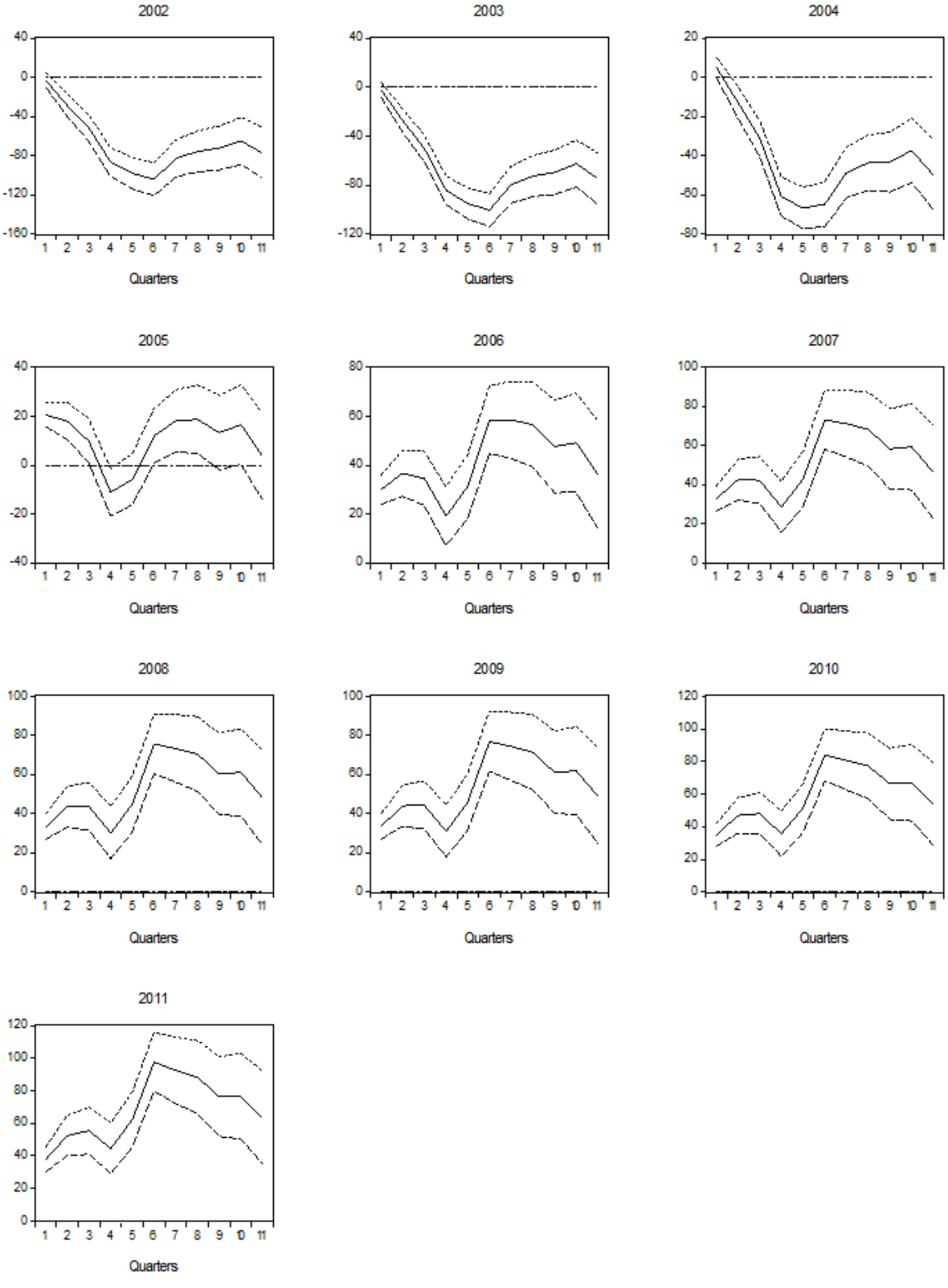


Figure 13

Monetary Policy Shock: Response of TES with Maturity Between 3 and 5 Years Conditional on the Average Maturity of New Issues of Fixed-rated TES

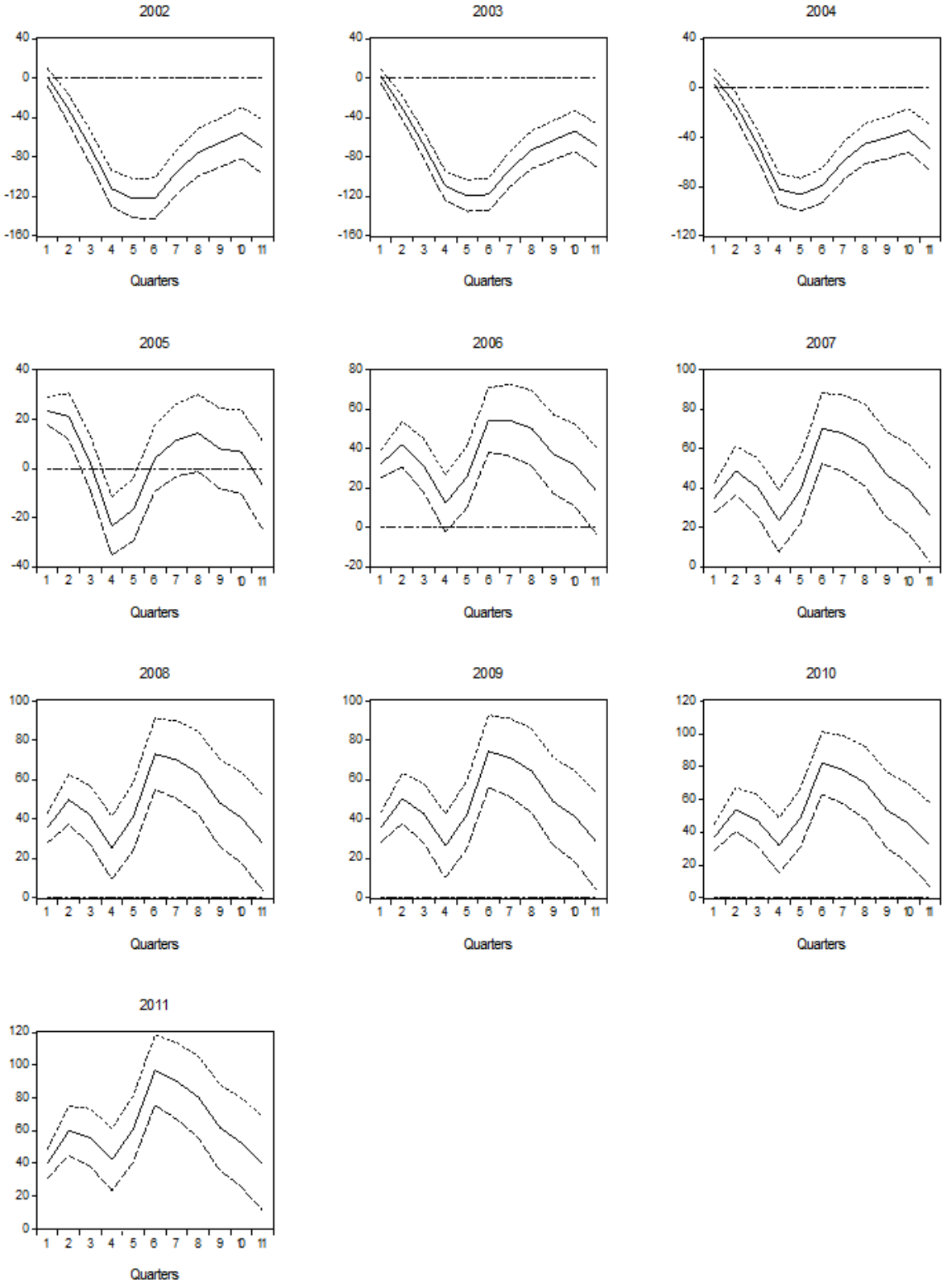
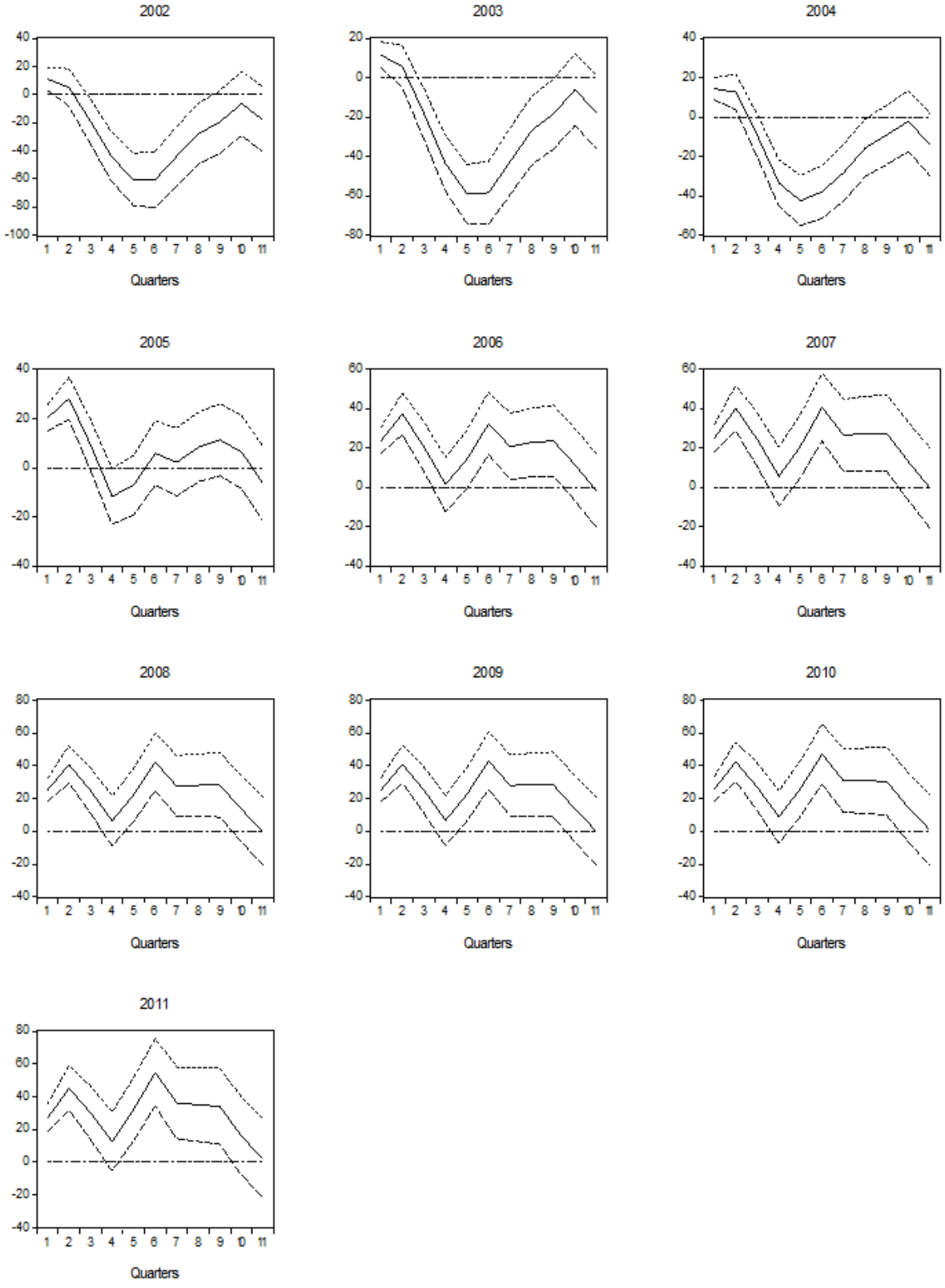


Figure 14

Monetary Policy Shock: Response of TES with Maturity Greater than 5 Years Conditional on the Average Maturity of New Issues of Fixed-rated TES



A possible interpretation of these results is that the monetary policy response to the risk aversion shock, the COP depreciation and rising core inflation observed between 2002 and 2003[16] was deemed insufficient by the market, so it was judged as a policy mistake that would require a correction over the short term (hence the response of the 0-3 year bond prices) or would risk a future rise of inflation (hence the response of the bonds with maturity greater than 3 years). Alternatively, there may be omitted variables that account for the negative response of the TES rates to the monetary policy shock, even though the econometric model controls for the effects of the contemporaneous sovereign risk premium shock.[17] After 2004 monetary policy shocks are smaller and the curve seems to shift upward and flatten after a positive shock, a signal of partial credibility of monetary policy.

With respect to the transmission of monetary policy shocks to market interest rates, there is also evidence of a structural change linked to the average maturity of new issues of TES. The main findings in this regard may be summarized as follows:

- For all loan and deposit rates considered there are two regimes: One, between 2002 and 2003, in which a positive monetary shock produces non-significant or, in few cases, negative responses of market rates. The other, between 2005 and 2011, in which there are generally positive, significant responses of market rates to a monetary shock. As in the case of the TES rates responses, 2004 seems to have been a transition year (Figures 11-28).
- The response of commercial loan rates after 2004 is monotonically increasing, reaching values that indicate a reaction greater than one-on-one after one year. This contrasts with the responses of the TES rates at similar maturities and suggests that corporate credit risk premia may rise after a positive monetary shock.
- The response of consumer loan rates with maturity less than one year after 2004 is initially negative, but positive six months after the monetary shock and less than one-on-one. For longer maturities, the response is very small for the first five or six months after the shock, but increases afterwards, reaching values that indicate a reaction greater than one-on-one after one year.
- Deposit (CD) interest rates with maturities less than one year increase with the monetary shock, reaching values that indicate a reaction close to one-on-one. CD interest rates with maturity greater than one year show a response larger than one-on-one after one year.

The contrast between the responses before and after 2004 may be a sign of rising credibility of monetary policy throughout the decade, as in the case of the TES rates responses. The lengthening of the maturity of TES could serve as a proxy for this increased credibility. However, it is indicative that, unlike the TES rates reaction in 2002-03, several market rates did not display a negative, significant response to the monetary shock in the same years. Thus, other phenomena could have influenced the estimated change in the transmission.

The extension of the maturity of new TES issues and the TES stock may have enhanced to role of the public debt market in the determination of financial system interest rates, by providing liquid, reliable "risk-free" benchmarks at more maturities than before. In turn, this may have reinforced the transmission of monetary shocks to lending and deposit rates. Without reliable "risk-free" benchmarks, interest setters had to produce an individual forecast of the future path of

---

[16] Following a sharp increase in the EMBI the second semester of 2002, the COP depreciated by 23.3 per cent between June 2002 and March 2003, while annual CPI without food inflation rose from 5.5 per cent on average in the first semester of 2002 to 6.6 per cent on average in the first semester of 2003.

[17] In particular, during those years there was a strong disturbance in the TES market after a sovereign risk aversion shock because banks cut funding to brokers that had leveraged to invest in these securities. It is possible then that, due to fire-sales of TES, their prices fell beyond what could be explained by fundamentals.

Figure 15

Monetary Policy Shock: Response of Commercial Loan Rate with Maturity Less Than 1 Year Conditional on the Average Maturity of New Issues of Fixed-rated TES

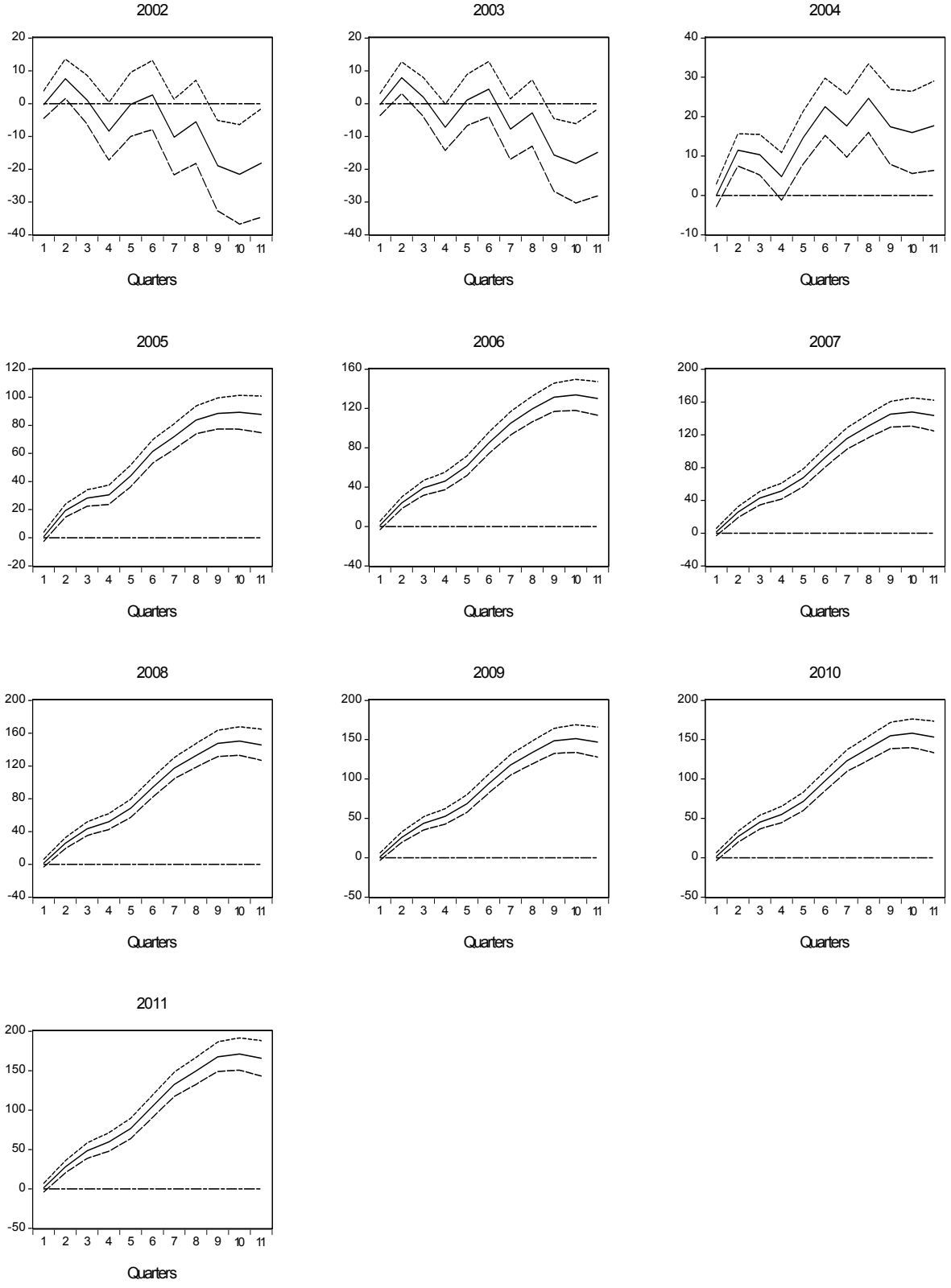


Figure 16

Monetary Policy Shock: Response of Commercial Loan Rate with Maturity Between 1 to 3 Years Conditional on the Average Maturity of New Issues of Fixed-rated TES

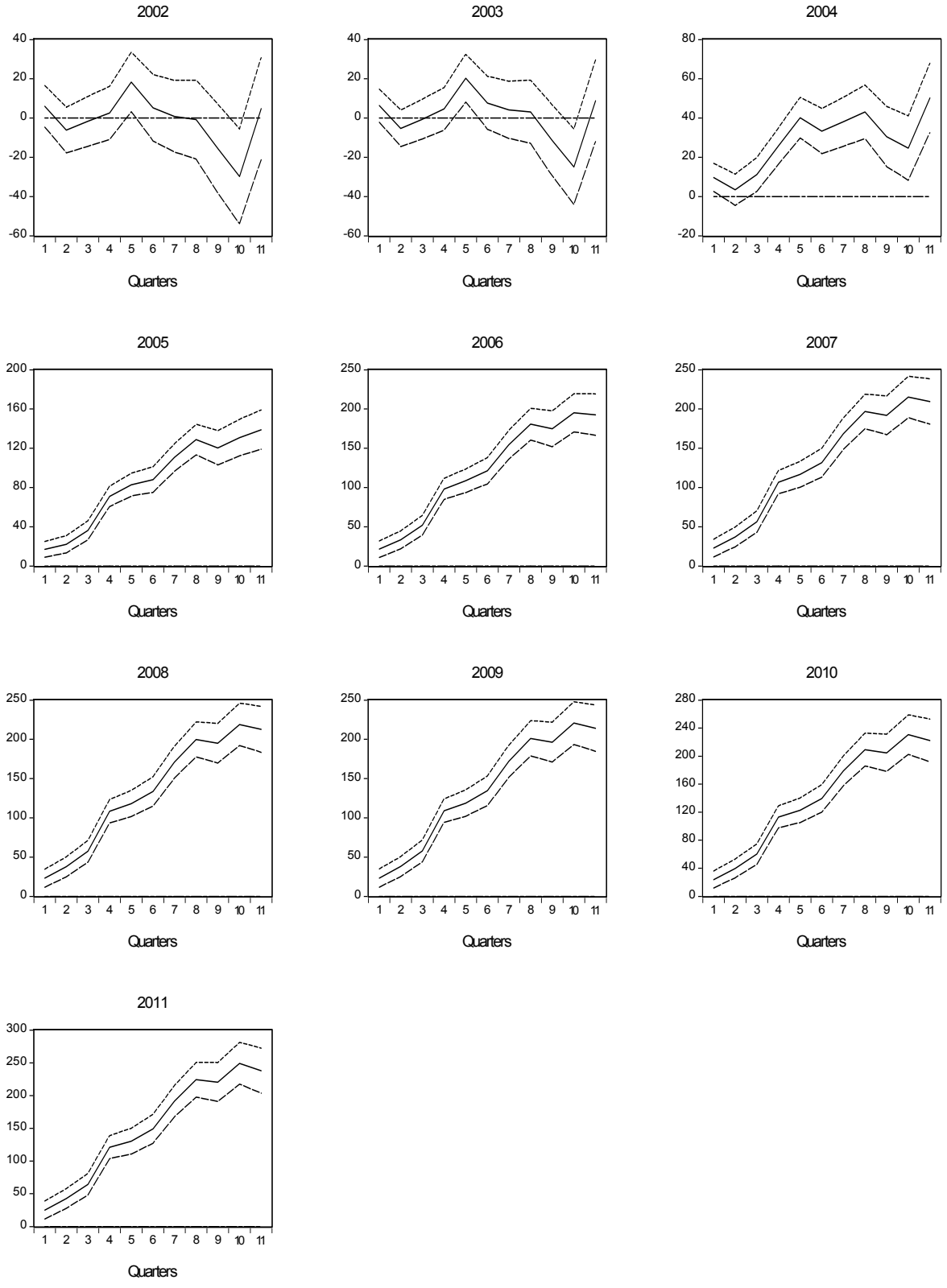


Figure 17

Monetary Policy Shock: Response of Commercial Loan Rate with Maturity Between 3 to 5 Years Conditional on the Average Maturity of New Issues of Fixed-rated TES

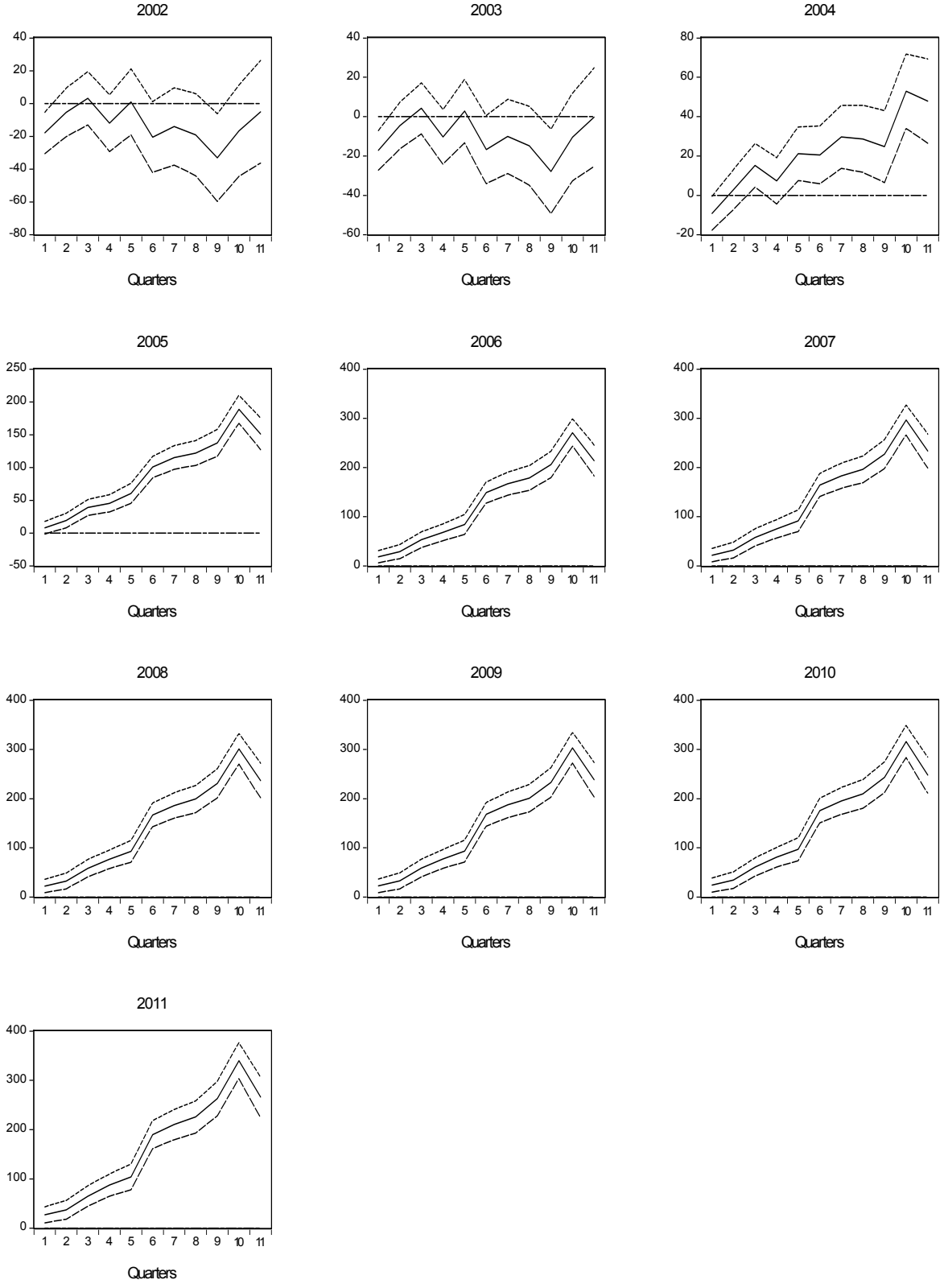


Figure 18

Monetary Policy Shock: Response of Commercial Loan Rate with Maturity Greater than 5 Years Conditional on the Average Maturity of New Issues of Fixed-rated TES

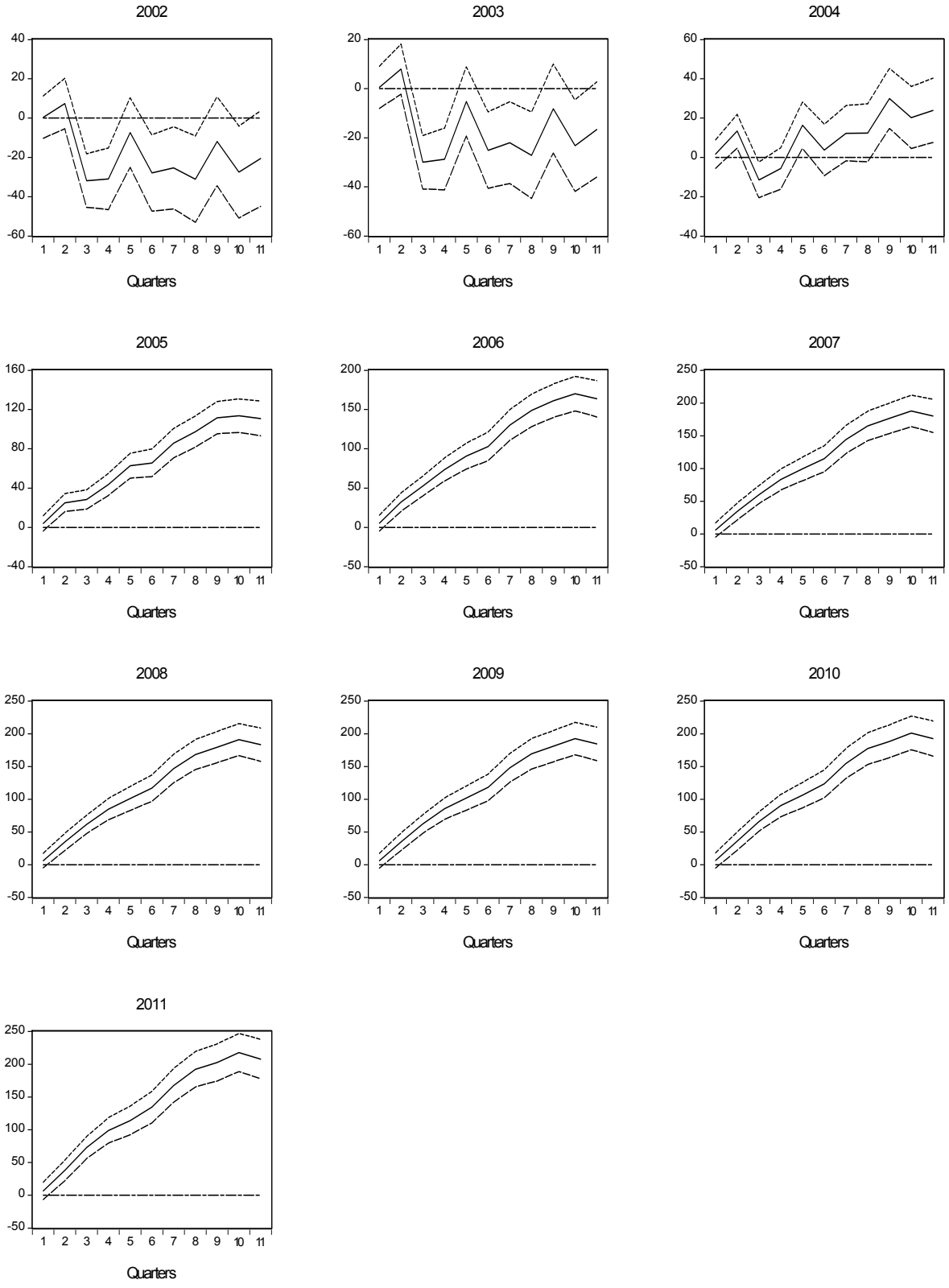


Figure 19

Monetary Policy Shock: Response of the Consumer Loan Rate with Maturity Less than 1 Year Conditional on the Average Maturity of New Issues of Fixed-rated TES

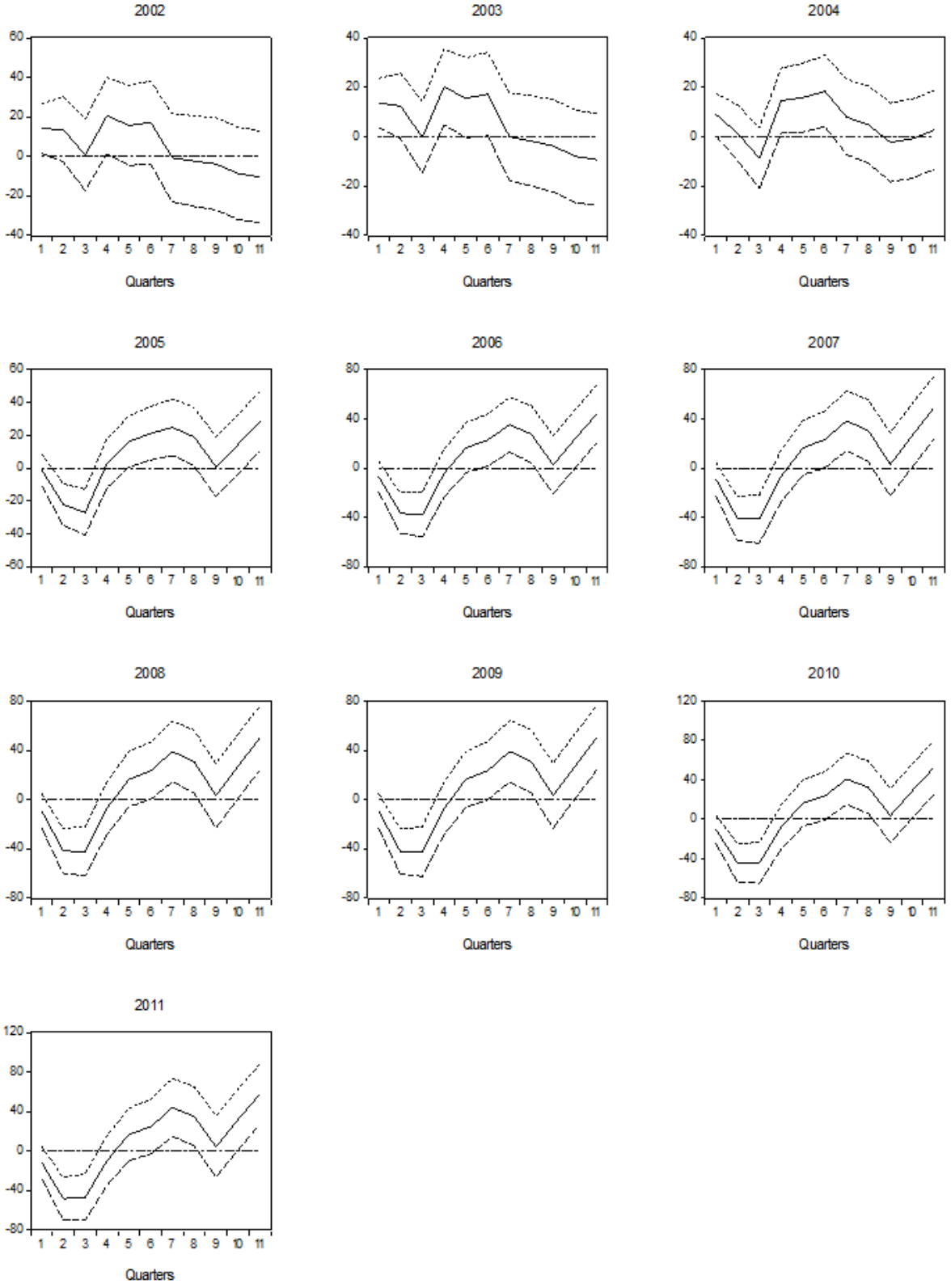


Figure 20

Monetary Policy Shock: Response of the Consumer Loan Rate with Maturity Between 1 and 3 years Conditional on the Average Maturity of New Issues of Fixed-rated TES

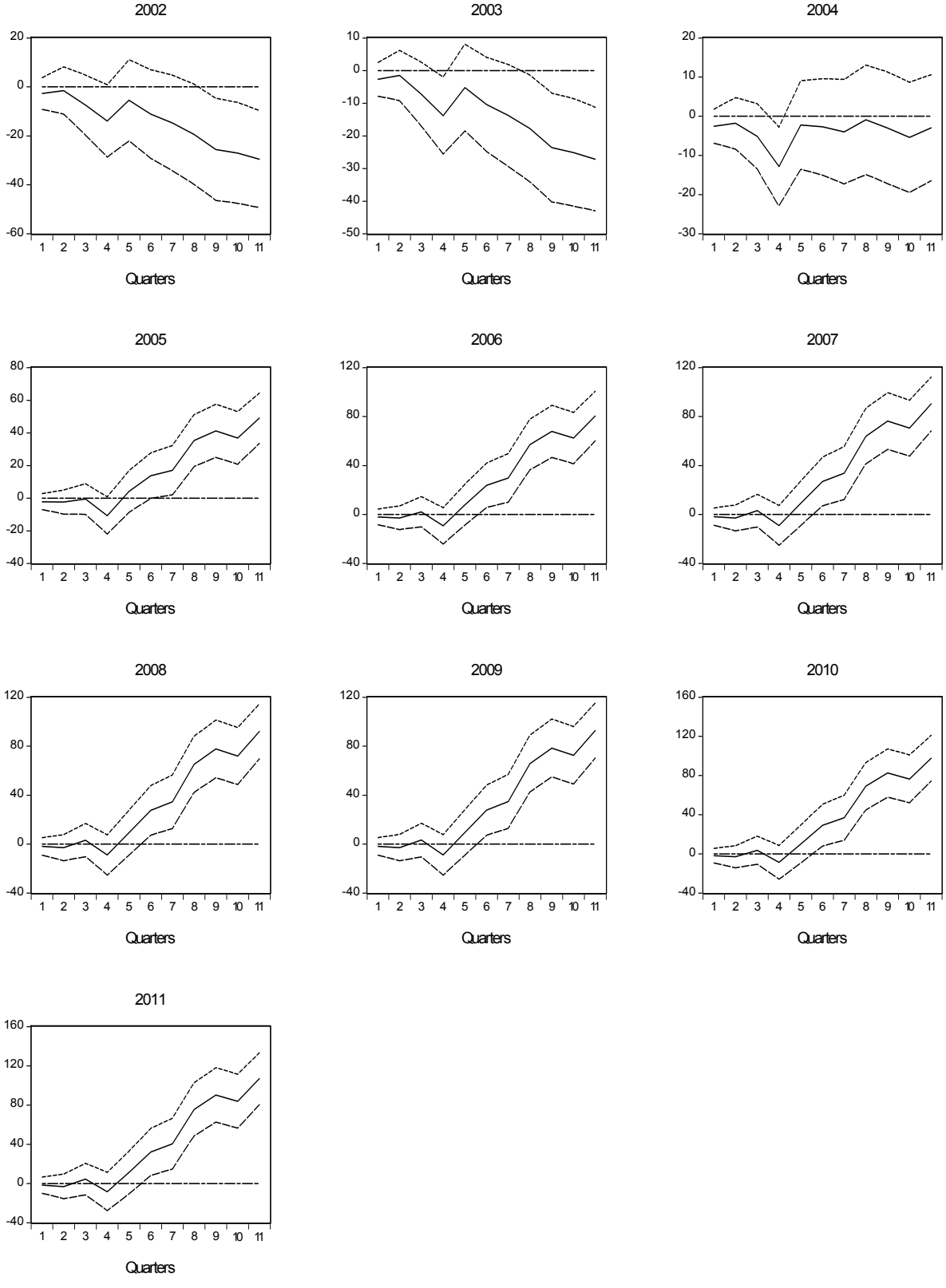


Figure 21

Monetary Policy Shock: Response of the Consumer Loan Rate with Maturity Between 3 and 5 Years Conditional on the Average Maturity of New Issues of Fixed-rated TES

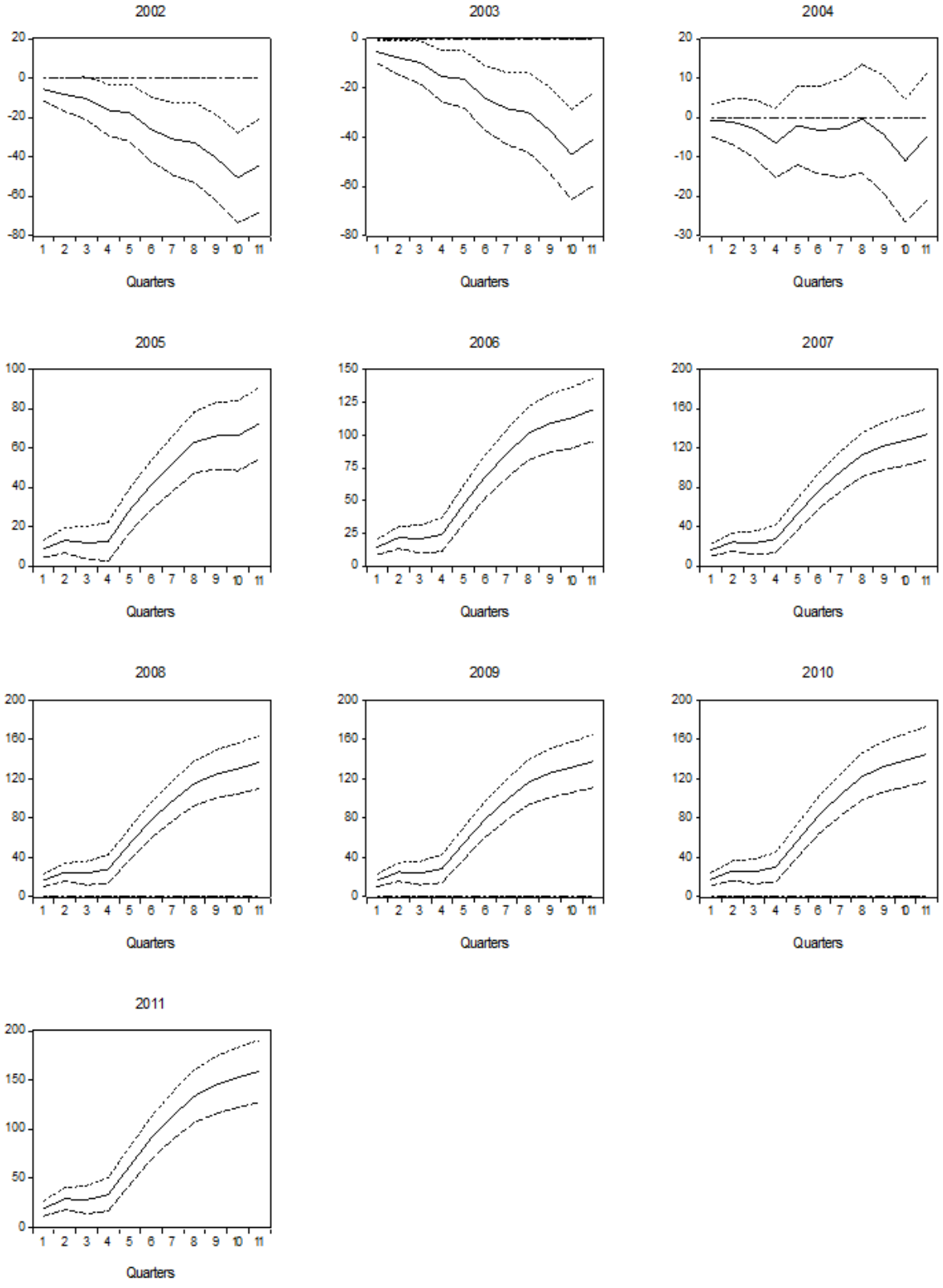


Figure 22

Monetary Policy Shock: Response of the Consumer Loan Rate with Maturity Greater than 5 Years Conditional on the Average Maturity of New Issues of Fixed-rated TES

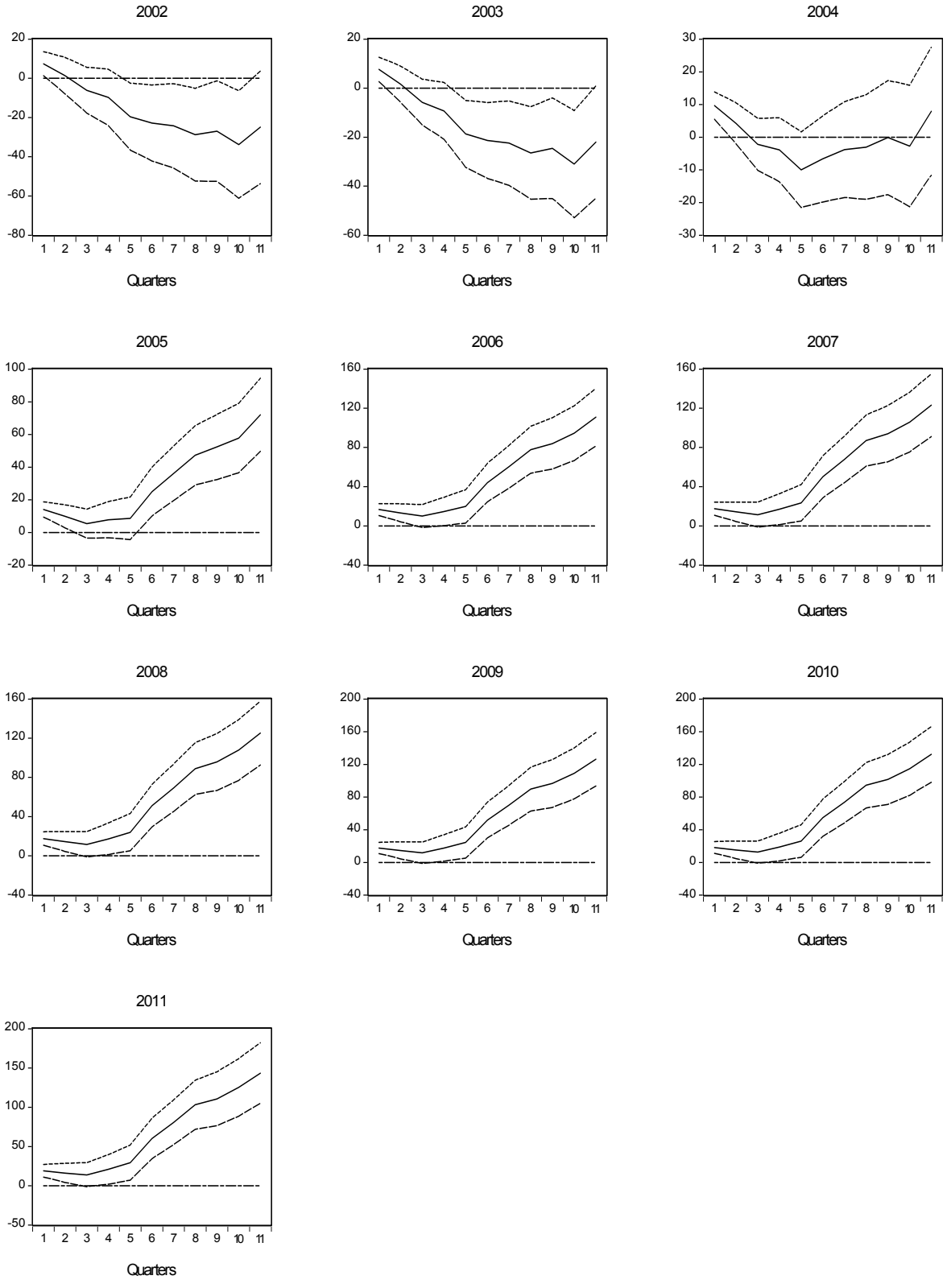


Figure 23

Monetary Policy Shock: Response of the CDT Rate with Maturity Less than 90 Days Conditional on the Average Maturity of New Issues of Fixed-rated TES

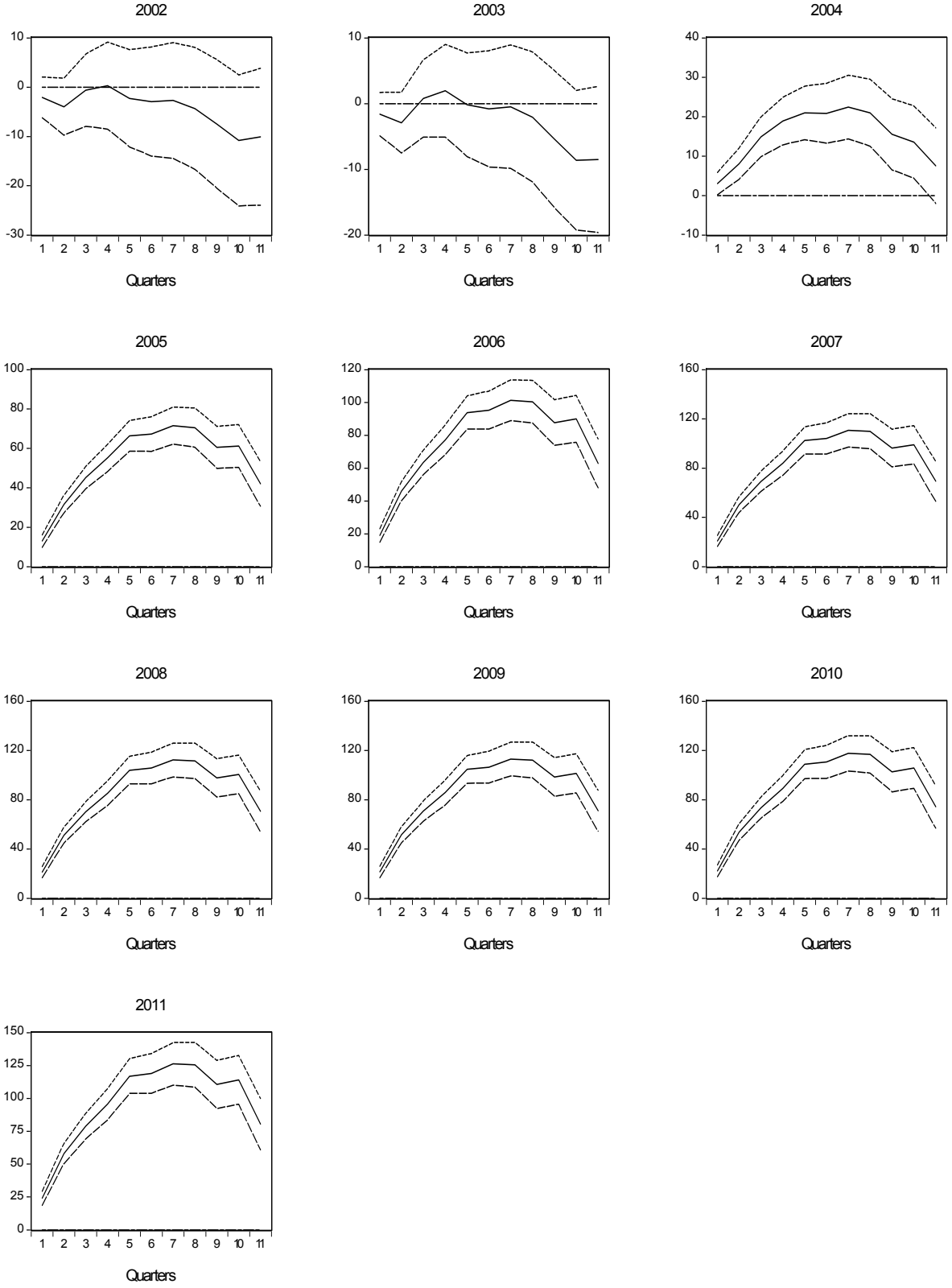


Figure 24

Monetary Policy Shock: Response of the CDT Rate with Maturity of 90 Days Conditional on the Average Maturity of New Issues of Fixed-rated TES

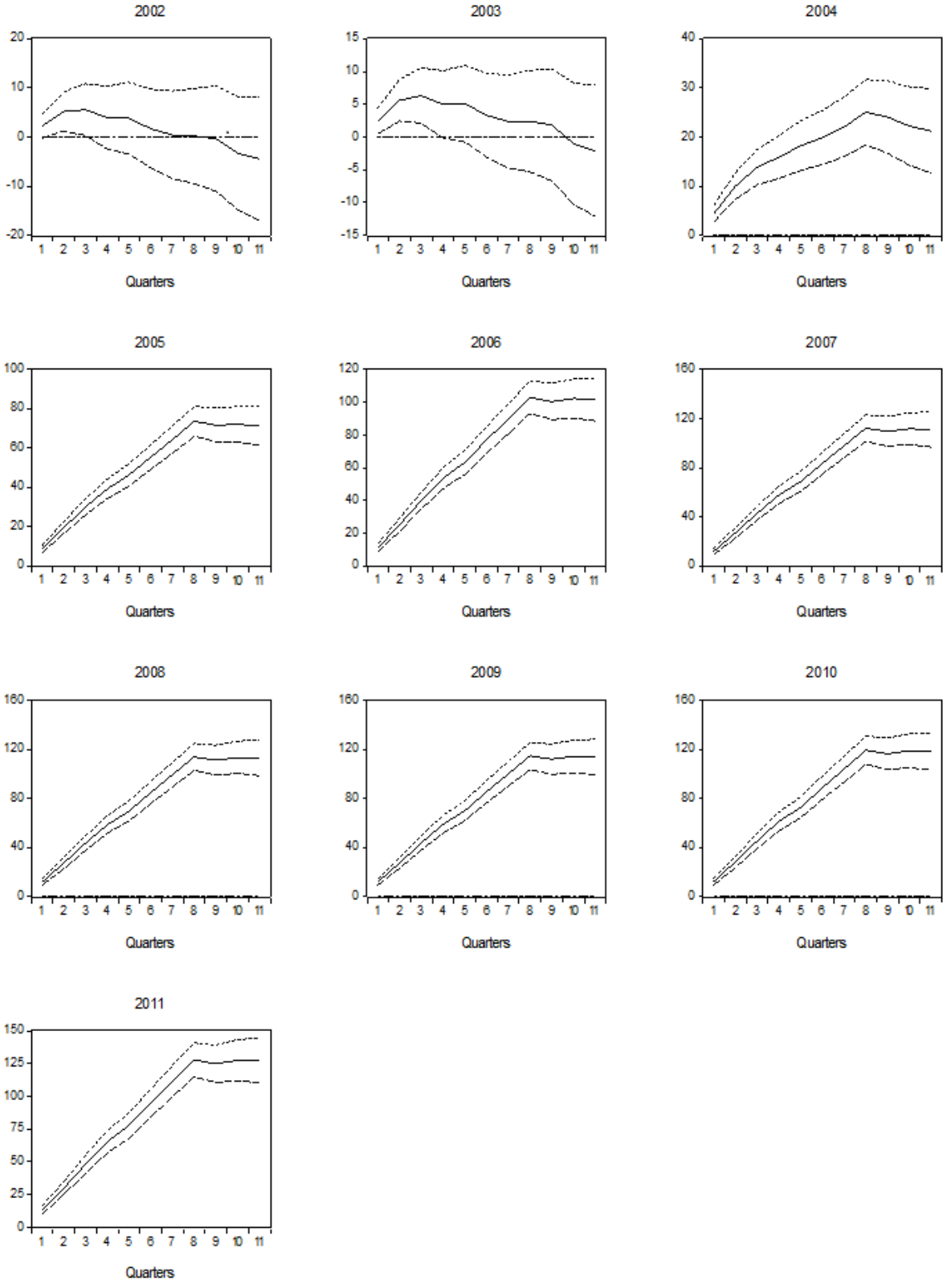


Figure 25

Monetary Policy Shock: Response of the CDT Rate with Maturity Between 91 and 170 Days Conditional on the Average Maturity of New Issues of Fixed-rated TES

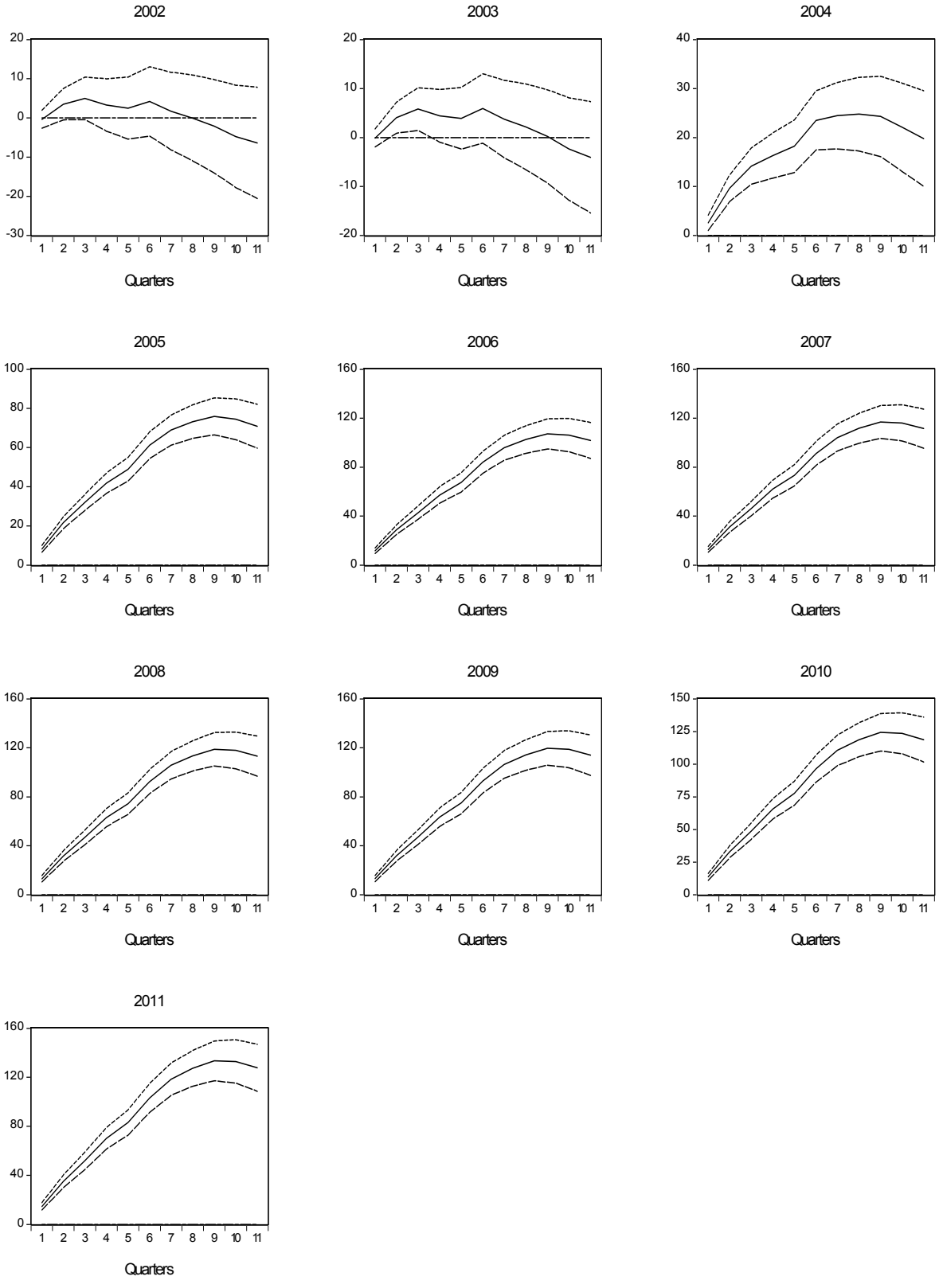


Figure 26

Monetary Policy Shock: Response of the CDT Rate with Maturity of 180 Days Conditional on the Average Maturity of New Issues of Fixed-rated TES

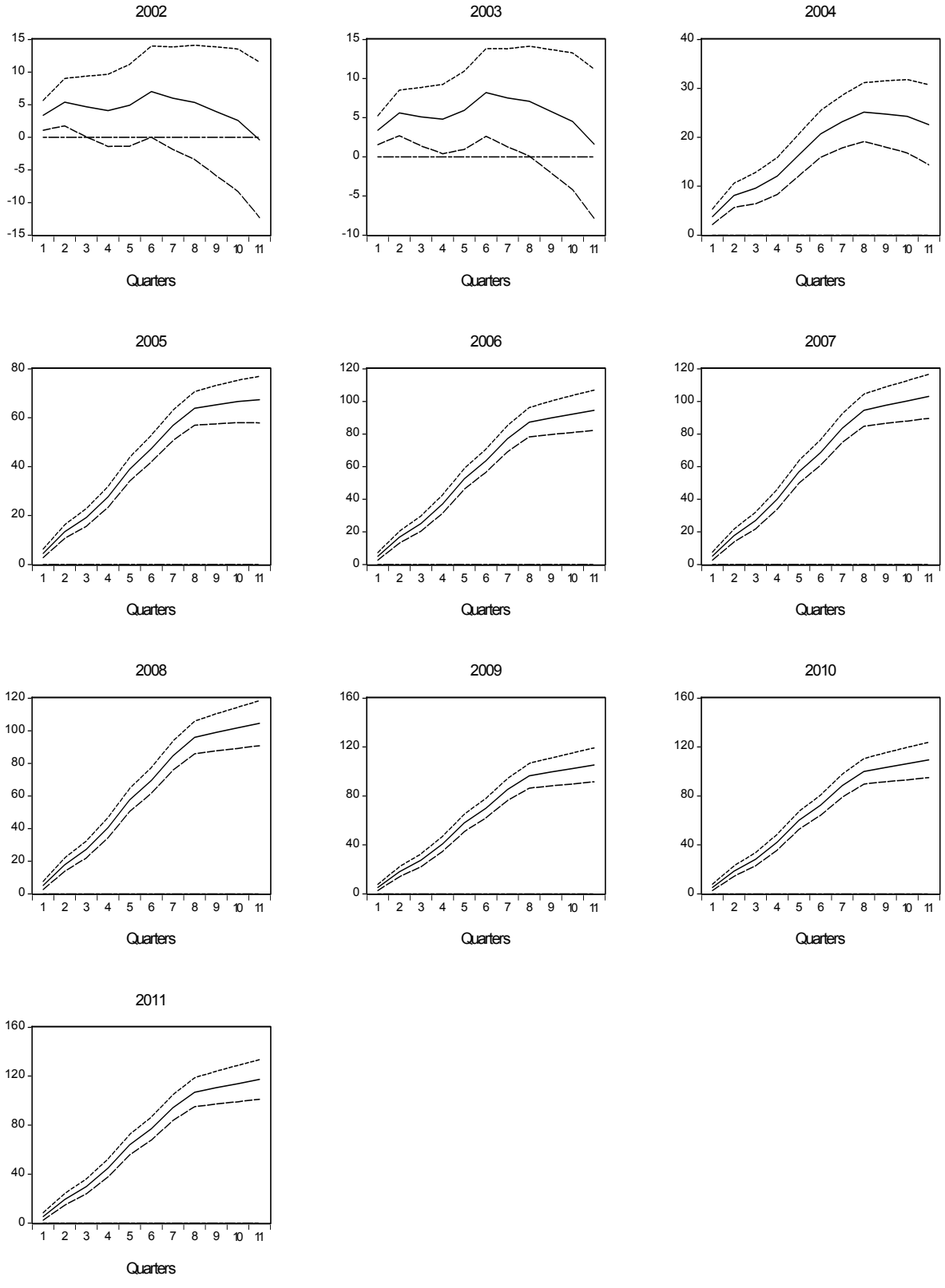


Figure 27

Monetary Policy Shock: Response of the CDT Rate with Maturity Between 181 and 360 Days Conditional on the Average Maturity of New Issues of Fixed-rated TES

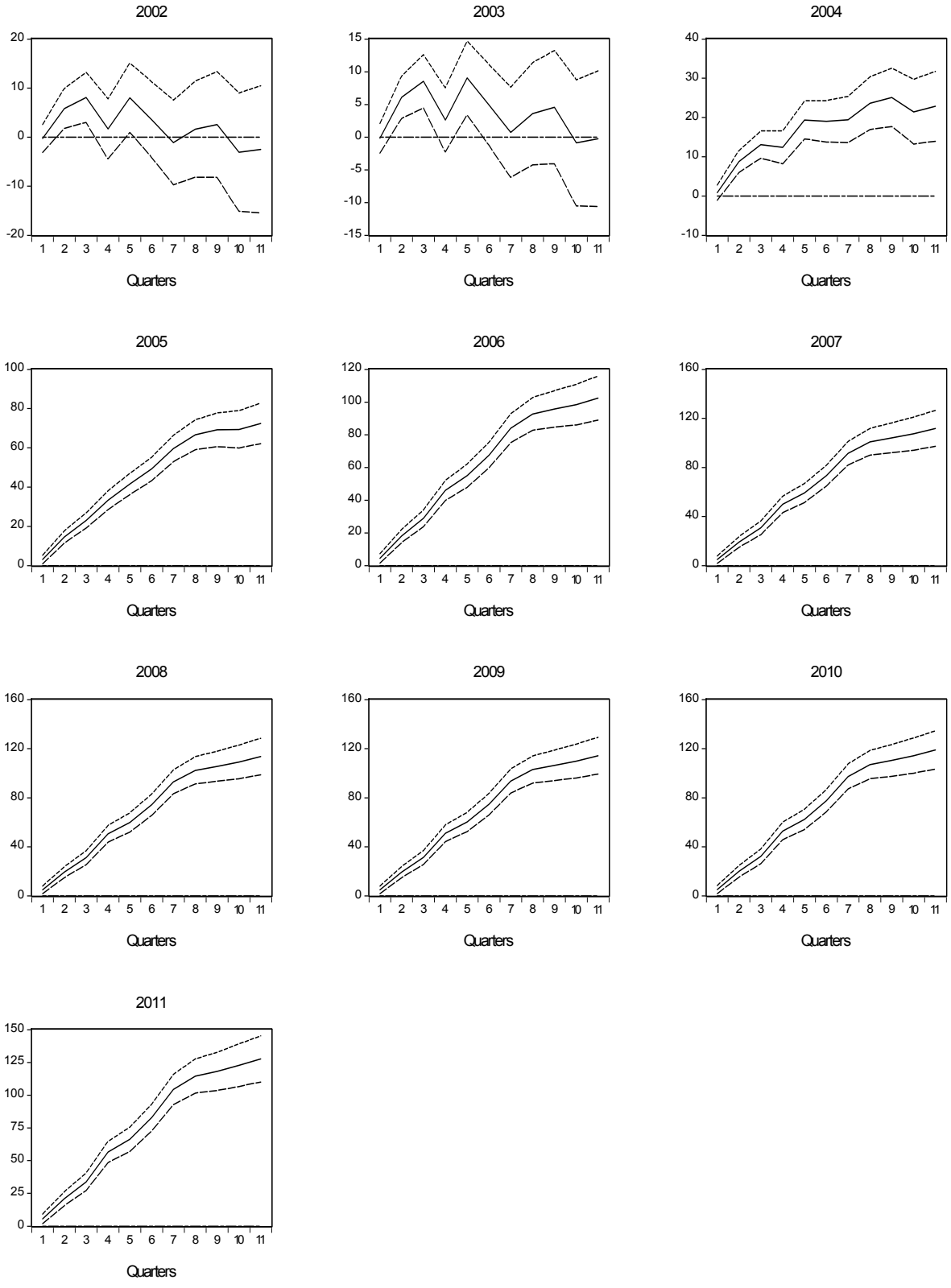
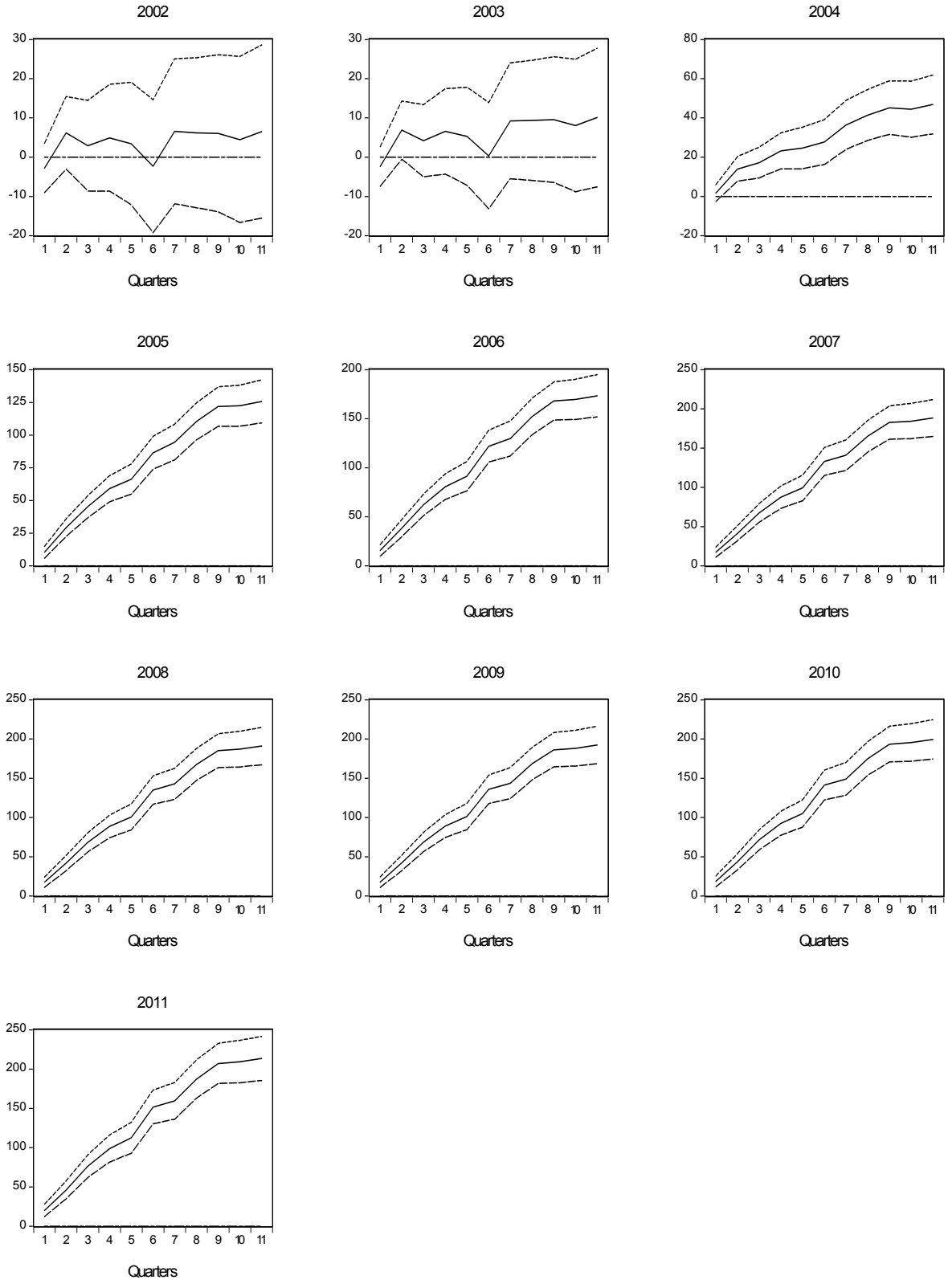


Figure 28

Monetary Policy Shock: Response of the CDT Rate with Maturity Greater than 360 Days Conditional on the Average Maturity of New Issues of Fixed-rated TES



short-term policy rates in order to determine longer-term deposit or loan interest rates. Such a forecast could be compared with other agents' forecast only with lags and noise, through the examination of competitors' interest rates. In these circumstances, future policy forecasts may be rather inaccurate and a policy shock may be more frequently associated to a forecast error than to a signal of a changing policy stance. Hence, transmission could be low.

In the presence of a liquid TES market, interest rate setters could have an immediate, centralized source of information regarding others' views on future monetary policy. As a consequence, the forecasts of future policy rates may have become more precise and a monetary policy shock could more frequently be interpreted as a signal of changing policy stance than as a simple forecast error noise. Given that monetary policy shifts have some persistence (they are rarely undone in the short term), the surprise involved in the shock is informative of a path of future Central Bank interest rates that is likely to be higher or lower than previously expected. Hence, transmission could be greater.

5 Conclusion

In the past decade the Colombian Authorities undertook a series of measures that reduced the structural fiscal deficit, corrected a possibly unsustainable public debt path, decreased the Government currency mismatch and deepened the local fixed-rate public bond market. The evidence shown in this paper suggests that these improvements had profound effects on the behavior of the macroeconomy. More specifically, they permanently reduced the sovereign risk premium (with the ensuing consequences on the real interest and exchange rates), increased the reaction of output to (unexpected) Government expenditure shocks (but still with multipliers lower than one) and may have strengthened the response of market interest rates to (unanticipated) monetary policy interest rate shocks. As a corollary, an increased soundness of fiscal policy may not only result in permanently lower costs of funding for all agents in the economy, but it may also enhance the power of fiscal and monetary policy to act counter-cyclically.

APPENDIX 1
CALCULATION OF THE GOVERNMENT EXPENDITURE SHOCKS

To construct the spending forecast of the central government we followed these steps:

a) The budget execution rate for each quarter in a year was obtained from the annual and quarterly historical data of actual expenditures.

b) The annual spending announcements made by the Government in the beginning of each year in its Financial Plans are considered as the annual spending forecast.

c) Based on (i) and (ii) we predict the Government spending for the four quarters of each year by multiplying the corresponding budget execution rate (using a moving average of 4th-order) by the annual spending announcements.

d) By the end of the second quarter, information on the first quarter actual expenditure is available. Thus, we add an adjustment to the forecast of the third and fourth quarters that results from the assumptions that the annual expenditure plan will be fulfilled and that the first quarter forecast error is uniformly distributed between the second, third and fourth quarters.

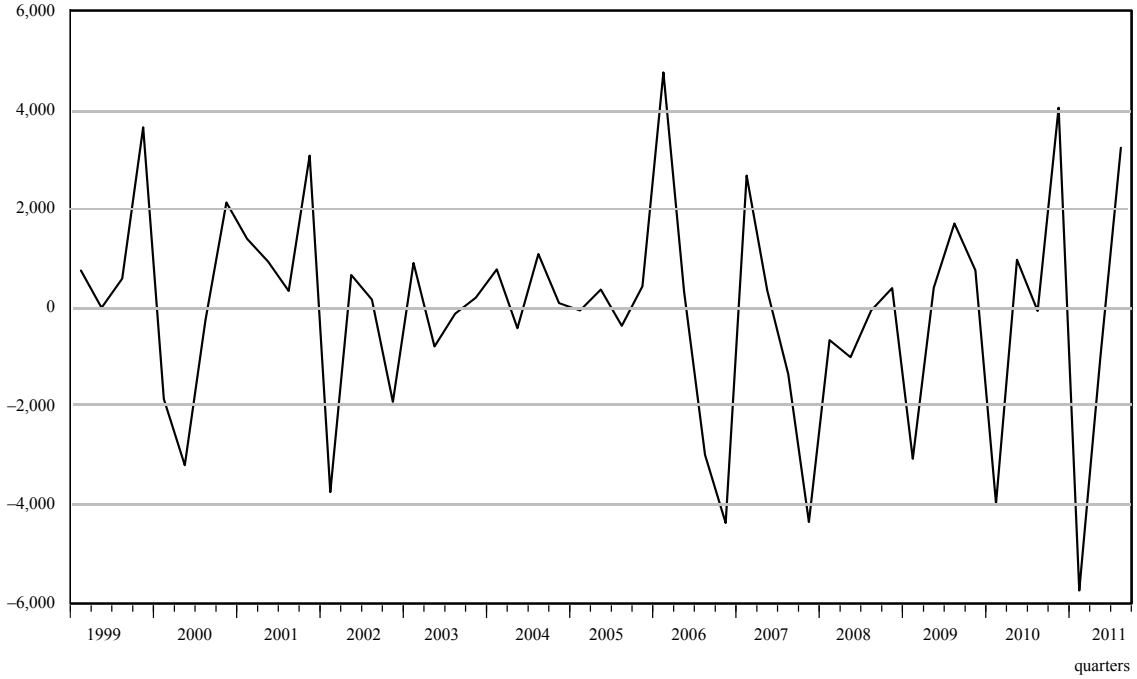
e) By the end of the third quarter, information on the second quarter actual expenditure is available. Thus, we add an adjustment to the forecast of the fourth quarter that results from the assumptions that the annual expenditure plan will be fulfilled and that the second quarter forecast error is uniformly distributed between the third and fourth quarters.

f) The series of forecast errors (calculated with respect to the adjusted forecasts in the case of the third and fourth quarters) is the expenditure shock for each quarter. Figure 29 shows the fiscal shock (measured in 2010 COP billions).

Figure 29

Fiscal Shock

(Colombian billions of pesos – December 2010)



APPENDIX 2
ESTIMATION OF THE MONETARY POLICY SHOCK

Similar to what is usually done in the VAR literature, the monetary policy shock is identified as an unexpected movement of the policy rate. That is, we suppose that there is a policy rule that relates the state of the economy with the actions of the monetary authorities and consequently a monetary policy shock will be a movement in the policy rate not explained by the rule. For example, under the assumption that the central bank follows a standard Taylor rule, a movement in the policy rate not explained by the observed behavior of inflation and output will be a monetary shock. However, if the central bank follows an expectations-based rule, that is a rule in which the expected value of inflation and output are important, then it is natural to include within an estimated Taylor rule not just current inflation and output but also any other variables that can be useful indicators about the future behavior of these variables.

Notice also that under the VAR recursive identification, a monetary policy shocks is not only an unexpected movement of the policy rate but it is also orthogonal to the information set of the Central Bank. In other words, it is assumed that a variable that is observed by the Central Bank cannot react contemporaneously to the policy shock. With this is in mind it is possible to see that a forecast error can serve as proxy of a policy shock. In fact, we defined the policy shock through the forecast error: $i_{t+1} - E[i_{t+1}|\Omega_t]$ where i_{t+1} is the actual policy rate at time $t+1$ and $E[i_{t+1}|\Omega_t]$ is its expected value given the information set at time t denoted by Ω_t.

Our definition of the policy shocks is coherent with the definition of the policy shock in a VAR model for two reasons: First, it captures unexpected movements in the policy rate and second because, by definition, it is orthogonal the information set. However, given our definition of a policy shock, we can capture policy shocks that are policy errors or changes in the policy stance not necessarily expected at time t. In the first case, the policy rate is, unintentionally, too low or too high with respect to what is dictated by a policy rule, whereas in the second case, the policy shock signals a change in the monetary policy stance. The source of the policy shocks can have very different effects on the economy.

To make operational this definition of the policy shock one needs to be particularly carefully about the definition of the information set Ω_t and the way $E[i_{t+1}|\Omega_t]$ is estimated. Empirically the main concern with Ω_t is not to include variables that are not observed at time t. In our exercise, the information set contains information on inflation, output, credit, the exchange rate, etc. However, some of these variables are observed with delay and consequently its current values cannot be in Ω_t.

We approximate $E[i_{t+1}|\Omega_t]$ with linear projections. That is, $E[i_{t+1}|\Omega_t] = \alpha_0 + \alpha_1 x_t$ where x_t is an element of Ω_t. α_0 and α_1 are estimated by OLS. We select the elements in x_t by minimizing the AIC criterion.

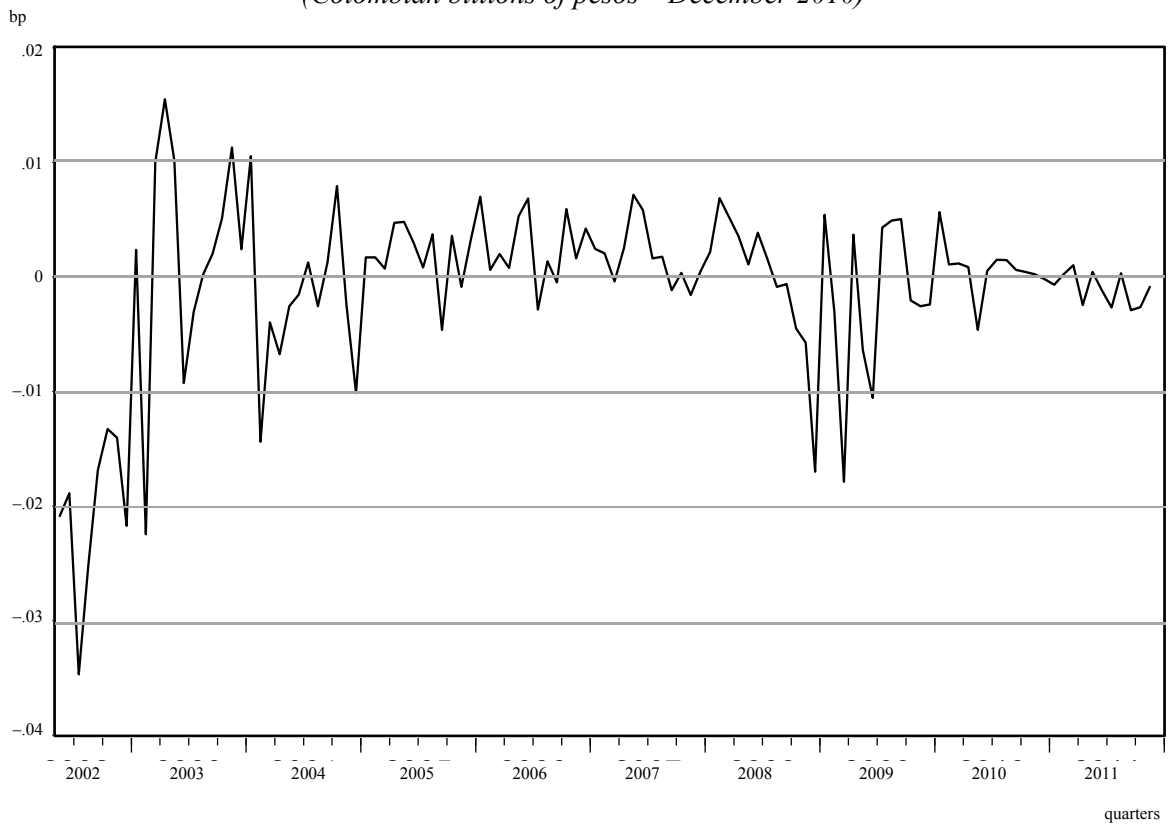
Finally, to construct a sequence of monetary policy shocks we carried out a rolling exercise where we forecast i_{t+1} at time t and compared it with the actual value of i_{t+1}. At each t the information set is updated and the elements of x_t are selected by minimizing the AIC criterion. The initial sample of the rolling experiment is 1999m9-2000m12 and is expanded until 2011m12.

The policy shocks are constructed using monthly data on the interbank rate, the Colombian inflation target, the growth rate of the index industrial production, the growth rate of credit, the index of capacity utilization, the nominal average unit labor cost, the nominal depreciation of the

Colombian peso, the Index of Consumer Confidence (ICC) and the US inflation rate.[18] The shocks are shown in Figure 30.

Figure 30

Monetary Policy Shock
(Colombian billions of pesos – December 2010)



[18] All growth rates are annual, the index of capacity utilization, and the nominal average unitary labor cost are included in annual changes. Data is seasonally adjusted using TRAMO-SEATS in Eviews). All these variables are in general available with a delay of one month, however the Index of Industrial Production, the Unitary Labor cost and the ICC are observed with a delay of two months.

REFERENCES

Auerbach, A.J. and Y. Gorodnichenko (2012), "Fiscal Multipliers in Recession and Expansion", paper prepared for the NBER conference *Fiscal Policy after the Financial Crisis*, Milan, December 2011.

Blanchard, O. and R. Perotti (2002): "An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes on Output", *Quarterly Journal of Economics*, Vol. 117, No. 4, pp. 1329-68. Also NBER, Working Paper, No. 7269.

Caldara, D. and C. Kamps (2008), "What Are the Effects of Fiscal Shocks? A VAR-based Comparative Analysis", European Central Bank, Working Paper, No. 877.

Favero, C. and F. Giavazzi (2004), "Inflation Targeting and Debt: Lessons from Brazil", NBER, Working Paper, No. 10390.

Galindo, A. and M. Hofstetter (2008), "Mortgage Interest Rates, Country Risk and Maturity Matching in Colombia", Universidad de los Andes, Documento CEDE 2.

Goldstein, M. and P. Turner (2004), *Controlling Currency Mismatches in Emerging Markets*, Peterson Institute for International Economics, April.

Hamman, F., I. Lozano and L.F. Mejía (2011), "Sobre el impacto macroeconómico de los beneficios tributarios al capital", Banco de la República, *Borradores de Economía*, No. 668.

Hamann, F., H. Vargas and A. González (2010), "Efectos de la política monetaria sobre las tasas de interés de los créditos hipotecarios en Colombia", Universidad de los Andes, *Desarrollo y Sociedad*, No. 66.

Hansen, B.E. (1992), "Tests for Parameter Instability in Regressions with I(1) Processes", *Journal of Business and Economic Statistics*, No. 10, pp. 321-35.

Itzletzki, E., E. Mendoza and C. Vegh (2009), "How Big Are Fiscal Multipliers?", CEPR, *Policy Insight*, No. 39, October.

Jordà, Ò. (2005), "Estimation and Inference of Impulse Responses by Local Projections", *American Economic Review*, Vol. 95, No. 1, March.

Julio, J.M., I. Lozano and L. Melo (2012), "Quiebre estructural de la relación entre la política fiscal y el riesgo soberano en los países emergentes: el caso colombiano", Banco de la República, mimeo.

Lozano, I. and J. Toro (2007), "Fiscal Policy throughout the Business Cycle: The Colombian Experience", *Ensayos sobre política económica*, Vol. 25, No. 55.

Lozano, I. and K. Rodríguez (2011), "Assessing the Macroeconomic Effects of Fiscal Policy in Colombia", *Journal of Financial Economic Policy*, Vol. 3, No. 3, pp. 206-28.

Perotti, R. (2004), "Estimating the Effects of Fiscal Policy in OECD Countries", Bocconi University, mimeo.

——————(2007), "In Search of the Transmission Mechanism of Fiscal Policy", NBER, Working Paper, No. 13143.

Restrepo, J. and H. Rincón (2006), "Identifying Fiscal Policy Shocks in Chile and Colombia", Banco de la República, *Borradores de Economía*, No. 397.

Rojas-Suárez, L. and C. Montoro (2011), "Latin America's Real Credit Growth During the Global Financial Crisis: Lessons on Coping with External Financial Shocks", mimeo.

Romer, C.D. (2011), "What Do We Know About the Effects of Fiscal Policy? Separating Evidence from Ideology", Speech Hamilton College, November 7.

REAL EXCHANGE RATE APPRECIATION IN EMERGING MARKETS: CAN FISCAL POLICY HELP?

Marialuz Moreno Badia[*] *and Alex Segura-Ubiergo*[*]

A number of emerging markets have experienced substantial real exchange rate appreciation in recent years, generating concerns about competitiveness and prompting policymakers to respond with a combination of mitigating policies. This paper shows that fiscal policy can play a role in alleviating these pressures. Using a sample of 28 emerging market economies over 1983-2011, we estimate a dynamic model of the real exchange rate and find that a permanent fiscal adjustment may reduce appreciation pressures over the long term. Furthermore, the composition of public spending matters, with reductions in current spending playing a key role. To illustrate the importance of these findings, the paper focuses on the case of Brazil. Our results suggest that maintaining fiscal discipline while increasing public investment in Brazil is likely to ease real appreciation pressures, hilighting the importance of tackling long-standing budget rigidities.

1 Introduction

A number of emerging markets (EMs) have seen their currencies appreciate substantially in recent years with China, oil exporters, and Latin American countries taking the lead (Figure 1). Several factors explain these trends including terms of trade gains and, in some cases, large capital inflows. The empirical evidence suggests that monetary policy in major advanced economies has been related to the latter (see, for example, IMF 2011a and 2011b). This has generated complaints from export-oriented companies in key industrial and manufacturing sectors in EMs about the collateral damaged created by the ensuing loss of competitiveness. Recent papers have looked into how policies can help manage large capital inflows and the associated exchange rate appreciation pressures (see Gosh *et al.*, 2008; Ostry *et al.*, 2010; and Ostry *et al.*, 2011). The overall conclusion is that, before resorting to capital controls, domestic macroeconomic policies should be appropriately set, including through fiscal consolidation.

The purpose of this paper is to assess empirically to what extent fiscal policy can indeed help contain exchange rate appreciation pressures. Specifically, the paper analyzes (1) whether fiscal adjustment can have a permanent effect on the real effective exchange rate (REER); and (2) to what extent the composition of public spending matters. These are important issues given that, despite its inclusion in the "toolkit", theoretical arguments and empirical work on the impact of fiscal policy on the exchange rate have not generated a unanimous view. To address these questions, the paper uses a panel of 28 emerging market countries over 1983 to 2011 and estimates a parsimonious model of the long-run REER. Our findings suggest that fiscal adjustment can indeed reduce exchange rate appreciation pressures, especially if it results from cuts in current spending. By contrast, fiscal adjustment achieved through a reduction in public investment would not be as effective. In fact, the results suggest that increases in public investment are associated with a decline in the real exchange rate (*i.e.*, depreciation).

---

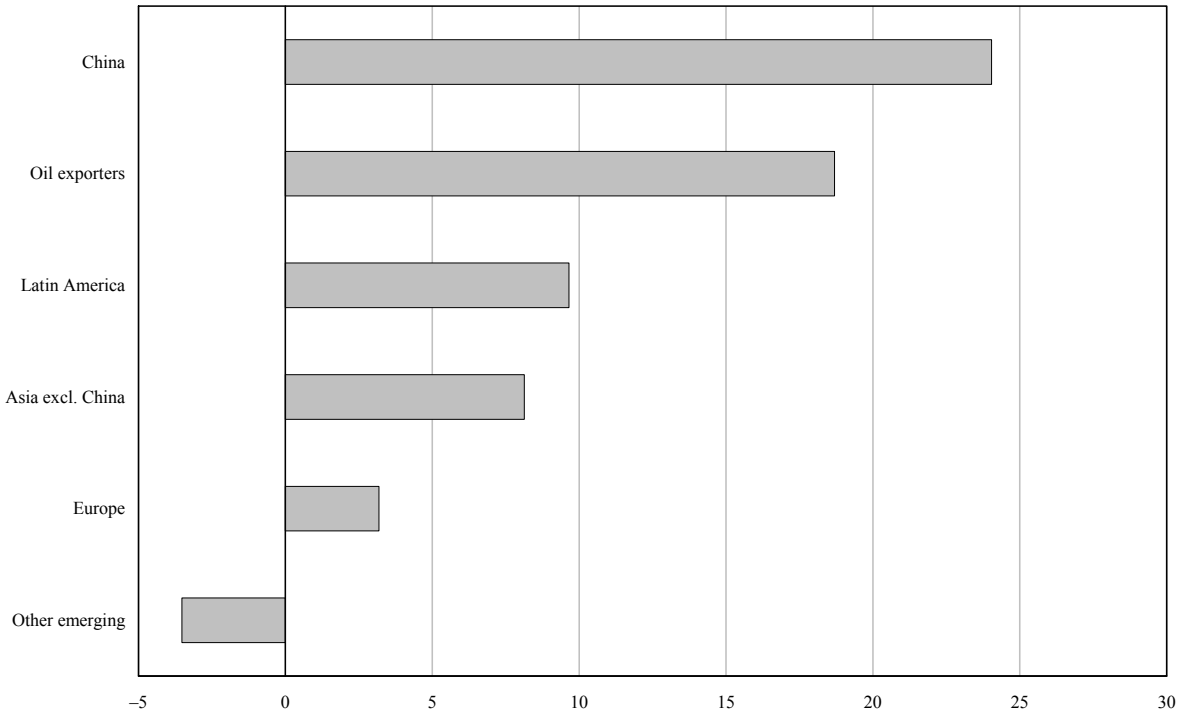
[*] International Monetary Fund.

E-mail addresses: MMorenobadia@imf.org and ASeguraUbiergo@imf.org

We are grateful to Anja Baum, Martine Guerguil, Vikram Haksar, Joana Pereira, Marcos Poplawski-Ribeiro, Abdelhak Senhadji, Rodrigo Valdes, Anke Weber and participants in the 15th Banca D'Italia Public Finance Workshop for helpful discussions and comments. Petra Dacheva and Nancy Tinoza provided excellent research assistance.

Figure 1

Emerging Markets: Real Effective Exchange Rate Appreciation, Jan. 2007-Dec. 2012
(percent)



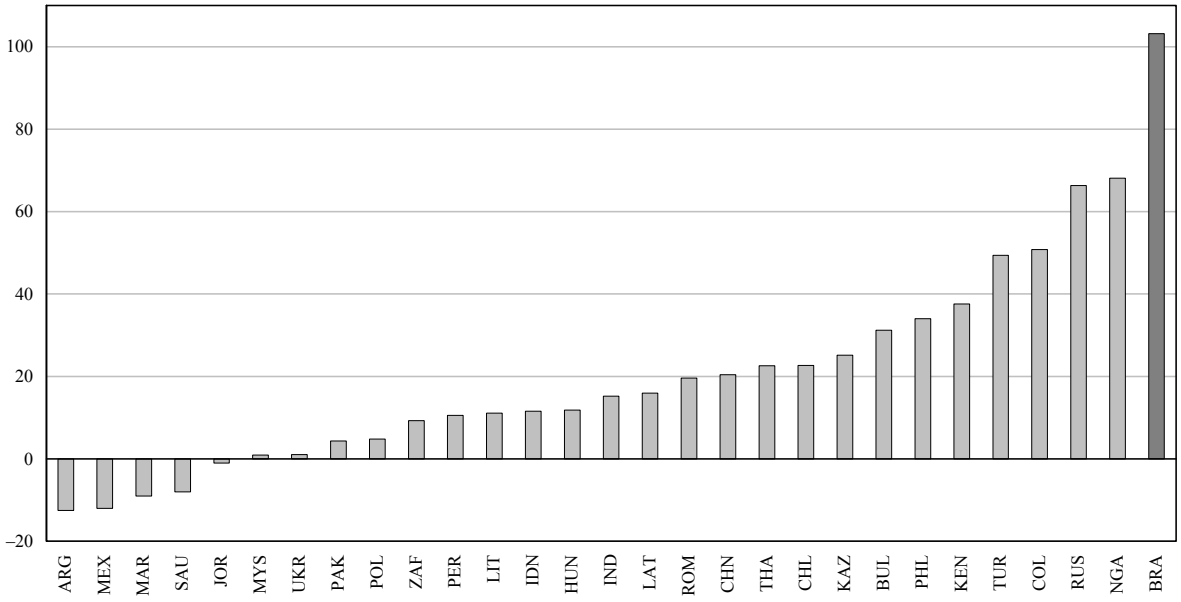
Sources: IMF, *Information Notice System*; and IMF staff calculations.
Regional REERs weighted by market GDP. Countries included in the sample are as follows: Asia excl. China: India, Indonesia, Malaysia, Philippines, and Thailand; Oil exporters: Kazakhstan and Russia; Latin America: Argentina, Brazil, Chile, Colombia, Mexico, and Peru; Europe: Bulgaria, Hungary, Lithuania, Poland, Romania, and Turkey; Other emerging: Jordan, Morocco, South Africa, and Ukraine.

To illustrate the critical importance of these results, we examine the case of Brazil. This focus is justified on two grounds. First, Brazil's REER appreciated more than 100 per cent over the period 2002-12 surpassing all other EMs (Figure 2). Second, Brazil has used all aspects of the policy toolkit to manage capital inflows: the exchange rate has appreciated, the macro-policy mix has been adjusted, and reserves have been built. Furthermore, macroprudential measures (such as reserve requirements limiting short dollar position of banks) and capital flow management measures (notably the tax on foreign purchases of domestic bonds and equities, "IOF") have been used in an adaptive manner to stem the large inflow of foreign capital and to slow the pace of nominal appreciation (see Benelli, Segura-Ubiergo and Walker (2011) for further discussion of these issues). Notwithstanding these efforts, the reality is that the real effective exchange rate in Brazil remains somewhat overvalued (IMF, 2013). Our results suggest that, tackling Brazil's public investment gap could help reduce real appreciation but only to the extent that it is financed through a compositional shift within the budget (*i.e.*, reducing government consumption to increase public investment) rather than via additional public debt.

The rest of the paper is organized as follows: Section 2 briefly reviews the literature. Section 3 describes the empirical specification and results and draw policy implications for the case of Brazil. Section 4 concludes.

Figure 2

Emerging Markets: Effective Exchange Rate Appreciation, 2002-12
(percent)



Sources: IMF, *Information Notice System*; and IMF staff calculations.

2 Literature review

While exchange rates are one of the most studied topics in international economics, most papers analyzing their determinants do not focus on fiscal variables. The empirical literature on the long-term behavior of exchange rates is dominated by attempts to test the purchasing power parity (PPP) theory. In the international finance literature, the focus is more on short-term dynamics, with an emphasis on tests of the uncovered interest parity theory. These papers focus mostly on the interaction between monetary policy, interest rates and the nominal exchange rate.[1]

Moreover, there is no consensus in the existing theoretical literature about the relationship between fiscal policy and the real exchange rate:[2]

- In *Keynesian models*, an expansionary fiscal shock raises the demand for home goods and money, thereby inducing a real appreciation either through higher interest rates and arbitrage capital inflows or a rise in domestic prices (see Mundell, 1963; and Flemming, 1962).[3] However, Sachs and Wyploz (1984), argue that the Mundell-Fleming framework ignores a number of critical factors that may be associated with a different result.[4]

---

1 See Abhyankar, Sarno and Valente (2009); Rime, Sarno and Sojli (2009); Sarno and Taylor (2001); Engel and West (2005); and Mark (1995).

2 For a review of the literature, see Abbas *et al.* (2011).

3 Goods market clearing will result in a nominal appreciation assuming prices are sticky.

4 These include (i) the growth of public debt that may follow a fiscal expansion; (ii) the fiscal measures that may have to be taken to service growing debt; (iii) the wealth and portfolio implications of current account deficits induced by the fiscal expansion; and (iv) forward looking expectations in the asset markets.

- In *real business cycle models*, increases in government spending trigger a decline in domestic private consumption and an increase in labor supply leading to a real appreciation (Backus, Kehoe and Kydland, 1994). However, more recent papers find opposite results. For example, Ravn, Schmitt-Grohe and Uribe (2007) develop a model of deep habit in which an increase in government spending provides an incentive for firms to lower domestic markups relative to foreign markups, leading to a real depreciation.[5] An alternative set of models look at the effect of government spending under incomplete financial markets (see Kollmann, 2010). In this case, when faced with an increase in government spending, domestic households experience a negative wealth effect, work harder and increase domestic output. Limited risk sharing exacerbates the negative wealth effect and the increase in output. Assuming balanced trade (financial autarky), the resulting supply-side response is so strong that the country experiences a deterioration of its terms of trade and a real exchange rate depreciation. Alternatively, in a bonds-only economy, and increase in relative government purchases will lead to a real depreciation if the increase in spending is sufficiently persistent and/or labor supply is highly inelastic.
- The *composition of government spending* could also matter. In particular, increases in government spending – whether tax or debt financed – will result in a real appreciation if skewed toward nontradable goods. The effect of public investment, on the other hand, is ambiguous. An increase in public investment may lead to a real appreciation if it raises productivity in the tradable sector through the Balassa-Samuelson mechanism (see Balassa, 1964; and Samuelson, 1964). But the opposite effect may result if public investment disproportionately increases productivity in the nontradables sector. Moreover, if productivity increases symmetrically in both sectors, there will be no impact on the real exchange rate (Galstyan and Lane, 2009). Chatterjee and Mursagulov (2012), on the other hand, find that in the presence of gradually accumulating stock of public capital and intersectoral adjustment costs, public investment generates a persistent and non-monotonic U-shaped adjustment path of the real exchange rate.

The empirical evidence is also relatively inconclusive.[6] Results vary depending on the methodology, specification, and sample used in the estimation. For example:

- Cardarelli, Elekdag, and Kose (2007) estimate a model based on a cross-section of countries (including advanced and emerging economies) and show that real appreciation and demand growth is more contained in countries that respond to capital inflows by pursuing a tighter fiscal policy in the form of slower growth of government expenditure.
- Similarly, IMF (2008) and Ricci, Milessi-Ferreti and Lee (2008) estimate panel cointegration models and find that an increase in government consumption is associated with a REER appreciation, while Guajardo, Leigh and Pescatori (2011) use a historical approach to identify changes in fiscal policy in advanced economies and find that the real exchange rate tends to depreciate in response to fiscal consolidation.
- In contrast, several studies based on dynamic VARs have found that fiscal expansions in advanced economies are associated with real depreciations. For example, Kim and Roubini (2008) find that an increase in the government primary deficit induces a real exchange rate depreciation for the United States. Similarly, Monacelli and Perotti (2007) look at the United

---

[5] Firms selling in the domestic market find it optimal to reduce markups because the increase in public spending renders the demand for individual goods more price elastic.

[6] The relationship between fiscal policy and the real exchange rate has been much less studied than the relationship between fiscal policy and the current account balance. For example, in a comprehensive review of the literature, Abbas *et al.* (2011) look at 20 papers studying the impact of fiscal policy on the current account balance, and only 5 analyzed the impact on the real exchange rate as well. Most studies find a positive relationship between budget balances and the current account.

States, United Kingdom, Canada, and Australia and show a negative relation between government spending and the real exchange rate.

- Regarding the composition of public spending, Galstyan and Lane (2009) study a sample of OECD countries and find that increases in government consumption appreciates the REER but the effect of government investment is more ambiguous. Caputo and Fuentes (2010), on the other hand find that both government consumption and public investment appreciate the REER (with a long-run elasticity close to 1).

3 Econometric evidence

3.1 Methodology

Given data constraints, we focus on a parsimonious set of economic fundamentals to account for changes in the REER. Our sample covers 28 emerging market economies for the period 1983-2011.[7] In the baseline model, we relate the real effective exchange rate to five underlying determinants drawn from the literature:[8]

- *Relative GDP per capita (GDPPC)* in constant 2005 U.S. dollars is measured relative to a weighted average of trading partners. Since it works as a proxy for the level of productivity, we expect to find a positive correlation between GDPPC and the REER in line with the Balassa-Samuelson conjecture. Also, richer countries tend to spend more on services that have higher income elasticity of demand (see Bergstrand 1991), which would result in a higher real exchange rate.
- *Balance of goods and services (TB)* is measured in percent of GDP and is used as a proxy for the international investment income position. In steady-state, the trade balance surplus should equal the international investment income deficit and, thus, we expect to find a negative relation between the TB and the REER.[9]
- *Structural balance (SB)* is defined as the cyclically-adjusted balance (excluding one-off adjustments) of the non-financial public sector. This measure is a better indication of discretionary changes in fiscal policy than the headline fiscal balance. The use of the SB also mitigates endogeneity concerns because the effect of automatic stabilizers is excluded in this measure.[10] We hypothesize that a higher SB will be associated with a depreciation of the real exchange rate, in line with the conventional Keynesian model.
- *Relative public consumption (PC)* is defined as government consumption in percent of GDP relative to a weighted average across trading partners.[11] We measure this variable in relative

---

[7] The time dimension varies depending on countries and variables. For a description of the variables and a list of countries, see the Appendix.

[8] Empirical analyses differ in their choices of the underlying real exchange rate fundamentals, sometimes due to data constraints. Alternative specifications were also estimated and some of these results are reported in the robustness checks. We did not include a measure of systemic risks in our estimation, such as VIX, since it is unlikely to affect the REER long-term dynamics and the impact would in any case become insignificant once a time variable is included.

[9] Standard intertemporal macroeconomic models predict that debtor countries will need a more depreciated real exchange rate to generate trade surpluses necessary to service their external liabilities.

[10] Not all endogeneity problems are corrected by this approach, however, given the fact that movements in the fiscal position can also have an impact on growth. An alternative to deal with the endogeneity problem would be to use historical documents to identify changes in fiscal policy as has been done in the literature looking at the impact of fiscal policy on growth (see, for example, Romer and Romer, 2010). One limitation of this approach, however, is that retrospective estimates of measures are rarely available and using contemporaneous assessments could be misleading since the size of the fiscal adjustment *ex post* may differ from what policymakers believed *ex ante*. In any case, Granger-causality tests seem to indicate that the REER does not cause movements in the structural balance.

[11] For each country we focus on the top trading geographic destinations of its exports that account for at least 80 per cent of exports during the period 1980-2010.

terms to capture factors driving the structure of relative prices. We expect an increase in public consumption to raise the relative demand for nontradables, thereby leading to a real appreciation.

- *Relative public investment (PI)* is defined as government investment in percent of GDP relative to trading partners. As discussed above, the effect of PI on the real exchange rate is ambiguous. Public investment may lead to a real appreciation (depreciation) if it improves disproportionally productivity in the tradable (non-tradable) sector. At the same time, if productivity improves symmetrically in the tradable and nontradable sectors, we would not expect an impact on the real exchange rate.

Following Ricci, Milesi-Ferretti and Lee (2008) and Galstyan and Lane (2009), we estimate a panel dynamic OLS (DOLS) to establish the long-run relation between the explanatory variables and the real exchange rate:

$$y_{it} = \alpha_i + t + \beta' x_{it} + \sum_{j=-1}^{j=1} \gamma' \Delta x_{it-j} + \varepsilon_{it} \quad (1)$$

where x is a vector including the explanatory variables described above and t is a time variable. In this model β is the vector of long-run cointegrating coefficients, Δ denotes the first-difference operator, γ is the vector of coefficients of leads and lags of changes in the determinants,[12] and ε_{it} is the residual term. Fixed effects are necessary because the real effective exchange rate is an index number that is not comparable across countries. They also account for time-invariant country-specific factors, reducing possible omitted variable bias. We favor the use of a panel DOLS because: (1) given the limited length of the sample, estimating separate real exchange rate equations for each country would result in imprecise estimates; and (2) data series are non-stationary.[13]

3.2 Results

The results suggest that fiscal policy has a significant effect on the REER. In particular:

- *Permanent fiscal adjustment is associated with a depreciation of the real exchange rate* (Table 1, columns 1 and 3). An improvement in the structural balance of 1 per cent of GDP would imply a depreciation of the real exchange rate of 1.7 per cent over the long term. This is line with the results of Guajardo *et al.* (2011) for advanced economies who find for a sample of advanced countries that a 1 per cent of GDP consolidation is associated with a 1.57 per cent real depreciation.
- *The composition of spending also matters*. An increase in relative government investment is associated with real exchange rate depreciation in the long run while government consumption does not have a significant effect (Table 1, columns 2 and 3).[14]

---

[12] The choice of one lead and lag is dictated by the sample length.

[13] Standard panel unit root tests do not reject the null hypothesis of a unit root for the real exchange rate. In addition, the tests indicate nonstationary for several of the explanatory variables (trade balance, structural balance). The DOLS methodology adds leads and lags of first differences of right-hand side variables to the set of regressors in order to wipe out the correlation of the residuals with the stationary component of the unit root process of the explanatory variables. Since this introduces serial correlation of the residuals, we use the Newey-West correction method to correct the standard errors. The DOLS residuals were found to be stationary using panel unit root tests, which is consistent with panel cointegration.

[14] An alternative specification with time dummies shows relative public consumption to have a positive significant effect but this result is not robust and thus we do not report it in here.

Table 1

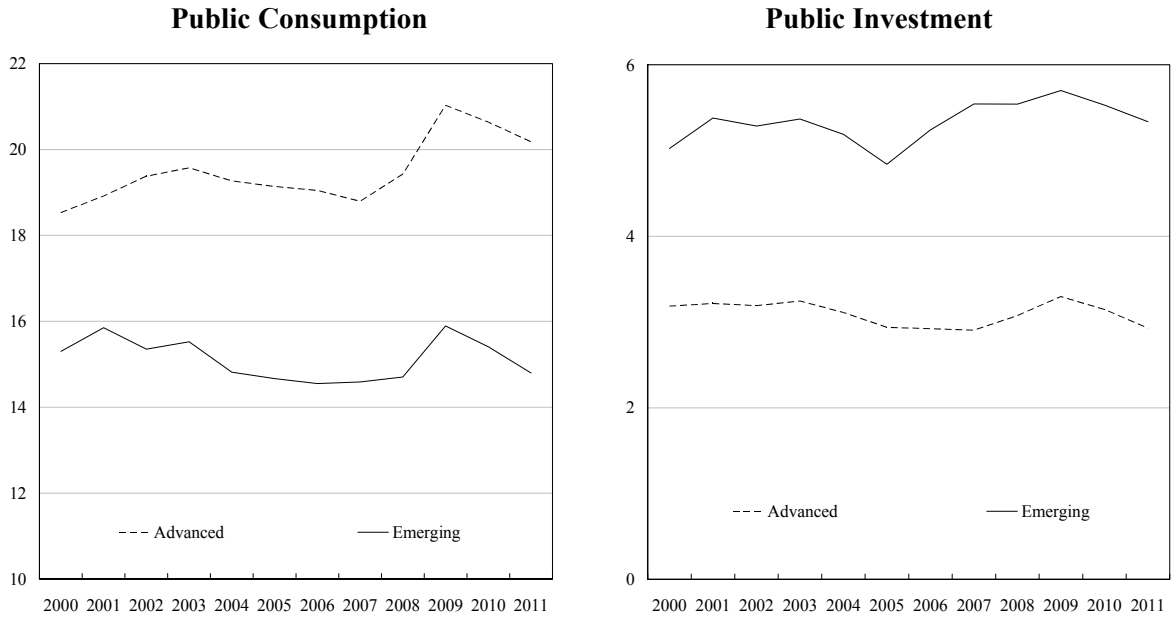
Real Effective Exchange Rate: Long-run Estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Structural balance	–0.018		–0.017	–0.018		–0.016
	*(0.00)***		*(0.00)***	*(0.00)***		*(0.00)***
Relative government consumption		–0.027	0.164	0.001	0.119	0.184
		(0.62)	*(0.30)*	*(1.00)*	*(0.47)*	*(0.24)*
Relative government investment		–0.044	–0.126	–0.114	–0.144	–0.129
		*(0.08)**	*(0.01)***	*(0.00)***	*(0.01)***	*(0.01)***
Relative GDP per capita	0.127	–0.013	0.139	0.121	0.161	0.154
	*(0.05)***	*(0.00)***	*(0.04)***	*(0.03)***	*(0.02)***	*(0.02)***
Balance of goods and services	–0.303	–0.632	–0.198	–0.278	–0.076	
	(0.23)	*(0.00)***	*(0.43)*	*(0.18)*	*(0.76)*	
Structural primary balance					–0.013	
					*(0.02)***	
Capital inflows						0.095
						(0.74)
R^2	0.60	0.44	0.65	0.54	0.63	0.65
Observations	195	564	190	190	185	145

Note: The dependent variable is the log of the real effective exchange rate. Structural balance is the structural balance in percent of GDP.
Relative government consumption is relative government consumption as a share of GDP; relative government investment is relative government investment as a share of GDP; relative GDP per capita is the log of real GDP per capita; balance of goods and service is as a share of GDP; structural primary balance is in percent of GDP; capital inflows are direct investment, portfolio investment and other flows as share of GDP. Hausman tests indicate fixed effects are more appropriate than random effects in our preferred specification. Asterisks ***, **, * indicate significance at 1%, 5% and 10% respectively.

Figure 3

Composition of Government Spending
(percent of GDP)



Source: IMF, *World Economic Outlook*.

As an illustration of the effect of these relativities, a 1 percentage point increase in relative public investment in Brazil would mean increasing public investment by 7½ percentage points of GDP; such a sizable increase would be associated with a depreciation in the real exchange rate of 12.6 per cent. These results are in contrast with findings for advanced economies where government consumption appreciates the real exchange rate while public investment does not have an effect (Galstyan and Lane, 2009). A possible explanation for this difference is that public investment is more likely to increase productivity in the nontradable sector among emerging markets given likely lower levels of infrastructure development. An additional argument could be associated with the different composition of government spending: emerging markets have relatively higher public investment but lower public consumption compared to advanced economies (Figure 3).[15]

Sensitivity analyses confirm the robustness of these results.

- The first question is whether these findings are driven by some groups of countries. In particular, Asian emerging economies have particularly large investment rates that could explain these conclusions. Thus, we adjust the model to control for possible outliers and find a similar result as in our baseline specification with the size of the coefficient on investment being only slightly smaller (Table 1, column 4). Also, estimating the model with a dummy for Asia yields the same results.

[15] Brazil has public investment ratios closer to the average of advanced economies; nevertheless, there are sizable infrastructure gaps, suggesting potential productivity gains from public investment could be large.

- Second, we look into a different measure of fiscal adjustment. In particular we use the structural primary balance instead of the overall structural balance. This variable may be more accurate to capture the true policy stance as interest rates (which are outside the control of the government) may fluctuate, distorting the size of fiscal adjustment. Consistent with our previous results, we find that an increase in the structural primary balance is associated with REER depreciation, although the impact is smaller (Table 1, column 5).
- Finally, the introduction of capital inflows as an additional control does not change the results (Table 1, column 6). Interestingly, capital inflows do not seem to have an effect on the REER over the *long term* irrespective of whether we use portfolio inflows or other inflows as our preferred measure.[16] This is a question we leave for further investigation in future research given our focus on fiscal policy variables.

3.3 Implications for Brazil

What role can fiscal policy play in efforts to contain real exchange rate appreciation pressures in Brazil? In order to make an assessment it is important to look at fiscal performance in Brazil and place it in an international perspective.

- *Fiscal policy*. Since the introduction of the Fiscal Responsibility Law in 2000 Brazil has maintained primary surpluses of around 3¼ per cent of GDP, one of the highest among emerging markets (Figure 4). However, the overall deficit is still relatively high because of large interest payments. In terms of the fiscal policy stance, there was a large adjustment during the period 2002-08. This allowed the creation of buffers that were used in part during the crisis (and more recently in response to the sharp economic deceleration since 2011) in the form a discretionary stimulus.[17] Following a large fiscal withdrawal in 2011, the structural deficit has declined to about 3 per cent of GDP, still larger than pre-crisis levels. Further improvements will likely require addressing budgetary rigidities going forward.
- *Composition of spending*. Relative to other emerging markets, Brazil is an outlier. In particular, public consumption, at 21¼ per cent of GDP in 2011, is one of the highest among emerging markets and almost double the level of its Latin American peers (Figure 5). Public consumption in percent of GDP has increased by 2 percentage points in Brazil since 2000, in contrast to most other emerging markets where it has declined. This is striking taking into account that public consumption does not include transfers (where increases have been large). On the other hand, public investment in Brazil has increased somewhat since 2000 but, at about 2½ per cent of GDP, is less than half the average of other emerging markets. Moreover, the level of public investment is now 70 per cent below that of trading partners (a marked deterioration since 2000). This evidence suggests that, by reallocating spending, Brazil could make some space for public investment and reap additional benefits.

Simulation analysis suggests that fiscal policy in Brazil could help reduce real appreciation pressures over the long term. In particular, a 1 per cent of GDP increase in public investment in Brazil would lead to a 1.7 per cent real depreciation. However, this is roughly the same effect but with an opposite sign as a corresponding 1 per cent of GDP deterioration of the

---

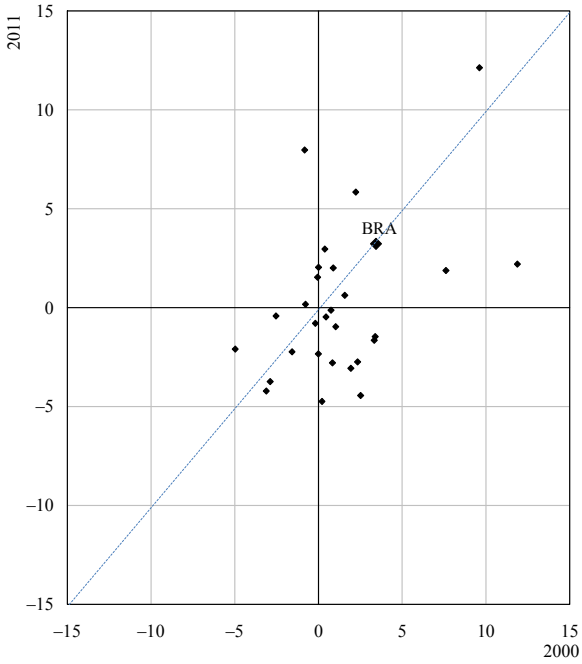
[16] Nevertheless, in an alternative specification (not reported here) we find that capital inflows have a significant impact on the REER for Brazil although the effect is relatively small.

[17] Public gross debt fell from 79.4 per cent of GDP in 2002 to 63.5 per cent of GDP in 2008 reflecting this effort. Moreover the composition of debt improved dramatically with substantial reductions in external and short-term indexed debt. Nonetheless, for some perspective, it is useful to recall that debt levels today are roughly the same as in 2000. This reflects partly the spike in debt associated with the economic shock Brazil experienced in 2002-03, as well as the impact on debt of the stimulus extended during 2009-10 to offset the effects of the global crisis.

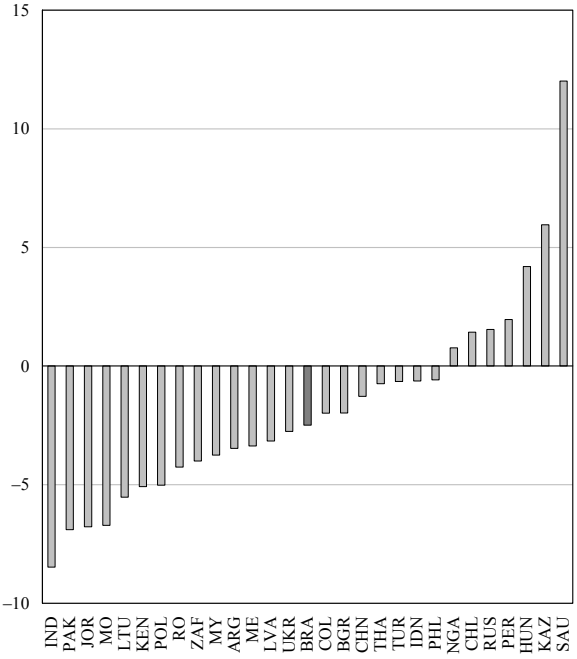
Figure 4

Emerging Markets: Fiscal Performance

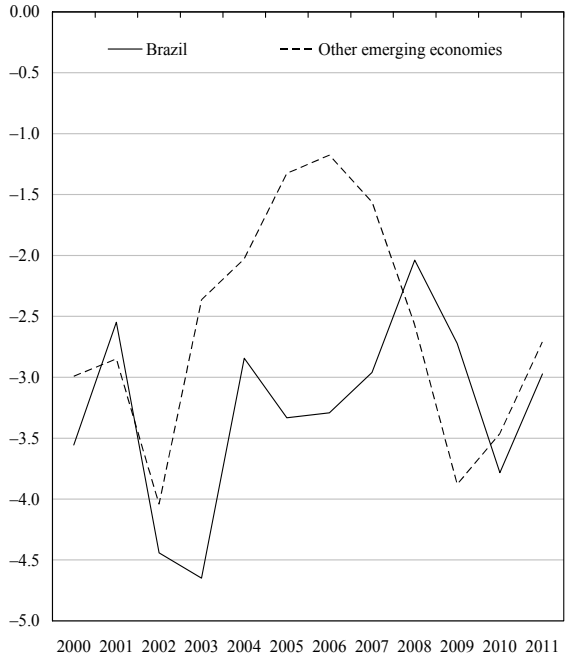
Primary Balance
(percent of GDP)



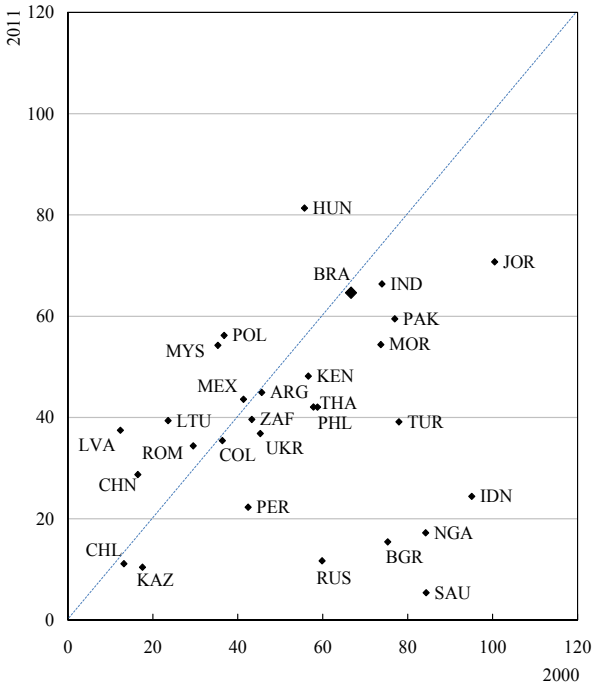
General Government Balance, 2011
(percent of GDP)



Structural Balance
(percent of GDP)



Gross Public Debt
(percent of GDP)

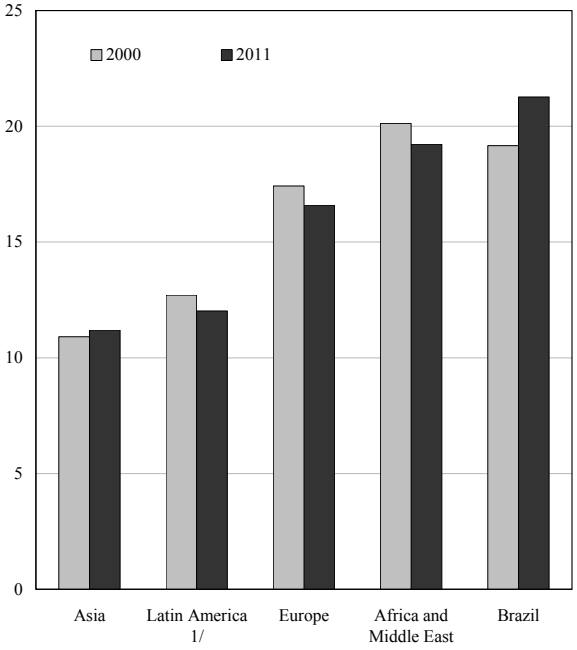


Sources: IMF, *World Economic Outlook*, and staff calculations.

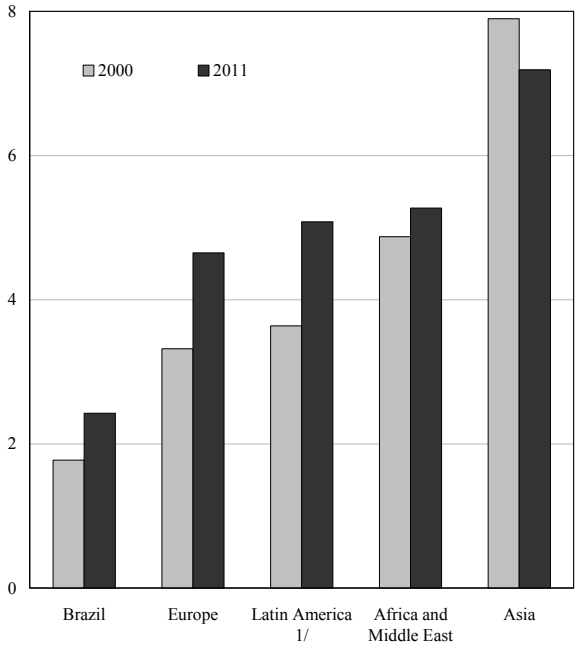
Figure 5

Emerging Markets: Composition of Government Spending

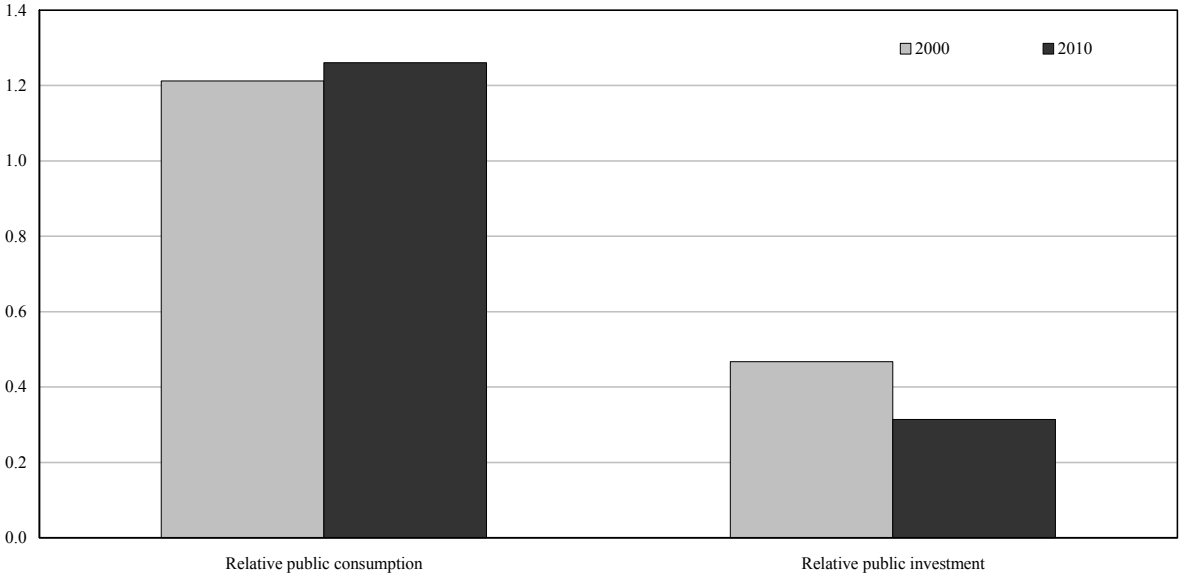
Public Consumption
(percent of GDP)



Public Investment
(percent of GDP)



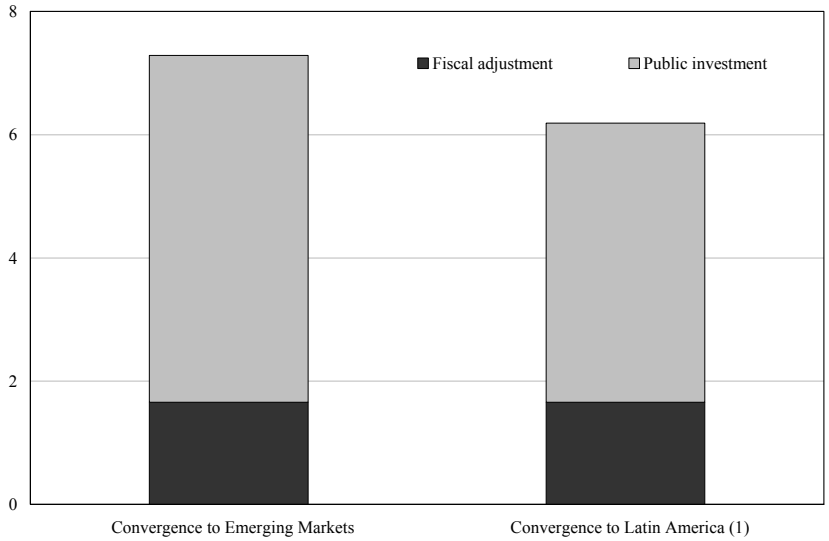
Brazil: Relative Public Consumption and Investment [2/]



Sources: IMF, *World Economic Outlook*; and authors' calculations.
1/ Excluding Brazil.
2/ Relative public consumption (investment) is calculated as the ratio of Brazil's public consumption (investment) in percent of GDP to a weigthed average of its trading partners' public consumption (investment) in percent of GDP. A number above 1 means Brazil has higher public consumption (investment) in percent of GDP than is trading partners.

Figure 6

Simulation Analysis
(real exchange depreciation, percent)



Sources: IMF, *Information Notification System*; *World Economic Outlook*; and staff's calculations.
(1) The countries included in Latin America are: Argentina, Colombia, Peru, and Mexico.

structural balance. Thus, if both investment and the structural deficit were to increase by similar amounts, the REER would not change. In other words, increasing public investment could only help if accompanied by offsetting measures to generate savings (for example, by reducing public consumption). To put this into context, we consider two scenarios. *Scenario 1* assumes Brazil improves the structural balance by 1 per cent of GDP. In addition, we assume public investment in Brazil converges to the level of its Latin American peers. This would require finding additional fiscal space of 2½ per cent of GDP. *Scenario 2* assumes the same improvement in the structural balance but public investment converging to the average in emerging markets (requiring fiscal space of 3¼ per cent of GDP). These scenarios imply that an appropriate combination of fiscal policy actions could, *ceteris paribus*, support a real depreciation in the range of 6¼ to 7¼ per cent in the long term (Figure 6).

In order to reap these benefits, it would be important for Brazil to create fiscal room. Our results show that strengthening the structural fiscal position could play a role in alleviating appreciation pressures. As an added benefit, this could help reducing real interest rates, thus creating additional fiscal space (see Segura-Ubiergo, 2012). A particularly promising avenue to facilitate a real depreciation would be to increase public investment, which is already an important priority for the authorities as demonstrated in their strategy under the Growth Acceleration Program (Programa de aceleração do crescimento, PAC). Nevertheless, to be an effective tool for the exchange rate, the increase in public investment would need to be financed by savings, and not by an increase in the deficit. A similar logic applies to financing investment through quasi-fiscal operations (such as policy lending to BNDES). Beneficial effects on the exchange rate would likely be maximized if these operations were matched by higher public savings. Else the external current account could deteriorate, pressing up the real exchange rate. Moreover, the interest subsidy on BNDES lending directly lowers net public saving, while an increase in contingent liabilities here could gradually push up risk premia. Similarly, public investment projects undertaken via concessions or PPPs could also result in higher current account deficits (if not accompanied by an increase in public savings) and crowding-out of private investment.

The most promising route to create that space would be lowering government consumption. Achieving this end would require reducing fiscal earmarking/mandates that lock current spending at very high levels and create a bias against public investment (Box 1). While some of these

Box 1
Budget Rigidities in Brazil

Budget rigidities – in the form of revenue earmarking and mandatory allocations[18] – appear to be behind the rapid increase of government spending in Brazil in recent years:

- *Revenue earmarking*. Revenues from all sources are to some extent earmarked with the main focus being on social sectors (education, health care, housing, and social benefits). In particular, the Constitution establishes that at least 25 per cent of tax revenue at all levels of governments be allocated to education, and 12 and 15 per cent of the states' and municipalities' tax revenues are earmarked to the provision of health care services (OECD, 2011). To increase flexibility, an arrangement for withholding federal earmarked revenues (*Desvinculação das Receitas da União*, DRU) has been extended until 2015.
- *Mandatory spending*. The Brazilian Constitution guarantees the funding of three types of government expenditure: revenue sharing with states and municipalities; salaries and pension for government employees, and interest on and repayment of the public debt. At the same time, social security spending is mandated with pressures mounting as a result of the indexation of minimum pensions to the minimum wage. In addition, Congress has in recent years designated several other expenditure programs as "mandatory" in the Budget Guidance Law in order to protect them from cuts in the presidential budget implementation decrees. Thus, mandatory spending (at the federal level) now accounts for ¾ of total spending.

Figure 7

Brazil: Central Government Revenue, 2001
(percent of total)

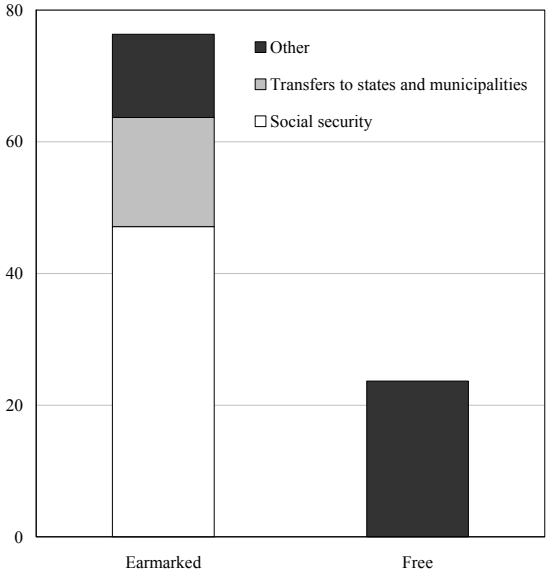
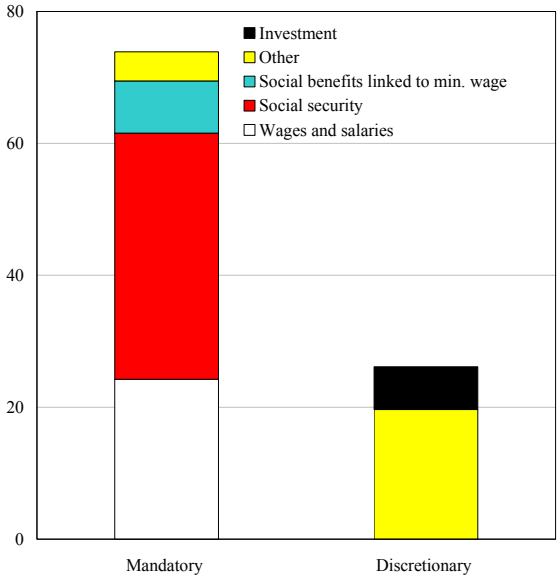


Figure 8

Brazil: Central Government Expenditure, 2001
(percent of total)



Sources: Ministry of Finance; Ministry of Planning; IMF, *World Economic Outlook*; and authors' calculations.

[18] For more details, see Alier and Costa (2005) and Weisman and Blanco (2006).

These rigidities introduce important distortions in fiscal management and reduce the space for investment. First, rigidities discourage efficiency gains by perpetuating budget allocations on the basis of historical spending and leave limited space for reallocation in response to changing needs. This is illustrated by Brazil's difficulty in increasing public investment which, at 2½ per cent of GDP in 2011, is less than half the average of other emerging markets. Second, these rigidities affect the quality of fiscal adjustment with retrenchment in spending falling just on a subset of budget items. Finally, budget rigidities have contributed to procyclical spending with revenue windfalls being spent as a result of earmarking. This trend in spending, however, might be difficult to reverse in case of an economic slowdown.

earmarks/mandates, like those for health and education spending floors have positive social objectives, improvements at the margin in their design could be explored. The priorities could include (i) reducing revenue-earmarking and mandatory spending in combination with more effective medium-term planning and rolling multi-year budget plans; and (ii) strengthening the costing, monitoring, and evaluation of public spending with a view to increasing its efficiency.

4 Conclusions

Fiscal policy in emerging markets can have an important effect on the REER. This works through two channels. First, increases in public savings (*i.e.*, a stronger structural fiscal position) could reduce real appreciation over the long term and hence might be an important instrument to ensure higher competitiveness. Second, the structure of government spending matters, with increases in public investment leading to a reduction in appreciation pressures. This last finding has important implications for Brazil since current spending accounts for almost 90 per cent of total spending. Hence, there is scope to increase public investment. One caveat, however, is that both channels have roughly the same impact on the REER. What this means in practice is that increases in public investment that are not accompanied by offsetting measures to reduce current spending would likely have little effect on the REER. Therefore, creating room for investment by a reallocation of public spending would have multiple beneficial effects, both for improving public service delivery but also for helping address real appreciation pressures. Just as an example, Brazil would need to increase public investment by 2½ to 3¼ per cent of GDP to converge to levels in emerging market peers. Given already high primary surpluses, achieving this solely through fiscal adjustment is likely to be challenging, which highlights the importance of addressing budgetary rigidities to reallocate resources from public consumption to investment. Equally important to increase public investment would be to improve project's delivery and spending execution. This is an area where lack of capacity in planning and management, difficulties in obtaining necessary licenses and procedural problems have resulted in long delays in the past (for further discussion, see OECD, 2011). Finally, this discussion also highlights the importance of making careful budgetary choices once oil productions increases in a few years and Brazil becomes a major oil exporter. Given the risk of Dutch diseases usually associated with increases in exports of natural resources, it would be particularly important that fiscal space generated by natural resource wealth is used to finance higher public investment.

APPENDIX
DATA

The sample includes 28 emerging countries for the period 1983 to 2011: Argentina, Brazil, Bulgaria, Chile, China, Colombia, Hungary, India, Indonesia, Jordan, Kazakhstan, Kenya, Lithuania, Malaysia, Mexico, Morocco, Nigeria, Pakistan, Peru, Philippines, Poland, Romania, Russia, Saudi Arabia, South Africa, Thailand, Turkey, and Ukraine. Time span varies depending on the countries with shorter data available for the fiscal aggregates.

Variables are defined as follows:

- *Real effective exchange rate* is based on consumer price index and taken from the IMF, Information Notification System.
- *Balance of goods and services* is defined as the difference between exports and imports of goods and services. The data are taken from the IMF, *World Economic Outlook*.
- *Real GDP per capita (in constant 2005 prices)* is taken from the IMF, *World Economic Outlook*.
- *Structural balance* is defined as the overall balance adjusted for the cycle and excluding one-offs. Due to data availability, we take the cyclically adjusted balance for Mexico and Philippines. Cyclically adjusted balance is defined as the overall balance minus cyclical balance whereby the cyclical revenues and expenditures are computed using country-specific elasticities with respect to the output gap. Data are from the IMF, *World Economic Outlook.*
- *Public consumption* is defined as current primary spending excluding transfers. The data are based on national accounts and come from IMF, *World Economic Outlook.*
- *Public investment* is defined as public gross fixed capital formation. Data come from IMF, *World Economic Outlook.*
- *Trade weights* are calculated using *Direction of Trade Statistics* data. For each country we focus on the top trading geographic destinations of its exports that account for at least 80 per cent of exports during the period 1980-2010. Because of data limitations, coverage is below 80 per cent at the beginning of the sample.
- *Capital inflows* are defined as gross flows including direct investment, portfolio investment and other flows. Data are from the IMF, *World Economic Outlook.*

REFERENCES

Abbas, S.M.A., J. Bouhga-Hagbe, A. Fatás, P. Mauro and R.C. Velloso (2011), "Fiscal Policy and the Current Account", IMF, *Economic Review*, Vol. 59, No. 4, pp. 603-29.

Abhyankar, A., L. Sarno and G. Valente (2005), "Exchange Rates and Fundamentals: Evidence on the Economic Value of Predictability", *Journal of International Economics*, Vol. 66, No. 2, pp. 325-48, July.

Alier, M. and A. Costa (2005), "Budget Rigidities in Brazil", International Monetary Fund, Selected Issues Paper (unpublished), Washington (D.C.).

Backus, D.K., P.J. Kehoe and F.E. Kydland (1994), "Dynamics of the Trade Balance and the Terms of Trade: The J-Curve?", *American Economic Review*, Vol. 84, No. 1, pp. 84-103.

Balassa, B. (1964), "The Purchasing Power Parity Doctrine: A Reappraisal", *Journal of Political Economy*, No. 72, pp. 584-96.

Benelli, R., A. Segura-Ubiergo and C. Walker (2011), "Brazil's Experience Managing Capital Inflows: The Role of Capital Flow Capital Flow Management Measures", International Monetary Fund, Selected Issues Paper (unpublished), Washington (D.C.).

Bergstrand, J. (1991), "Structural Determinants of Real Exchange Rates and National Price Levels: Some Empirical Evidence", *American Economic Review*, No. 81, pp. 325-34.

Cardarelli, R., S. Elekdag and A. Kose (2007), "Managing Large Capital Inflows", International Monetary Fund, *World Economic Outlook*, Ch. 3, Washington (D.C.), October.

Caputo, R. and M. Fuentes (2010), "Government Spending and the Real Exchange Rate: A Cross-country Perspective", unpublished manuscript.

Chatterjee, S. and A. Mursagulov (2012), "Fiscal Policy and the Real Exchange Rate", IMF, Working Paper, No. 12/52, Washington (D.C.).

Engel, C. and K.D. West (2005), "Exchange Rates and Fundamentals", *Journal of Political Economy*, Vol. 113, No. 3, pp. 485-517.

Fleming, M.J. (1962), "Domestic Financial Policies Under Fixed and Under Floating Exchange Rates", International Monetary Fund, Staff Papers, Vol. 9, pp. 369-79.

Galstyan, V. and P.R. Lane (2009), "The Composition of Government Spending and the Real Exchange Rate", *Journal of Money, Credit and Banking*, Vol. 41, No. 6, pp. 1233-49.

Ghosh, A., M. Goretti, B. Joshi, U. Ramakrishnan, A. Thomas and J. Zalduendo (2008), "Capital Inflows and Balance of Payments Pressures – Tailoring Policy Responses in Emerging Market Economies", IMF, Policy Discussion Paper, No. 08/2, Washington (D.C.).

Guajardo, J., D. Leigh and A. Pescatori (2011), "Expansionary Austerity: New International Evidence", IMF, Working Paper, No. 11/158, Washington (D.C.).

International Monetary Fund (2008), "Exchange Rate Assessments: CGER Methodologies", IMF, Occasional Paper, No. 261, Washington (D.C.).

——————(2011a), "The Multilateral Aspects of Policies Affecting Capital Flows", Washington (D.C.).

——————(2011b), "Recent Experiences in Managing Capital Inflows – Cross-cutting Themes and Possible Policy Framework", Washington (D.C.).

International Monetary Fund (2013), "Brazil: 2012 Article IV Consultation – Staff Report", IMF, Country Report, No. 13/312, Washington (D.C.).

Kim, S. and N. Roubini (2008), "Twin Deficit or Twin divergence? Fiscal Policy, Current Account and the Real Exchange Rate in the U.S.", *Journal of International Economics*, No. 74, pp. 362-83.

Kollmann, R. (2010), "Government Purchases and the Real Exchange Rate", *Open Economies Review*, Springer, Vol. 21, No. 1, pp. 49-64, February.

Mark, N.C. (1995), "Exchange Rates and Fundamentals: Evidence on Long-Horizon Predictability", *American Economic Review*, Vol. 85, No. 1, pp. 201-18.

Monacelli, T. and R. Perotti (2008), "Fiscal Policy, the Trade Balance, and the Real Exchange Rate: Implications for International Risk Sharing", IGIER, Working Paper.

Mundell, R.A. (1963), "Capital Mobility and Stabilizing Policy Under Fixed and Flexible Exchange Rates", *Canadian Journal of Economics and Political Science*, Vol. 29, pp. 475-85.

OECD (2011), *Economic Survey of Brazil*, Organization for Economic Cooperation and Development, Paris.

Ostry, J.D., A. Ghosh, K. Habermeier, M. Chamon, M.S. Qureshi and D.B.S. Reinhardt (2010), "Capital Inflows: The Role of Controls", IMF, Staff Position Note, No. 10/04, Washington (D.C.).

Ostry, J., A.R. Ghosh, K. Habermeier, L. Laeven, M. Chamon, M.S. Qureshi and A. Kokenyne (2011), "Managing Capital Inflows: What Tools To Use?", IMF, Staff Discussion Note, No. 11/06, Washington (D.C.).

Ravn, M.O., S. Schmitt-Grohe and M. Uribe (2007), "Explaining the Effects of Government Spending Shocks on Consumption and the Real Exchange Rate", NBER, Working Paper, No. 13328, Cambridge (MA).

Rime, D., L. Sarno and E. Sojli (2009), "Exchange Rate Forecasting, Order Flow and Macroeconomic Information", CEPR, Discussion Paper, No. DP7225, March.

Ricci, L.A., G.M. Milesi-Ferretti and J. Lee (2008), "Real Exchange Rates and Fundamentals: A Cross-country Perspective", IMF, Working Paper, No. 08/13, Washington (D.C.).

Romer, C.D. and D.H. Romer (2010), "The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks", *American Economic Review*, Vol. 100, No. 3, pp. 763-801.

Segura-Ubiergo, A. (2012), "The Puzzle of Brazil's High Interest Rate", IMF, Working Paper, No. 12/62, Washington (D.C.).

Samuelson, P. (1964), "Theoretical Notes on Trade Problems", *Review of Economics and Statistics*, No. 46, pp. 145-54.

Sachs, J. and C. Wyplosz (1984), "Real Exchange Rate Effects of Fiscal Policy", NBER, Working Paper, No. 1255, Cambridge (MA).

Sarno, L. and M.P. Taylor (2001), "Purchasing Power Parity and the Real Exchange Rate", CEPR, Discussion Paper, No. 2913.

Weisman, E. and F. Blanco (2006), "Brazil: Improving Fiscal Circumstances for Growth", The World Bank, Washington (D.C.).

COMMENTS ON SESSION 3
FISCAL POLICY AND MACROECONOMIC IMBALANCES IN EMERGING ECONOMIES AND RESOURCE-RICH COUNTRIES

Teresa Ter-Minassian[*]

Comments on "Fiscal Challenges to a Long-run Sustainable Growth in Brazil" by Ana Teresa Holanda De Albuquerque

The paper by Ana Teresa Albuquerque provides an interesting and thoughtful discussion of challenges for fiscal policy in Brazil today. I agree with most of it. Therefore, my comments will focus on what I believe to be key reasons for the current sub-par performance of the Brazilian economy, and on the appropriate role of fiscal policy in improving it.

First, in my view, the current protracted slowdown in the economy reflects more structural than cyclical factors, in particular a significant loss of competitiveness, reflected in poor performance of manufacturing exports, growing import penetration (despite increased resort to protectionist measures), and an increase in the relative price of non-tradable goods and services, and, relatedly, in the share of services in GDP. The loss of competitiveness is only partly due to nominal exchange rate movements. The overheated labor market, rapid increases in the minimum wage, a continuing rise in the tax burden, and lack of progress in needed structural reforms to boost productivity over the last ten years are the main culprits.

The loss of competitiveness, together with uncertainties on the course of key policies, explains the poor performance of private investment, despite fiscal incentives and a marked reduction in the cost of credit from mid-2011 to mid-2013. Public investment continues to be hampered by structural impediments, despite ongoing government efforts to boost infrastructure spending. Private consumption has been the main engine of growth in domestic demand in recent years, but households are moderating their spending, given their rapidly rising debt burden.

The assessment of the role of fiscal policy in recent years in Brazil is hampered by a proliferation of accounting gimmicks and quasi-fiscal operations, including:

- anticipation of revenues and postponements of payments (including VAT refunds),
- progressive reduction of the coverage of the fiscal target (exclusion of large public enterprises and of a growing share of public investment),
- massive use of public banks for directed lending, financed by below-the-line Treasury loans.

As a result, both the primary balance and the net public debt have lost value as indicators of the fiscal stance (as well as of fiscal sustainability). Fiscal policy is more expansionary than signaled by the recorded modest decline of the primary surplus; and it is less sustainable than suggested by the gradual decline of the net public debt. The gross public debt is still rising and, at just under 60 per cent of GDP, is relatively high for an emerging market country; and fiscal risks are mounting, as underlined by Ana Teresa.

Nevertheless, the significant fiscal stimulus and the substantial monetary easing through mid-2013 have failed so far to produce a sustained recovery of the economy. This supports the view that neither is the appropriate remedy for the underlying causes of the slow growth. How could fiscal policy support sustainable higher growth in Brazil?

---

[*] Inter-American Development Bank.

First and foremost by reducing the share, and improving the quality, of current spending. This would require:

- entitlement reforms (in the pensions and, to a lesser extent, the health systems),
- the elimination or at least substantial reduction of the pervasive earmarking requirements,
- reforms of the civil service at all levels of government, and
- reduction of interest and other types of subsidies.

A significant and sustained reduction of current spending would create fiscal space for much needed investments in infrastructure and in the energy sector (either through public works or PPPs); and for reforms in indirect taxation at both the federal and sub-national levels that are essential to improve competitiveness. It would be also important to reverse the unfortunate recent trend to manipulate the fiscal accounts, that has undermined the transparency and credibility of fiscal policy

Fiscal reforms are only a part of the structural reform agenda needed for growth in Brazil, but are a crucial part of it. Unfortunately, the electoral timetable and still relatively benign conditions in financial markets make it unlikely, in my view, that such an agenda will be meaningfully addressed in the near future.

Comments on "Cyclicality of Fiscal Policy in India" by Atri Mukherjee

Main comment

The paper provides an interesting quantitative analysis of the responses of fiscal variables to cyclical fluctuations in output, using alternative statistical and econometric methodologies. But, is it appropriate to call this an exploration of the pro- or counter-cyclicality of fiscal policy?

Traditionally a fiscal policy is characterized as pro-cyclical if the impulse it imparts to the economy tends to aggravate, rather than smooth, the output cycle. From this perspective a positive elasticity of revenues to output is stabilizing, not pro-cyclical. In contrast, a positive elasticity of spending is pro-cyclical. The net impact of the two effects (i.e. whether the overall fiscal stance is pro- or counter-cyclical) depends on the relative size of different revenue and spending categories, and on their respective elasticities.

Therefore, the paper does not really shed light on the cyclicality of the overall fiscal stance, a question of importance in a country like India with historically high deficits and public debt, and currently struggling to return to higher sustainable growth rates.

Additional comments

The terminology used in the paper is somewhat at odd with established international standards, and may be confusing for a reader unfamiliar with Indian budgets. Does "revenue expenditure" refer to what is commonly categorized as current expenditures? Are "capital receipts" not really financing items? How do "capital outlays" differ from government investment?

The paper focuses on the Union's budget. Given the federal nature of the country, the sizable shares of the states in expenditure and revenues, and the fact that they run significant (and varying over time) deficits, it would be useful to expand the analysis to the state level, if the relevant data are available.

The three methodologies employed in the paper yield fairly different estimates of the elasticities of various budget categories to the cycle. It would be interesting to include some discussion of possible reasons for such differences.

The estimated tax revenue elasticities are surprisingly high, especially as regards excise taxes. I wonder whether the series have been purged of the effects of discretionary changes. If not, the underlying elasticities may well be lower than the estimated buoyancies.

Is there a risk of reverse causality in the equation relating expenditures to output (methodology 2)?

The paper explains the relatively low cyclical responsiveness of current spending by the inability of the government to cut it during bad times. It would be interesting to test for an asymmetric behavior during good times

The paper also attributes the counter-cyclical character of spending on subsidies to the government's desire to protect the poor. But, how much of these subsidies really go to benefit the lowest income groups?

COMMENTS ON SESSION 3
FISCAL POLICY AND MACROECONOMIC IMBALANCES IN EMERGING ECONOMIES AND RESOURCE-RICH COUNTRIES

Sergey Vlasov[*] *and Elena Deryugina*[*]

We would like to thank Banca d'Italia for the opportunity to contribute to this excellent workshop by providing our comments on last two papers of Session 3, prepared by the representatives of Bank of Columbia and IMF. Both papers investigate empirically macroeconomic effects of fiscal policy in Emerging market economies (*EMs*). It was very interesting to read them since implications can be applied to Russia. We will take up these papers in turn, covering the motivation, the main results and our comments on the papers.

Comments on "Macroeconomic Effects of Structural Fiscal Policy Changes in Colombia" by Hernando Vargas, Andrés González and Ignacio Lozano

The paper prepared by Vargas, González and Lozano indicates uncertain state of public finances in Colombia by the end of 1990s both because of the high level of budget deficit, public debt, interest payments, etc., and due to the fact that the main fiscal indicators were on the wrong path. The fiscal adjustment in 2000s allowed to reduce structural budget deficit, decrease government currency mismatch, deepen local fixed-rate public bond market. The motivation of the paper is to assess macroeconomic effects of these improvements:

- on the sovereign risk premium;
- on the short run response of output to government expenditure shocks;
- on the transmission of monetary policy shocks to market interest rates.

By applying different econometric techniques authors test the relationships over 1999-2011 and come to the following conclusions. First, the reduction in the public debt-to-GDP ratio and government currency mismatch has contributed to a permanent drop in the sovereign risk premium and to a decline in its sensitivity to global risk aversion shocks. Moreover, the calculations show that the most of this dynamics is the result of the local factors' impact. Secondly, in Colombia throughout the 2000s there was an increase in the power of public spending to affect output which allows authors to conclude that there is a direct dependence between the soundness of public finances and the effectiveness of government spending shocks. Thirdly, the improvement in the state of public finances and increase in the credibility of Colombian monetary policy throughout the 2000s allowed to reinforce the transmission of monetary shocks both to public bonds and financial system interest rates, and 2004 is indicated as a transitional year.

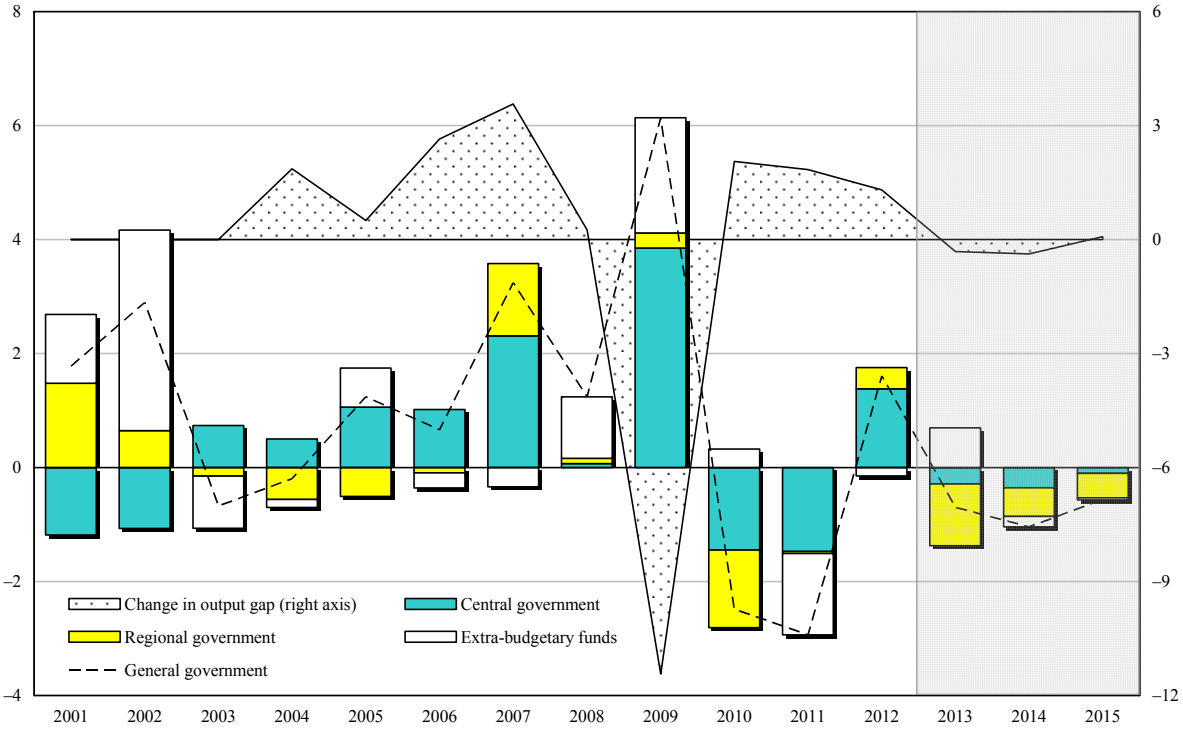
Finally here are several comments on the paper. First, let us ascertain that the data used for estimations is seasonally adjusted. There are some doubts since we found no mention of this fact in the text while some series presented on the graphs definitely display seasonality (currency mismatch, difference between actual and debt-stabilizing primary balances, etc.).

Second, for the estimations authors use the data for the central government, while it is worthwhile to use those for the general government level. This should allow to capture the full effect of the fiscal policy, while otherwise inaccuracy and unrobustness of the results are possible. To illustrate this, in the paper authors draw a conclusion on the cyclicality of fiscal policy in

[*] Bank of Russia.

Figure 1

Fiscal Policy Cyclicality on the Different Levels of the Russia's Budget System, 2001-15
(change in structural non-oil-and-gas primary balances: percent of GDP
(positive value indicates balance decrease), change in output gap: percent of potential GDP)



Colombia. Our calculations made for Russia show that the estimates of the fiscal policy cyclicality can differ significantly for the central and general government, particularly they were opposite in 2001-2004 (see Figure 1 for the estimates of fiscal policy cyclicality on the different levels of the Russian budget system over 2001-15 and Vlasov (2012) for the employed methodology).

Third, concerning modeling of the second and third effects the following sentence from the text is highly arguable: "An unexpected increase in public expenditure may prompt an expectation of higher taxes in the short run in a dire financial situation of the Government, thereby offsetting its possibly expansionary effect on output." (Vargas *et al.*, 2013). It seems important to note that identification of structural shocks basing on deviations between projected and actual values of fiscal indicators may be hindered by market inefficiency in EMs, at least this should be fair in the Russian case.

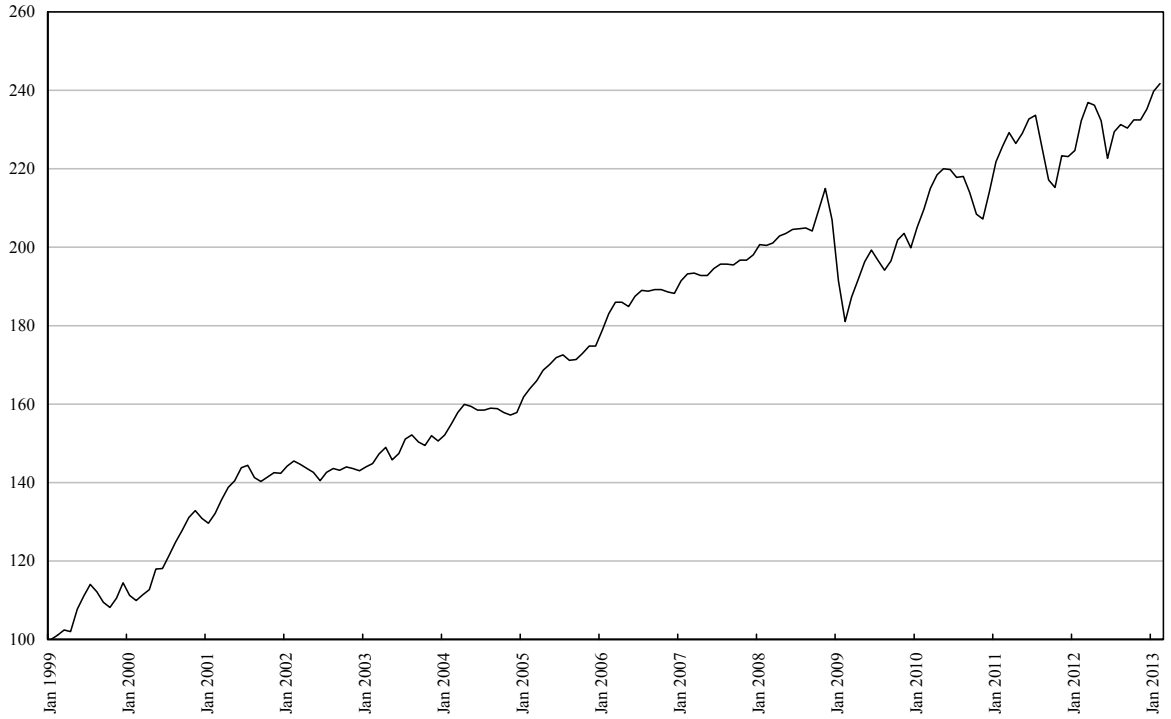
Also while reading the text we got the impression that authors treat currency depreciation as one of the main threats to be prevented. In this respect the following paper stands up for a rather opposite view.

Comments on "Real Exchange Rate Appreciation in Emerging Markets: Can Fiscal Policy Help?" by Marialuz Moreno Badia and Alex Segura Ubiergo

The motivation of the paper prepared by Badia and Ubiergo is the sizeable currencies appreciation in recent years in a number of EMs that resulted from the terms of trade gains, large

Figure 2

Developments of the Russian Ruble's Real Effective Exchange Rate
(monthly, percent, January 1999=100 per cent)



capital inflows, etc., and led to a loss of competitiveness of export-oriented companies. The paper discusses to what extent can fiscal policy actions help contain exchange rate appreciation pressures in EMs with the special focus on Brazil.

Just to add up to the motivation Figure 2 presents the developments of the Russian ruble's real effective exchange rate (*REER*) and real exchange rate against US dollar. With the exception of the crisis period there is a continuous ruble's REER appreciation since the beginning of 2000s. The background is large-scale oil-and-gas budget revenues against relatively low standard of living that followed crazy 1990s in Russia. Insufficient savings of resource revenues in the sovereign funds and limited efficiency of the Central Bank's instruments contributed to asymmetrical development of oil-and-gas and non-oil-and-gas sectors of the Russian economy.

Using a sample of 28 EMs for the period 1983-2011, authors estimate a panel dynamic OLS model of the real exchange rate. Baseline model includes five explanatory variables: 1) Relative GDP per capita (*GDPPC*); 2) Balance of goods and services (*TB*); 3) Structural balance (*SB*); 4) Relative public consumption (*PC*); 5) Relative public investment (*PI*).

The estimations allow Badia and Ubiergo to come to the following conclusions applied for the long run. First, they show that appreciation pressures can be reduced by permanent fiscal adjustment: a 1 per cent of GDP increase in the structural balance would imply a depreciation of the real exchange rate of 1.7 per cent. The second finding is that the composition of public spending matters: the increase in relative government investment leads to REER depreciation and government consumption does not have a significant effect. An illustration for Brazil means that a 1 percentage point increase in relative public investment would mean increasing public investment

by 7.5 percentage points of GDP and would be associated with 12.6 per cent depreciation of the real exchange rate. While the former finding is in line with the existing literature the latter is in contrast with the findings for the advanced economies where public consumption appreciates the real exchange rate and public investment does not have an effect. An explanation for this difference given by the authors is that public investment is more likely to increase productivity in the nontradable sector among EMs given likely lower levels of infrastructure development. An additional argument is that EMs have relatively higher public investment and lower public consumption compared to advanced economies.

Finally, we would like to produce some comments on the paper. First, let us inquire about the results of multicollinearity testing since there are some doubts about the correlation between PC, PI and SB indicators.

Second, since both fiscal and monetary policy simultaneously affect fluctuations in macroeconomic variables it seems worthwhile to try to introduce as an explanatory variable any monetary indicator, for example, interest rate. This will allow to control for monetary policy effect (for example, see Mountford and Uhlig, 2009, and Rossi and Zubairy, 2011). Another suggestion that can improve the model is to employ public debt, possibly instead of structural balance indicator.

Third, as for the representative of the oil-producing country, it's of particular interest whether the public investment effect on REER is fair for oil-producing countries on a par with the others presented in the sample, since such countries are characterized by a special structure of export, capital flows, etc., and economic development at all.

Moreover, we believe some description is required of the results for GDPPC and TB indicators since nothing is presented in the text. The special interest is for the second specification, that is characterized by the largest number of observations and the wrong sign of coefficient associated with the relationship between GDPPC and REER.

REFERENCES

Badia, M.M. and A.S. Ubiergo (2013), "Real Exchange Rate Appreciation in Emerging Markets: Can Fiscal Policy Help?", in this volume.

Mountford, A. and H. Uhlig (2009), "What Are the Effects of Fiscal Policy Shocks?", *Journal of Applied Econometrics,* Vol. 24, pp. 960-92.

Rossi, B. and S. Zubairy (2011), "What Is the Importance of Monetary and Fiscal Shocks in Explaining U.S. Macroeconomic Fluctuations?", *Journal of Money, Credit and Banking*, Vol. 43, No. 6, pp. 1247-70.

Vargas, H., A. González and I. Lozano (2013), "Macroeconomic Effects of Structural Fiscal Policy Changes in Colombia", in this volume.

Vlasov, S. (2012), "Russian Fiscal Framework: Past, Present and Future. Do We Need a Change?" in Banca d'Italia (ed.), *Rules and Institutions for Sound Fiscal Policy after the Crisis*, papers presented at the Banca d'Italia workshop held in Perugia, 31 March-2 April, 2011, pp. 585-610.

Session 4

FISCAL TOOLS TO CONTROL MACROECONOMIC RISKS AND IMBALANCES: EXPERIENCES AND PRESCRIPTIONS

MACROECONOMIC IMBALANCES: A QUESTION OF TRUST?

Sascha Bützer,[*] *Christina Jordan*[**] *and Livio Stracca*[***]

In this paper, we address the question of whether cross-country differences in civic capital, notably interpersonal trust, have contributed to the build-up of macroeconomic imbalances over the last three decades. We analyse the link between a stylised index of economic imbalances (a combination of the government budget balance, the inflation rate and the current account balance) and trust, alongside other measures of civic and cultural capital, obtained from value survey data for 65 advanced and emerging countries. For the whole set of countries, we find robust empirical evidence for a negative and significant relationship between interpersonal trust and macroeconomic imbalances which may therefore partly reflect underlying heterogeneity in civic capital. Within the euro area, differences in trust exist although they are not particularly large from an international perspective. With the nexus between trust and macroeonomic imbalances being equally robust we can attribute one fifth of the variation in intra-euro area imbalances to differences in interpersonal trust. Euro area membership does not appear to have weakened the link between the two variables which suggests that monetary union and EU fiscal rules have not constrained the transmission mechanism.

1 Introduction

Macroeconomic imbalances have become an essential element of the narrative of the sovereign debt crisis in the euro area. While a few years ago the discussion focused on whether imbalances matter at all in a currency union, it is now commonly acknowledged that financial, fiscal and economic imbalances have contributed to the crisis. Policy instruments designed to prevent and correct excessive imbalances have been introduced.[1] At the same time, the notion that cross-country differences in values and norms have played a role in the build-up of economic imbalances has entered the debate. For example, Greenspan (2011) notes that "*euro-north has historically been characterised by high saving rates and low inflation, the metrics of a culture that emphasises longer-term investments rather than immediate consumption. In contrast, negative saving rates – excess consumption – have been a common feature of Greece and Portugal since 2003*".[2]

Against this background, in this paper we investigate the broader question of whether cultural traits affect the emergence or persistence of macroeconomic imbalances. We focus on interpersonal trust as the main proxy for civic capital (cf. Guiso *et al.*, 2010) and six other cultural traits we deem relevant in this context. Unlike most of the existing literature on trust and economic

---

[*] Department of Economics, Ludwig-Maximilians-University Munich (LMU).

[**] European Commission (EC), Directorate General for Economic and Financial Affairs.

[***] European Central Bank (ECB), Directorate General International and European Relations.

Corresponding author, email livio.stracca@ecb.int. Large parts of this work were undertaken when Christina Jordan and Sascha Bützer were working at the ECB. The views expressed are those of the authors and do not necessarily reflect those of the ECB. We are grateful for useful advice and suggestions by Jaromir Baxa, Luigi Guiso, David Heald, Eelke de Jong, Christian Popa, Bernd Süssmuth, Cezary Wójcik and for comments by seminar participants at the ECB, the 18th Dubrovnik Economic Conference, the 7th Biennial Conference of the Czech Economic Society in Prague, the University of Leipzig, LMU, the European Public Choice Society Meeting 2013 in Zurich, and at the 15th Banca d'Italia Public Finance Workshop on Fiscal Policy and Macroeconomic Imbalances in Perugia.

[1] The European Union (EU)'s new Macroeconomic Imbalance Procedure aims at preventing and correcting imbalances in the EU and entails the possibility of applying financial sanctions to euro area countries that do not abide by the rules.

[2] Alan Greenspan (6 October 2011), "Europe's Crisis is All About the North-south Split", *Financial Times*.

outcomes (e.g., Algan and Cahuc, 2010; Knack and Keefer, 1997; Tabellini, 2010), we therefore do not look at the link between trust and *economic growth* (or economic development) but between trust and *economic imbalances*. Our main hypothesis is that higher interpersonal trust, as a well measurable indicator of a broader set of underlying values and preferences, reduces macroeconomic imbalances. To measure macroeconomic imbalances we consider three economic indicators, (i) the government budget balance, (ii) the inflation rate and (iii) the current account balance. On the basis of these three indicators, we construct an imbalances index for a large set of advanced and emerging countries, *i.e.*, going well beyond the euro area. Figure 1 presents some first preliminary evidence which suggests a link between interpersonal trust and economic imbalances.

The notion that culture matters in explaining economic outcomes is certainly not new. As early as 1905, Max Weber postulated a causal effect of religion on the development of capital which has been subject to a large body of research ever since (Barro and McCleary, 2006; Guiso *et al.*, 2006). Tabellini (2010) analyses the impact of culture on economic development and finds that culture is the main channel through which distant history impacts on institutional and economic outcomes. Many studies relating culture to macroeconomic performance focus on trust as main indicator. Algan and Cahuc (2010), for example, look at the impact of US immigrants' descendants' trust and show that inherited trust had a direct impact on growth in the twentieth century.

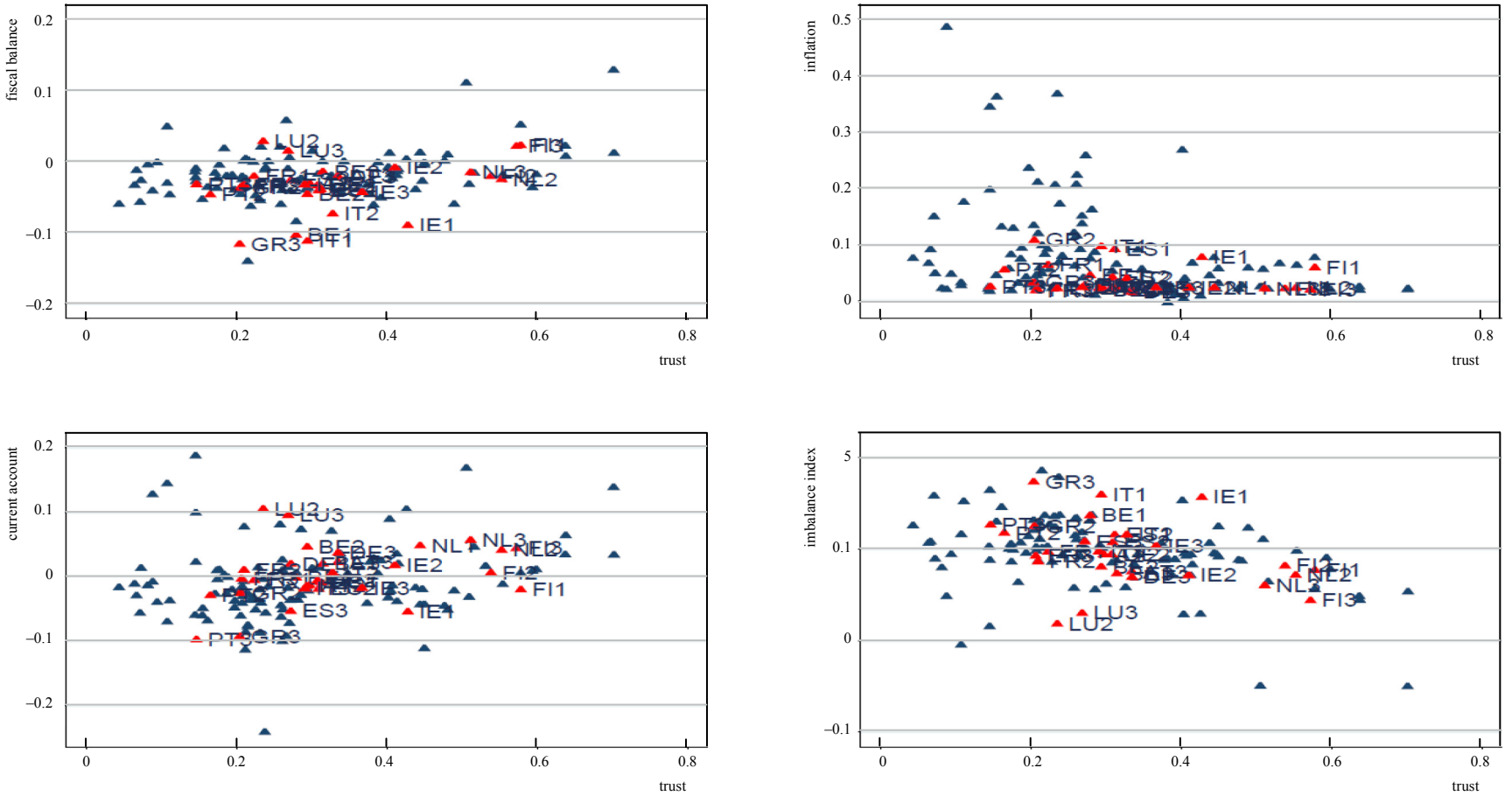
Taking the research on culture and economic outcomes one step further, this paper empirically addresses three main questions. *First*, do cross-country differences in inter-personal trust affect macroeconomic imbalances, *i.e.*, the government budget balance, the inflation rate and the current account balance? *Second*, does the level of trust between euro area countries vary, and, if so, how significant is this variation compared to the rest of the world? *Third*, does euro area membership weaken the link between trust and macroeconomic imbalances, possibly by introducing rules and institutions that foster sustainable economic policies at the national level?

The starting point of our narrative is the characterisation of macroeconomic imbalances as an inter-temporal shift of resources. The fiscal laxity associated with high public deficits, the over-consumption or over-investment associated with high current account deficits (where these deficits do not reflect expectations of higher future growth) and high inflation can all be regarded as processes that attempt to shift resources from the future to the present. Policy makers and citizens transfer the burden of paying for goods from which the current majority gains to the future, often onto the shoulders of future generations. This is a kind of *inter-temporal collective action problem*. We conjecture that societies are better able to overcome such problems and to focus on long-term public goods when higher levels of interpersonal trust prevail, that is, when the society's civic capital is more developed (cf. Guiso *et al.*, 2010).

In our analysis, we proceed in three main steps. First, we document global differences in trust using decade-level data from the World Values Survey (WVS) and the European Values Study (EVS) starting in 1980. We extend our analysis by considering six additional traits that we deem potentially relevant in the context of explaining economic imbalances (honesty, obedience, confidence in individual self-determination, competition affinity, work ethic, importance attached to thrift). While trust and honesty are proxies for civic capital, the other traits capture a broader notion of norms and beliefs that we refer to as civic culture. Given the limited data availability and the fact that these traits tend to persist over time (cf. Guiso *et al.*, 2006), we use decade-level averages, *i.e.*, one observation for the 1980s, the 1990s, and the 2000s. In the second step, we analyse to what extent civic culture is associated with economic imbalances. To this end, we first present cross-correlations between our cultural traits and their association with the imbalances

Figure 1

Trust and Macroeconomic Imbalances



Notes: The values represent observations per country and decade (1980s, 1990s and 2000s). EA12 countries are colored and labelled. Current account and fiscal balance are expressed as ratios to GDP. The Imbalance Index is constructed using the standardised 2000-10 average of (i) the inflation rate minus (ii) the fiscal balance in percentage of GDP minus (iii) the current account in percentage of GDP, where each component has also been standardised (for details, see Section 4.1).
Source: IMF WEO, World Values Survey and own calculations.

index. We then focus on trust and estimate its impact on the imbalances index, employing both Ordinary Least Squares (OLS) and Instrumental Variables (IV). In the third and final step, we focus on the euro area only. We interact trust with dummies for euro area low-yield and high-yield countries to see whether euro area membership attenuated or amplified the effect of trust on economic imbalances.[3]

The biggest challenge in this strand of literature is to isolate the impact of civic capital from those of other factors, notably institutions, and to address the issue of reverse causality. While civic capital likely affects economic outcomes, there could also be a feedback mechanism through which economic outcomes reinforce and shape certain values and preferences. In our analysis, however, this issue should be less of a concern. First, we only look at a relatively short time horizon of three decades and values like interpersonal trust tend to be very slow-moving. Second, while economic growth and development may indeed impact on individual norms and preferences, it is less clear in what way economic imbalances would impact on such values. Nevertheless, we employ instrumental variables to address possible issues of reverse causality. Moreover, we explicitly control for the quality of institutions, as well as people's confidence in them, to identify the effect of civic capital on economic imbalances over and above the influence of institutions. We also control for other potential explanatory variables, where relevant, such as income and education.

For the entire country sample we find strong evidence of a link running between interpersonal trust and economic imbalances. While we do detect differences in trust between euro area low-yield and high-yield countries in the data, these differences are not large by international standards and typically not statistically significant. Finally, we find no evidence that the euro has had any impact on the link between trust and imbalances. Focusing on euro area imbalances, we find that controlling for differences in trust removes around one fifth of the differences between low-yield and high-yield countries in our measure of imbalances.

The paper is organised as follows. Section 2 clarifies the concept of culture in our work and explains the focus on civic capital and trust. Section 3 briefly describes the transmission channels through which trust is expected to impact on economic imbalances. Section 4 outlines the construction of the imbalances index, the measurement of our variables of civic culture, and the choice of control variables and instruments. The empirical approach is discussed in Section 5. Section 6 presents the baseline results at the global level. Section 7 discusses the results specific to the euro area. Section 8 concludes.

2 Culture, civic capital, and trust

2.1 Definitions

The Oxford English Dictionary defines culture as "*the ideas*, *customs*, *and social behaviour of a particular people or society*" and, more relevant in our context, as "*the attitudes and behaviour characteristic of a particular social group*".[4] To be more specific, we are interested in civic capital which Guiso *et al.* (2010) define as "*those persistent and shared beliefs and values that help a group overcome the free rider problem in the pursuit of socially valuable activities*". Civic capital is similar to the concept of social capital developed inter alia by Putnam (1993), which enables individuals to effectively collaborate in a group in order to reach common goals. Although civic

---

[3] As will be discussed in detail in Section 7, we define as euro area low-yield countries those original eleven euro area countries (plus Greece which joined in 2001) with a long-term sovereign credit rating of AA or higher. Accordingly, euro area high-yield countries are those with a long-term sovereign credit rating of BBB+ or lower.

[4] "Culture" (2013. At: Oxforddictionaries.com. Retrieved January 14, 2013, from http://oxforddictionaries.com/definition/english/culture

capital is a collective concept, it has its roots in individual values, attitudes and preferences. Papademos (2007) speaks of "*values*" that "*can affect markets and economic performance both directly and indirectly*, *that is by shaping the features*, *objectives and functioning of institutions*".

In this paper we consider the following values and norms: (i) interpersonal trust as the main proxy for civic capital, (ii) honesty, (iii) obedience, (iv) confidence in individual self-determination, (v) competition affinity, (vi) work ethic, and (vii) importance attached to thrift.[5] With the exception of honesty, the latter six traits do not directly measure civic capital. Yet, they matter for our analysis since they measure a more general form of cultural capital, or civic culture, that may impact on economic imbalances. We use the term civic culture as a broader reflection of values and norms in society and not in its narrower sense pertaining to participatory issues. As will be discussed in greater detail in Section 4, we expect all seven traits, with the exception of obedience, to reduce economic imbalances. In the choice of our traits we have been guided by the literature on culture and economic outcomes. Tabellini (2010) inter alia uses interpersonal trust, obedience and confidence in individual self-determination to measure culture and its impact on the economic development in the regions of Europe. Knack and Keefer (1997) look at honesty when analysing the impact of civic capital on growth and investment rates. Phelps (2006) stresses the positive impact of a population's willingness to work hard (work ethic) and their acceptance of a free market economy (competition affinity) on national economic outcomes like labour productivity and the employment rate. Guiso *et al.* (2006) analyse the importance of a population's preference for thrift on national saving rates.

2.2 Why trust?

Our analysis focuses on trust as main proxy for civic capital for several reasons. First, the significance of trust for economic interactions has been well established in the literature, both theoretically and empirically. Trust matters because "*virtually every commercial transaction has within itself an element of trust*, *certainly any transaction conducted over a period of time*" (Arrow, 1972). In a high-trust environment, any kind of economic interaction will be observed more frequently and carried out at a lower cost. This can be attributed to trust reducing uncertainty, thereby lowering contract and control costs. Higher levels of interpersonal trust can also reduce principal-agent problems, increase investment in physical and human capital, and promote innovation (Knack and Keefer, 1997). In addition, trust may impact on cross-border movements of goods and labour (Spring and Grossmann, 2013). Trust is also used as main proxy for civic capital (Guiso *et al.*, 2010) and social capital (Zak and Knack, 2001) since a person's dispositional tendency to trust others is considered key to overcome social coordination failures. Put differently, the degree to which people trust each other should be a good indicator of a society's ability to internalise the general interest. This is because contributions to a public good hinge on the degree to which people trust their fellow citizens that these contributions will be put to productive means.[6] In the same vein, interpersonal trust impacts on economic outcomes through better institutions and improved government performance (Putnam, 1993). For instance, Knack (2000) shows that higher levels of trust enhance political participation and decrease rent-seeking.

Second, it can be argued that trust is considerably correlated with the other cultural traits considered above. We expect trust to be positively correlated with *honesty*. An individual who

---

[5] Their exact measurement is explained in greater detail in Section 4 and in the Appendix.

[6] Herrmann *et al.* (2008) show dramatic differences in behaviour across countries using a controlled experiment. Participants in high-trust countries such as Germany or Switzerland tended to contribute more than participants in low-trust countries such as Greece or Turkey. Moreover, participants in high-trust countries had a higher inclination to punish non-contributors whereas a large number of participants in low-trust countries paradoxically even punished those who did contribute.

places high trust in other people and expects them to behave in an honest way is more likely to be honest in her interactions with other individuals herself. On the other hand, trust should be negatively correlated with *obedience* since high levels of inter-personal trust increase the confidence in other individuals' actions and reduce the need to insist on strict obedience. In a principal-agent situation characterised by low levels of trust, however, the principal should demand stricter obedience from the agent. Likewise, in a low-trust environment, interpersonal interactions are likely to be structured in a more rigid, hierarchical way. This tends to restrain the room for personal development, thereby reducing the belief in individual self-determination. We therefore expect a positive relation between interpersonal trust and the belief in *individual self-determination*. We also expect trust to be positively correlated with the acceptance of free market forces (*competition affinity*). Lower trust in others should increase the perceived need to reduce free competition, be it in the economy or at work. This is because the perceived probability that counterparts in economic interactions will cheat is higher in low-than in high-trust environments, so that competition cannot be expected to lead to efficient outcomes. Moreover, higher trust should go hand in hand with a more pronounced *work ethic*, *i.e.*, with individuals' willingness to work hard. For instance, in high-trust environments employees will trust that their work will be adequately rewarded. Finally, we expect a positive link between the *importance attached to thrift* and generalised trust: if individuals believe that the government will guarantee savings and that the risk of expropriation is negligible, saving will become more attractive and thrift valued. Furthermore, higher levels of trust may facilitate the implementation of sustainable policies and thus positively impact on public savings. However, in principle the effect of higher readings of trust on national saving rates is ambiguous. In societies with low levels of generalised interpersonal trust people may have an incentive to save more if they believe that they (and their children) cannot rely on anybody but close family members. In our sample, the former effect outweighs the latter markedly as we will show in Section 4.2.

Third, we use trust due to reasons of data quality. While people may deliberately misreport their true convictions in surveys to look good in the eyes of the interviewer, they may have little incentive to lie about their levels of trust towards others. For example, measures of honesty in values surveys tend to be upward biased because interviewees may be reluctant to reveal morally questionable ("bad") behaviour, particularly if it is illegal. Lastly, and not surprisingly in view of the arguments presented above, trust outperforms all other variables in explaining macroeconomic imbalances as will be discussed in the empirical section.

2.3 Origins of trust

The level of trust in a society is not exogenously given. Delhey and Newton (2005) analyse the origins of trust in sixty countries and find that countries with high levels of trust tend to exhibit ethnic homogeneity, Protestant religious traditions, good government, relatively high GDP per capita and income equality. In explaining long run levels of trust, the literature emphasises the role of religion and history (such as legal origin, slavery, or foreign occupation). Putnam (1993), for instance, claims that the hierarchical structure of the Catholic Church, and its focus on traditional virtues like obedience and the acceptance of one's destiny in life, has discouraged the formation of trust in Italy. La Porta *et al.* (1997) extend this argument to other hierarchical religions, such as Eastern orthodox and Islam. Protestantism, on the other hand, as described in Weber's Protestant Ethic, is the archetype of a non-hierarchical religion, associated with higher levels of trust. Considering the strong path-dependency of norms and values prevailing in a society, another important factor in explaining contemporaneous levels of trust is the structure and quality of institutions in the distant past (Tabellini, 2010).

In this paper, however, we remain agnostic about the origins and formation processes of trust and the other cultural variables we consider since they are not of immediate relevance in the context of our empirical analysis. While we take the existing levels of trust as given, in a second step we employ religion and legal origin as instruments for trust to alleviate concerns about reverse causality.

3 The impact of trust on macroeconomic imbalances: potential transmission mechanisms

What is the mechanism through which trust impacts on economic imbalances? We start from the characterisation of macroeconomic imbalances as an inter-temporal shift of resources. "Bad" imbalances, brought about by policy choices and indicated by large fiscal and current account deficits and high inflation rates, can be considered a form of sub-optimal redistribution of wealth from future to current generations, as well as from the future to the present within the same generation (cf. Alesina and Perotti, 1995). This is essentially an *inter-temporal collective action problem*. We argue that the main channel through which higher readings of interpersonal trust impact on imbalances is a society's increased ability to overcome such collective action problems. Higher levels of trust help individuals and politicians enhance the care of current generations for future generations when the two are not directly related through parental links. That is, trust induces agents to internalise the future costs of their action. Following this line of reasoning, we predict that trust impacts on each of our three imbalances indicators, *i.e.*, the general government balance, the inflation rate and the current account.

We expect higher levels of interpersonal trust to be associated with lower fiscal deficits. Reforms aimed at fiscal consolidation are easier to implement when interpersonal trust between citizens and social groups is high (Alesina and Drazen, 1991). Moreover, higher interpersonal trust decreases tax evasion (Feld and Frey, 2002) and activities in the informal sector (D'Hernoncourt and Méon, 2008). Both phenomena can be considered collective action problems in the sense that a particular individual action, such as evading taxes, has social costs that are not internalised by the individual. They are more likely to occur in a low-trust environment where citizens are less convinced (i) that their fellow citizens will play by the rules and pay taxes themselves and (ii) that their government will make efficient use of the tax revenues.

We expect higher levels of interpersonal trust to be associated with lower inflation rates. Higher trust leads policy makers and society as a whole to place more emphasis on price stability as a long-term public good. In the words of Gordon (1975), high-trust environments would thus reduce both the "*demand for*" and the "*supply of*" inflation. The "*demand for inflation*" would decrease as groups that might potentially benefit from inflation, e.g., beneficiaries of public programmes who are opposed to the reduction of public expenditures, exert less political pressure to pursue inflationary policies. The "*supply of inflation*" would decrease as a response to lower "*demand for inflation*" but also through institutions shaped by the higher level of civic capital, such as an independent central bank or a wage bargaining system that allows for downward wage flexibility. Indeed, as regards wage inflation, high-trust environments should make it easier to ensure that wage developments are kept in line with productivity developments and facilitate the downward adjustment of wages where necessary.

We expect higher levels of interpersonal trust to be associated with lower current account deficits. Higher readings of trust may reduce a country's current account deficit by mitigating collective action problems in the implementation of structural reforms. Labour market reforms or reforms aimed at the liberalisation of goods markets, for example, should help increasing a country's competitiveness and improve the current account balance. With higher levels of trust citizens and interest groups are more likely to accept the costs of reform since they expect others to

do the same.[7] This is also due to the fact that, in high-trust environments, individuals are more likely to accept long-term compromises and economic strategies as they have longer time horizons (Tabellini, 2010).

4 Data

Our dataset comprises decade-level data between 1980 and 2010 for 65 advanced and emerging economies. Table 1 provides the full list of countries covered. A description of all variables used in this paper and their sources can be found in Table 16 and Table 17 in the Appendix. Table 18 provides summary statistics for most below mentioned variables which may facilitate the interpretation of the regression results in Section 6.

4.1 Measuring macroeconomic imbalances

We construct a stylised macroeconomic imbalances index:

$$Imbalance_{it} = -fb_{it} + \pi_{it} - ca_{it} \quad (1)$$

where *fbt* is government net lending in percentage of GDP, πt is the inflation rate, and *cat* is the current account of the balance of payments in percentage of GDP. Furthermore, each component is standardised to account for different variances. An increase in the index signals an increase in macroeconomic imbalances, by which we mean a higher fiscal deficit, a higher inflation rate, and a higher current account deficit. Since this implies a normative statement on the desirable sign and size of the components, we present alternative variants below. However, as we show in the estimation, the results do not hinge on the exact specification of the index.

For robustness we consider five variants of our imbalances index. In the second version of the index, we include inflation in absolute values, based on the recognition that the benefits of low inflation disappear when inflation turns negative (*Imbalance*2). In the third version, we include the current account balance in absolute terms since very high current account surpluses may also signal the existence of imbalances (*Imbalance*3).[8] In the fourth version, we remove the current account balance altogether (*Imbalance*4), thereby leaving only the variables on which governments have more direct influence and in the fifth version we remove inflation from the index (*Imbalance*5). The sixth version squares all components to resemble a loss function which is particularly sensitive to both large surpluses and deficits (*Imbalance*6).

A number of caveats apply. First, we recognise that the choice of indicators is debatable and that alternative measures could be included in the index. In particular, imbalances are a matter of stock, not flow, variables. We consider the public deficit instead of public debt because it is the deficit that ultimately drives the stock of public debt. A high level of public debt is not worrisome as such, as long as the government runs a large enough primary surplus. For the same reason, and also considering measurement problems and issues of data availability, we include the current

---

[7] For example, the role of low interpersonal trust in impeding product market reforms in Italy is illustrated by Eichengreen (2012): "*There is lack of trust among the social groups called on to make sacrifices. Italian taxi drivers would be prepared to allow more competition if they were sure that Italian pharmacy owners were willing to do likewise. But if issuing more taxi medallions reduces cab drivers' earnings, while pharmacists succeed in vetoing pro-competition measures to lower the cost of their services, the taxi drivers will end up worse off and the pharmacists will be enriched, which hardly seems fair*".

[8] Although the European Commission's Macroeconomic Imbalance Procedure attaches a greater degree of urgency to tackling current account deficits, as opposed to surpluses, its surveillance covers both. While a high current account deficit may signal an unsustainable external debt position, a high surplus may reflect weaknesses in domestic demand (European Commission, 2012).

Table 1

List of Countries

Algeria	Finland	Malaysia	Singapore
Argentina	France	Malta	Slovakia
Australia	Germany	Mexico	Slovenia
Austria	Greece	Morocco	South Africa
Belgium	Hong Kong	Netherlands	Spain
Bosnia-Herzegovina	Hungary	New Zealand	Sweden
Brazil	Iceland	Nigeria	Switzerland
Bulgaria	India	Norway	Taiwan
Canada	Indonesia	Pakistan	Thailand
Chile	Ireland	Peru	Turkey
China	Israel	Philippines	Ukraine
Croatia	Italy	Poland	United Kingdom
Cyprus	Japan	Portugal	United States
Czech Republic	Korea	Romania	Venezuela
Denmark	Latvia	Russia	
Egypt	Lithuania	Saudi Arabia	
Estonia	Luxembourg	Serbia	

Table 2

Variants of the Imbalances Index

$Imbalance1_{it} = -fb_{it} + \pi_{it} - cait$
$Imbalance2_{it} = -fb_{it} + \lvert\pi_{it}\rvert - cait$
$Imbalance3_{it} = -fb_{it} + \lvert\pi_{it}\rvert + \lvert cait\rvert$
$Imbalance4_{it} = -fb_{it} + \pi_{it}$
$Imbalance5_{it} = -fb_{it} - ca_{it}$
$Imbalance6_{it} = (fb_{it} * 100)^2 + (\pi_{it} * 100)^2 + (ca_{it} * 100)^2$

account balance (flow), leaving aside the net international investment position (stock). Additionally, one could include other measures of competitiveness, e.g., unit labour costs, export market shares or the real effective exchange rate, or the level of private debt in the imbalances index. Second, different weights could be given to the different components, instead of using a simple average, to reflect the fact that an in-or decrease of one percentage point in one indicator does not matter to the same extent as a similar change in another indicator. However, the case for doing so is not clear cut and, to avoid arbitrariness, we consider that equal weights are a reasonable starting point. Third, the inclusion of the inflation rate as an imbalance indicator might pose questions. For example, inflation differentials in the euro area could simply reflect wage convergence, that is, a process of catching up by the high-yield with the low-yield countries, rather than unsustainable developments.

In the Appendix (Table 19) we report the correlation matrix between *Imbalance* (and its variants), its various components, and alternative macroeconomic imbalance indicators of possible relevance. As we would expect, the components are strongly correlated with each other. *Imbalance* is positively correlated with its five variants and the inflation rate and negatively correlated with the fiscal balance and the current account balance. We also add the net international investment position as percentage of GDP to the correlation matrix, as well as an indicator of institutional quality which is discussed in detail in Section 4.3. The net international investment position is negatively correlated with Imbalance and *Imbalance*2. Surprisingly, it is not correlated with the current account balance. The quality of institutions appears to be negatively correlated with *Imbalance*4 and the inflation indicator, suggesting that institutional quality matters especially to contain inflation.

When ranking advanced countries according to Imbalance in the past decade in Table 3, the euro area countries that are currently under an EU/IMF adjustment programme appear at the bottom while the euro area low-yield countries, Switzerland and the Scandinavian countries display a much better performance. This is visualised by Figure 2 in the Appendix. Our index thus seems to be a reasonably good measure of a balanced economy.

4.2 Measuring civic capital and civic culture

To measure civic capital, *i.e.*, interpersonal trust and honesty, and the other traits of a society's civic culture that were introduced in Section 2, we make use of survey data from the World Values Survey (WVS) and the European Values Study (EVS). WVS and EVS are large-scale, cross-national longitudinal surveys that are well established in the literature. The EVS covers mainly Western European countries; surveys were carried out in 1981, 1990, 1999 and 2008. The WVS emerged out of the EVS; survey waves date from 1990, 1995, 2000 and 2005. The questions in the two surveys have been harmonised to allow for their integration and cover four broad topics, *i.e.*, family, religion and morality, work/leisure and broader societal issues. WVS and EVS cover 96 countries, with at least 1000 respondents in each country.

There are obvious drawbacks to working with values surveys. The usual caveats apply regarding possible sampling errors and response bias. The authors of the WVS correct for the fact that more highly educated, more urbanised persons tend to be over-sampled in the surveys by attaching different weights to different groups in the data (Inglehart, 2000). Another issue is that surveys may tend to measure individuals' marginal, time-dependent, preferences, rather than more stable values (Beugelsdijk and Maseland, 2011). Moreover, the aggregation of individual preferences at country-level ignores within-country differences in civic capital and culture that may be significant.

Table 3

Imbalances Index Country Ranking: Advanced Economies

Rank	Country	Index Value	Rank	Country	Index Value
1	Norway	–3.78	18	Japan	–0.16
2	Singapore	–2.08	19	Australia	–0.10
3	Hong Kong	–1.73	20	France	–0.08
4	Switzerland	–1.72	21	Slovenia	0.01
5	Luxembourg	–1.70	22	Italy	0.05
6	Finland	–1.34	23	Estonia	0.14
7	Sweden	–1.33	24	United Kingdom	0.14
8	Denmark	–1.09	25	Ireland	0.20
9	Taiwan	–1.03	26	United States	0.29
10	Netherlands	–0.91	27	Spain	0.33
11	South Korea	–0.87	28	Czech Republic	0.37
12	Germany	–0.68	29	Cyprus	0.54
13	Canada	–0.63	30	Malta	0.65
14	Belgium	–0.58	31	Iceland	0.76
15	Austria	–0.53	32	Portugal	0.81
16	Israel	–0.25	33	Slovakia	0.90
17	New Zealand	–0.21	34	Greece	2.02

Notes: The imbalances index is measured as the standardised 2000-10 average of (i) the inflation rate minus (ii) government net lending in percentage of GDP minus (iii) the current account in percentage of GDP, where each component has also been standardised. See also Table 2. Advanced economies are identified according to IMF classification.

For each trait included in our analysis, we consider the replies to between one and three relevant survey questions. We aggregate the available annual data to decade-level data (using the average observation in each decade) and thus have three observations per country, for the 1980s, 1990s and 2000s, respectively.

It follows a brief discussion of how our variables are constructed; further details can be found in Table 17 in the Appendix.

Trust. We measure interpersonal trust using the question "*Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?*". *Trust* is the percentage of respondents in each country replying "*Most people can be trusted*". Knack and Keefer (1997) point to the ambiguity of this question depending on whom respondents refer to when thinking of "*most people*". Respondents in low-trust environments are likely to deal relatively less often with strangers and more often with friends or members of their family, as compared to respondents in high-trust environments. The variation in the replies might hence be reduced if respondents regard "most people" as the people that they interact with.

When measuring trust, a distinction needs to be made between generalised and personalised trust. While generalised trust refers to trust in persons that are randomly drawn from the societal sample, personalised trust refers to trust in persons the respondents have a specific relationship with, e.g., family members, colleagues, friends. Results for these two types of trust may differ markedly. In this paper, we are interested in generalised, interpersonal trust only. As discussed at length in Section 2, we expect interpersonal trust to attenuate imbalances. High levels of personalised trust, on the other hand, may be indicative of a society where the provision of and contribution to public goods is limited: trust and cooperation tend to be restricted to interactions among family members and friends. For an overview of different trust levels across Europe see Figure 3.

Honesty. We measure honesty using the first principal component of the replies to the question "*Is it justifiable to cheat on taxes / avoid fare on public transport / fail to report damage you have done accidentally to a parked vehicle?*". This variable measures the extent to which individuals attempt to increase their own benefits irrespective of potentially negative social externalities of their actions (Guiso *et al.*, 2010). In countries where honesty is underdeveloped tax evasion, for instance, is likely to be more pronounced, as are corruption and fraud. The resulting increase in transaction and enforcement costs tends to increase inefficiencies in the economy. Low-honesty countries are therefore likely to be associated with high imbalances indices. The risk of biased replies is high for this question, potentially leading to an under-reporting of the justifiability of the mentioned actions and artificially high levels of honesty. Because of this measurement problem, we rely on trust as proxy for civic capital; in principle, honesty should also be a good indicator of civic capital.

Obedience. We measure obedience using the survey question "*Which quality do you consider to be especially important to teach your children?*" and take the first principal component of the percentage of mentions of "*obedience*" and "*independence*" (the latter enters with a negative sign). The relationship between obedience and macroeconomic imbalances is ambiguous. On the one hand, a certain willingness to follow orders is a necessary pre-condition to ensure the implementation of decisions taken and a smooth collaboration in any working environment. This leads Phelps (2006) to assume a positive impact of obedience on labour productivity. Tabellini (2010), however, observes that "*coercive cultural environments stifle individual initiatives and cooperation within a group*" and may lead to the implementation of decisions that are considered wrong or inefficient.

Control. To measure control, we make use of the question "*How much freedom of choice and control you feel you have over the way your life turns out?*". Control essentially measures the belief in individual self-determination, referring to individuals' conviction that their life is primarily controlled by themselves rather than by exogenous factors and that individual effort is likely to pay off. Individuals that are "*highly motivated to succeed and view economic success as related to their deliberate choices [...] are more likely to work hard, to invest for the future and to innovate and undertake new economic initiatives*" (Tabellini, 2010). A high level of control could thus decrease macroeconomic imbalances.

Competition affinity. We measure the general acceptance of competition in a country with the first principal component of the replies to the questions "*how would you place your view on a scale from 1 to 10*", ranging from "*competition is good*" to "*competition is harmful*", and "*people can only get rich at the expense of others*" versus "*wealth can grow so there is enough for everyone*". A population with positive attitudes towards competition should be more likely to favour competition, and therefore market liberalisation, in product and labour markets. Phelps (2006) uses acceptance of competition as one of various attitudes to explain employment, labour participation rates and labour productivity.

Work ethic. To measure work ethic we take the first principal component of (i) the percentage of respondents who mention "*hard work*" when asked which quality they consider to be especially important to teach their children and (ii) the percentage of respondents who say that work is "*very important*" in their lives. Work ethic is meant to capture individuals' intrinsic motivation to work (Phelps, 2006). In societies where work is central to individuals' lives, and where individuals define themselves via their work, they can be expected to be more motivated and hardworking. A good work ethic may increase productivity, thereby increasing competitiveness and possibly contributing to an improvement in the current account balance.

Propensity to save. We measure propensity to save using the survey question "*Which quality do you consider to be especially important to teach your children?*" and take the percentage of mentions of "*thrift, saving money and things*". It is fair to assume that the degree of importance individuals attach to thrift impacts on their savings decisions, and consequently affects overall private saving. Guiso *et al.* (2006) empirically confirm the positive impact of thrift on national savings rates, although their results are less clear when they use instruments rather than standard OLS. Thrift can thus be expected to impact on a country's current account balance. It may also affect the level of public debt, provided that voters' preferences are reflected by the incumbent government.

Overall civic culture. To obtain a summary measure and gauge of civic culture, we take the first principal component of all seven variables. As shown in Table 20, we find that overall civic culture is positively correlated with all seven values (in particular with work ethic, trust and honesty) apart from obedience, where the correlation is strongly negative, as expected.

Table 20 also provides the correlations between the seven traits. In line with our expectations, and the discussion in Section 2, trust is positively correlated with control and honesty, and negatively with obedience. Unexpectedly, the correlation with work ethic is not statistically significant, while the correlation with competition affinity and the propensity to save is negative. It is noteworthy that household saving rates, measured as the percentage of savings to disposable income, are negatively correlated with trust, suggesting that low levels of interpersonal trust may induce precautionary saving behaviour on the individual level. However, this does not translate into higher saving rates on aggregate (and thereby lower imbalances) since trust and gross national saving, measured as gross national income less total consumption plus net transfers, are positively correlated with each other. This implies that gross national saving is primarily driven by public saving which in turn is strongly associated with interpersonal trust.

4.3 Controls

In our empirical analysis we employ a number of potentially relevant control variables to alleviate the risk of omitted variable bias and test the robustness of our results. While time dummies and real GDP per capita are always included in the baseline estimation, further controls comprise the quality of institutions, confidence in national institutions, latitude, the age dependency ratio, educational attainment, financial openness, financial development, a communist past dummy, and the oil trade balance to GDP ratio.

Income. Real GDP per capita (PPP converted, at 2005 constant prices) should be correlated with the imbalances index, as well as with civic capital, due to a self-reinforcing mechanism (cf. Knack, 2000). If high levels of civic capital are conducive to economic growth as postulated in the literature (e.g., Guiso *et al.*, 2006 and 2010), the resulting higher level of income serves as a reward mechanism, upholding and strengthening values like trust and honesty. In the regressions real GDP per capita is scaled to units of $1000 without undergoing further transformation since the relationship between trust and real GDP appears linear in the non-transformed data.

Institutional Quality. Apart from direct effects, trust can have indirect effects on macroeconomic imbalances via a number of variables, particularly the quality of institutions. It is therefore crucial to include institutional quality as a control. We use the International Country Risk Guide (ICRG) indicator of "Quality of Government" as a proxy for institutional quality.[9] The ICRG indicator consists of the mean values of the three ICRG variables corruption, law and order, and bureaucratic quality (Teorell *et al.*, 2011).[10] Controlling for institutions should allow us to assess to which extent institutional quality intermediates the impact of trust on macroeonomic imbalances.

Confidence in national institutions. Interpersonal trust could also influence economic imbalances through its link with trust towards institutions, with transmission mechanisms similar to those described above. Brehm and Rahn (1997), for example, consider confidence in national institutions as closely related to interpersonal trust. This is because people that have higher trust in their fellow citizens and expect them to accept and comply with government policies are more likely to accept those policies themselves and therefore trust institutions. To ensure that we capture the impact of interpersonal trust on imbalances in addition to the impact that confidence in national institutions may have, we use a WVS question that inquires about the degree of confidence that respondents have in various institutions. We measure *confidence in national institutions* with the following question: "*I am going to name a number of organizations. For each one, could you tell me how much confidence you have in them: is it a great deal of confidence, quite a lot of confidence, not very much confidence or none at all?*" We then construct our *confidence in national institutions* indicator from the first principal component of respondents' answers regarding "*parliament*" and "*judicial system*". These two institutions have been covered in the EVS Questionnaire since the first wave in 1981 and are therefore appealing for reasons of data availability. Moreover, we consider them good indicators of the public's prevailing sentiment towards institutions, regardless of religious or political beliefs. Indeed, correlations with other confidence measures, such as confidence towards the government, the police or the social security system, turn out highly significant and positive (at 0.72, 0.63 and 0.68, respectively) across the whole sample. Likewise, we find a strong and statistically significant correlation (0.43) between interpersonal trust and confidence in national institutions, which lends evidence to our assumption that these two measures display a substantial amount of co-movement.

Latitude. A country's geography and climate has been argued to impact on economic outcomes and long-term development (e.g., Acemoglu *et al.*, 2002). Economies farther away from the equator are expected to perform better in terms of GDP per capita (Hall and Jones, 1999). Similarly, geography and climate may have an impact on trust, and civic capital more generally, and macroeconomic imbalances. We therefore include latitude, defined as the distance (in degrees) of each country's capital to the equator, as a control in the sensitivity analysis.

Old age-dependency ratio. An adverse composition of the age structure might put a strain on government expenditures. To not falsely attribute such potential negative effects on the fiscal balance to civic capital, we control for the underlying demographics. This has the additional advantage of simultaneously controlling for possible links between civic capital and the age structure (a higher average age could lead to more conservative answers).

---

[9] The ICRG indicator is highly correlated with the World Bank's commonly used Worldwide Governance Indicators (WGI) with a correlation coefficient of 0.92 for the overlapping sample. Since the WGI only start in 1996, we opt for the ICRG indicator throughout the whole analysis.

[10] The corruption variable measures actual or potential corruption in the form of excessive patronage, nepotism, job reservations, "favor-for-favors", secret party funding, and suspiciously close ties between politics and business. The law and order variable assesses the strength and impartiality of the legal system and popular observance of the law. The bureaucratic quality variable assesses to which extent a country's bureaucracy is autonomous from political pressure and has an established mechanism for recruitment and training (Teorell *et al.*, 2011).

Education. Higher levels of education can be expected to have a positive impact on both trust and *Imbalance*. Knack and Keefer (1997) argue that "*education may strengthen trust and civic norms, for example, if ignorance breeds distrust, or if learning reduces uncertainty about the behavior of others, or if students are taught to behave cooperatively*". At the same time, a positive correlation between education and *Imbalance* may be due to the fact that a more educated electorate chooses leaders with stronger long-term orientation. Hence, we include a variable of educational attainment of those 25 years and older (male and female) to see whether the impact of education attenuates the individual impact of trust.

Communist past. We include a dummy for countries with a communist past to account for the additional challenges those countries had to cope with in maintaining sustainable economic policies, particularly in the first two decades of our sample. Otherwise, this effect could bias the coefficient of civic capital since civic capital itself is impacted by having a history of communism.

Oil trade balance. Oil exporters are more likely to have large fiscal and current account surpluses even in the absence of sustainable economic policies due to the revenues from oil exports. This conjecture is confirmed when we look at the overall country ranking of *Imbalance* which lists a number of Northern African and Middle Eastern countries near the top of the index.

Financial openness. Financial openness, as measured by the Chinn-Ito index of capital account openness (Chinn and Ito, 2006), may be associated with both cultural traits, such as the acceptance of competition or open-mindedness towards strangers, and certain components of *Imbalance*. As regards the latter, financial openness makes it easier to finance imbalances and may thus be correlated with the current account and the government balance.

Financial development. Civic, or social, capital has been shown to be positively correlated with financial development which we measure as the ratio of private credit to GDP. Guiso *et al.* (2004) demonstrate that in Italy households in regions with high social capital, as measured by electoral turnout and blood donation, are more likely to have better access to credit. One might expect a similar relationship between trust and financial development. At the same time, financial development is often, though not unanimously, argued to be correlated with the national savings rate. This and the fact that financial development facilitates debt financing might impact on our imbalances index over and beyond any influence of civic capital.

4.4 Instruments

A key issue that needs to be addressed in the analysis of the relation between trust and economic outcomes is the direction of causality and the possible endogeneity of the regressors. To scrutinise the effect of trust and other values on macroeconomic imbalances, we rely on instrumental variables. For these variables to be valid, they should be (i) relevant, *i.e.*, the variation in the instrument should be related to the variation in our independent variables (trust and other traits, as well as the controls), and (ii) exogenous, *i.e.*, uncorrelated with the error term. A number of promising variables have been proposed in the literature, of which we have selected the most suitable for our robustness analysis. Nevertheless, it should be borne in mind that finding instruments that are both relevant and exogenous is difficult in practice and that the instruments used here will inevitably be imperfect.

Derived from the WVS questions "*How important is religion in your life?*" and "*Do you consider encouraging your children to learn religious faith to be important?*", we take religiosity as one instrumental variable considering that it should be highly correlated with trust and the other traits we consider, as discussed in Section 2, but not susceptible to short-term change and reverse feedback mechanisms from macroeconomic imbalances (cf. Knack, 2000). Religious customs and

beliefs display a strong path-dependency. At the same time, distant religious customs and beliefs have had a strong, potentially mutually reinforcing impact on likewise highly persistent values, such as trust.[11]

In a similar vein, we employ the *share of Protestants* (again obtained from the WVS). The share of Protestants should not matter for contemporaneous macroeconomic imbalances in view of largely harmonised legal systems (particularly in the euro area), once we control for level differences in per capita income.[12]

The two instruments display a high correlation with trust at –0.50 and 0.51 respectively, are only weakly correlated with each other (–0.11) and are not relevant explanatory variables in the original equation.This prima facie evidence is corroborated in the two-stage least-squares estimation. The instruments appear to be valid and strong as the *J*-test for overidentifying restrictions and the Kleibergen-Paap test for underidentifying restrictions indicate.

Additionally, we take advantage of the panel structure of our data and employ *lagged trust* as an instrument. Because trust is very persistent over time, lagged values are a strong instrument for periods ahead. At the same time, since past values of trust cannot be influenced by macroeconomic imbalances in later periods it can be considered exogenous and not prone to reverse causality. We control for lagged macroeconomic imbalances in order to rule out that part of its explanatory power on macroeconomic imbalances in subsequent decades is picked up by the lagged trust instrument.[13]

5 Empirical model

To test the hypothesis whether trust, and differences in civic capital more generally, have contributed to the build-up of macroeconomic imbalances, we first estimate the following equation:

$$Imbalance_{it} = \alpha + \beta Trust_{it} + \gamma_t \lambda_t + \delta \theta \theta_{it} \quad (2)$$

where i is the country, t is time (decade) and θ is a vector of control variables as described in Section 4.3. We start from a simple bivariate regression of *Imbalance* on *Trust* and λt that captures mere association and then employ relevant controls and instrumental variable estimation to identify a potentially causal relationship. Note that both *Imbalance* and *Trust* are standardised unless stated otherwise. In terms of interpretation, β indicates the average effect of one standard deviation change in *Trust* (equivalent to 0.142 on a *Trust* scale from 0 to 1) on Imbalance (equivalent to 1.93 on an *Imbalance* scale from –7.51 to 5.53) from one decade to the next.

We treat the data as cross-sectional due to the properties of our sample (small $T = 3$, large $N = 65$) and control for possible serial correlation and unobserved heterogeneity by clustering at the country level. Furthermore, we employ decade level time dummies λt to control for aggregate time effects that are common to all countries. We do not include country-fixed effects since most of the variation in our sample stems from cross-country differences. Indeed, the between variation of trust is six times as high as the within variation in our sample. Moreover, conducting a robust Hausman test as proposed by Wooldridge (2002), which yields the same test statistic as a Mundlak test, does

---

[11] We remain agnostic with respect to the exact transmission mechanism, which may be both extrinsic via institutions and intrinsic via ethics. In any case, this is not central to our argument.

[12] Apart from the two above mentioned instruments, we also considered a number of other potential instruments discussed in the literature, *i.e.*, legal origin, ethnic fractionalisation, income per capita in the early 1800s, population density in the 1500s, and the length of coastline as a share of country size. However, none of these variables had as strong an association with trust as the included ones.

[13] Indeed, in the original equation (available upon request) lagged trust becomes highly insignificant once lagged imbalances are controlled for, indicating a valid exclusion restriction.

not indicate the presence of country-fixed effects. Their inclusion would therefore render the estimation inefficient.[14]

When comparing pooled OLS estimates with standard errors clustered at the country level with those obtained from a random effects (RE) model, we find that standard errors do not deviate substantially between the two. Estimations under the RE specification only yield modestly higher standard errors without impacting on the significance or size of the coefficients. Although the Breusch-Pagan Lagrange multiplier test indicates the presence of heterogeneity, it seems more appropriate to proceed with pooled OLS and cluster-robust standard errors given the structure of our dataset. This allows for valid inference even in the presence of autocorrelation and unobserved heterogeneity.[15]

To check the robustness of our results and to test whether the identified link may indeed be causal in nature, we instrument *Trust* as outlined in Section 4.4. The use of instrumental variables should, in principle, address concerns of endogeneity in our model. Moreover, it is difficult to imagine the presence of reverse causality or simultaneity with regard to trust and macroeconomic imbalances over a time span of only thirty years. Indeed, the augmented Durbin-Wu-Hausman test does not suggest the presence of endogeneity in the baseline pooled OLS regression (with income, education and quality of institutions included as controls).

6 Results for the whole sample

6.1 Capturing associations

We start off with some prima facie evidence on our first main research question: *Do cross-country differences in interpersonal trust and other traits of civic culture affect macroeconomic imbalances?* Looking at the pooled OLS results in Table 4, we find that, in line with our expectations, trust, work ethic, and overall civic culture are significantly associated with a lower macroeconomic imbalances index and that obedience is associated with a higher imbalances index. However, with the exception of trust, all regressions on the socio-cultural variables display R^2 values below or equal to 0.14, suggesting that the variation in the imbalances index attributable to civic culture is limited. At the same time, we find that a one standard deviation increase in trust corresponds to roughly one half of a standard deviation reduction in macroeconomic imbalances, which is a large effect. Column (9), which includes all socio-cultural variables that are significant when used as individual regressors, shows that trust (and to a lesser degree work ethic) is indeed the most relevant variable, while overall civic culture and obedience become statistically insignificant. To see whether our results are broadly consistent with the literature on the nexus between culture and growth, we run a similar regression with real GDP per capita as dependent variable in column (10). We find that also in this case there is a positive, large and statistically significant association between trust and income. Concretely, one standard deviation in trust (corresponding to 14 percentage points on a trust scale from 0 to 100) is associated with a $6700 increase in real GDP per capita (PPP).

An interesting question at this point is whether our results are driven by one of the three components of our imbalances index in particular. Table 5 presents estimates of the regression of *Imbalance* and its variants (as described in Section 4), as well as the individual components of the

---

[14] Note that results from all mentioned tests can be obtained from the authors upon request.

[15] While the Pesaran cross-section dependence test cannot be performed in our sample due to too few common observations across the panel, cross-sectional dependence should not be much of an issue when T is very small relative to N.

Table 4

Association Between Civic Culture and Imbalances

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)*
Competition	–0.16									
is good	*(0.17)*									
Obedience		0.23**							–0.10	
		(0.11)							*(0.17)*	
Control			–0.16							
			(0.10)							
Trust				–0.47***					–0.57***	6.73***
				(0.10)					*(0.16)*	*(1.04)*
Work ethic					–0.37**				–0.54**	
					(0.15)				*(0.26)*	
Propensity						0.11				
to save						*(0.12)*				
Honesty							–0.12			
							(0.12)			
Civic								–0.35***	0.31	
culture								*(0.12)*	*(0.31)*	
Observations	112	126	123	126	126	126	126	123	123	141
R^2	0.104	0.059	0.080	0.276	0.141	0.069	0.069	0.170	0.276	0.286

Notes: Pooled OLS on decade-level data, including time dummies. All cultural variables are standardized. Civic culture is constructed as the first principal component of all seven cultural variables which are described in detail in Table 17.
(*) In regression (10) the dependent variable is real GDP per capita (PPP) in 1000 $ (2005 constant prices). Robust standard errors (clustered at country level) in parentheses; significance levels: *** 1 per cent, ** 5 per cent, and *10 per cent.

index, on trust. The results are consistent across variables, in particular negative for inflation and positive for the government balance and the current account balance. They confirm our predictions from Section 3 that higher interpersonal trust is associated with lower fiscal deficits, lower inflation rates and lower current account deficits.

To interpret the magnitude of the results, Table 6 provides non-standardised estimates for all imbalances indicators, additionally controlling for real GDP per capita. It becomes clear that a large part of the common variation between trust and Imbalance can be attributed to the link between trust and inflation with a strongly negative association and trust and the fiscal balance with a strongly positive association. A 10 percentage point (p.p.) increase in trust is associated with a 1.1 p.p. decrease in inflation. Equivalently, a 10 p.p. increase in trust is associated with a 1 p.p. improvement in the fiscal balance. The nexus seems to be weakest for trust and the current account

Table 5

Variants of Imbalances and Trust

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Imbalance	**Imbalance2**	**Imbalance3**	**Imbalance4**	**Imbalance5**	**Imbalance6**	**Inflation**	**Fiscal Balance**	**Current Account**
Trust	–0.47***	–0.38***	–0.29***	–0.49***	–0.38***	–0.24**	–0.35***	0.37***	0.26***
	(0.10)	*(0.12)*	*(0.10)*	*(0.10)*	*(0.12)*	*(0.11)*	*(0.09)*	*(0.12)*	*(0.10)*
Observations	126	126	126	126	126	126	142	126	143
R^2	0.276	0.171	0.0990	0.342	0.163	0.0593	0.215	0.168	0.0697

Notes: Pooled OLS on decade-level data, including time dummies. Table 2 provides definitions of the different imbalance indices. All variables are standardised. For a description of inflation, fiscal balance and current account see Table 16. Robust standard errors (clustered at country level) in parentheses; significance levels: *** 1 per cent, ** 5 per cent, and * 10 per cent.

Table 6

Trust and Components of the Imbalances Index (Non-standardised)

	Inflation		**Fiscal Balance**		**Current Account**	
	(1)	(2)	(3)	(4)	(5)	(6)
Trust	–0.19***	–0.11**	0.09***	0.10***	0.10***	0.04
	(0.05)	(0.05)	(0.03)	(0.04)	(0.04)	(0.05)
Real GDP		–0.18***		–0.01		0.10*
per capita (PPP)		(0.04)		(0.04)		(0.06)
Observations	142	139	126	123	143	140
R^2	0.215	0.288	0.168	0.180	0.070	0.122

Notes: Pooled OLS on decade-level data, including time dummies. None of the variables are standardised. Fiscal balance and current account are measured in percentage of GDP. Robust standard errors (clustered at country level) in parentheses; significance levels: *** 1 per cent, ** 5 per cent, and * 10 per cent.

Table 7

Differences Across Regions
(dependent variable: Imbalances index)

	(1) **Global**	(2) **Advanced**	(3) **Europe**	(4) **European Union**	(5) **Euro Area 17**	(6) **Euro Area 12**
Trust	–0.47***	–0.52***	–0.61***	–0.49***	–0.49***	–0.43**
	(0.10)	*(0.14)*	*(0.13)*	*(0.08)*	*(0.11)*	*(0.18)*
Observations	126	59	72	57	38	30
R^2	0.276	0.355	0.414	0.356	0.319	0.316

Notes: Pooled OLS on decade-level data, including time dummies. The imbalances index (*Imbalance*) and trust are standardised. *Global* refers to the entire set of countries as listed in Table 1. *Advanced* countries (classified according to the IMF criterion) are listed in Table 3. *Europe* refers to its geographical boundaries whereas *European Union* comprises the 27 EU countries as of 19 December 2012. Robust standard errors (clustered at country level) in parentheses; significance levels: *** 1 per cent, ** 5 per cent, and * 10 per cent.

where both size and significance of the coefficient are lowest. This is confirmed by the low R^2 of 0.07 that we observe with trust as single regressor.

Furthermore, the associations are consistent across different country groups. This can be seen in Table 7 where we narrow the country selection from a global scale to the original euro area. Indeed, the association of macroeconomic imbalances with trust is not only maintained when restricting the sample but is even slightly larger for all but one subset.

6.2 Robustness checks

In Table 8 we test whether the relationship between trust and imbalances may be driven by potential omitted variables.

When including real GDP per capita in column (2) we observe that, as expected, income picks up some of the impact of trust on imbalances. The drop is not large, however, and trust remains significant at the 1 percent-level. Adding *confidence in national institutions* in column (3), the effect of trust decreases further as the additional variable picks up some of the shared variation of trust. Nevertheless, we exclude it from the baseline scenario in the subsequent regressions since the inclusion of *confidence in national institutions* decreases the sample size substantially, from 123 observations to 86. Including other potentially relevant variables such as institutional quality (the ICRG indicator) and education (measured as years of schooling) in column (4) does not increase the explanatory power of the regression as the *adjusted* R^2 values and the F-test for joint significance of the additional controls indicate. At the same time, the effect of trust is preserved in size and significance. The insignificance of institutional quality suggests that trust may have a direct impact on imbalances in the short to medium run that is not intermediated by the quality of institutions, at least as measured by the ICRG indicator. When we take the full sample and simultaneously add all control variables discussed in Section 4.3, none of the controls turns out to be statistically significant individually (column 5). In sum, the coefficient for trust remains positive and statistically significant across all specifications albeit somewhat smaller in size.

Table 8

Robustness: Adding Controls
(dependent variable: Imbalances index)

	(1)	(2)	(3)	(4)	(5)
Trust	–0.47***	–0.35***	–0.19*	–0.22*	–0.22*
	(0.10)	*(0.12)*	*(0.10)*	*(0.11)*	*(0.12)*
Real GDP per capita (PPP)		–0.02**	–0.02*	0.01	0.01
		(0.01)	*(0.01)*	*(0.01)*	*(0.02)*
Confidence in institutions			–0.17*	–0.12	–0.09
			(0.09)	*(0.11)*	*(0.12)*
Quality of Government				–0.17	–0.37
				(0.21)	*(0.30)*
Years of schooling				–0.05	0.01
				(0.05)	*(0.07)*
Oil trade balance to GDP					0.01
					(0.01)
Latitude					0.01
					(0.01)
Age dependency ratio					–0.02
					(0.02)
Chinn–Ito index of financial					0.11
openness					*(0.13)*
Dummy for post–communist					0.12
country					*(0.22)*
Financial development					–0.10
(private credit to GDP ratio)					*(0.11)*
Observations	126	123	86	73	62
Adjusted R^2	0.258	0.319	0.433	0.438	0.439
Controls: Prob > F		0.042	0.082	0.451	0.272

Notes: Pooled OLS on decade-level data, including time dummies. The variables imbalances index (Imbalance), trust, confidence in institutions, quality of government, the Chinn-Ito index, and financial development are standardised. Compare with Table 18 for interpretation. A description of all control variables can be found in Table 16. Robust standard errors (clustered at country level) in parentheses; significance levels: *** 1 per cent, ** 5 per cent, and * 10 per cent.

Proceeding with real GDP per capita and time trends as controls in the full country sample, Table 9 shows that our results are robust to model choice as coefficients and standard errors are broadly the same across the pooled OLS, a random effects and an autoregressive (AR(1)) setting.[16]

6.3 Capturing causality: IV estimates

As mentioned earlier, a major concern with our results ought to be the possibility of simultaneity bias. This is well recognised in the literature on culture and growth but should be less of a concern for our analysis. It seems far-fetched to argue that imbalances may by themselves influence trust rather than the other way around. Nonetheless, it is important to rule out that the relationship may be driven by a third, unobserved common factor. Using the set of instrumental variables (IVs) introduced in Section 4.4 we address the question of causality in Table 10. A comparison of OLS with IV estimates using religiosity and the share of Protestants as instruments for trust confirms the strong negative association between trust and *Imbalance* in columns (1) and (2) (controlling for time fixed effects only). While the negative link persists when we add real GDP per capita as control (column 4), significance vanishes. However, this result could be driven by outliers in the global dataset. Once we re-estimate the regression with a reduced sample that contains advanced countries only (34 countries in the third decade), significance reappears with an even greater coefficient of –0.58 (column 7).

Employing lagged values of trust as IVs lends further evidence to size and significance of the effect of trust on macroeconomic imbalances. To this end we instrument trust with trust one period ahead in the first stage of the 2SLS (limiting the number of observations in the second stage) and additionally control for lagged *Imbalance*. At –0.24, this yields a coefficient close to the one obtained under the first set of IVs (column 4) which is significant at the 5 per cent-level (column 5). The strength of the lagged trust instrument is confirmed by the Kleibergen-Paap (K-P) statistic but due to exact identification (as we have one instrument per instrumented variable), we cannot test the exclusion restriction.[17]

Overall, the results suggest that a strong link between trust and macroeconomic imbalances can indeed be established with the former impacting on the latter. The IV estimates in columns (4) and (7) in Table 10 point to a factor of around –0.24, meaning that an increase of trust by one standard deviation lowers our measure of imbalances by around 1/4 of a standard deviation. This is slightly larger than the pooled OLS estimates with the full set of controls of –0.22 in columns (4) and (5) of Table 8.[18] Furthermore, the transmission channel appears to be more pronounced in advanced countries than across the entire set of countries.[19] Across all specifications, the standard tests confirm the instruments to be valid (large *J*-test *p*-value) and strong (small K-P *p*-value and large first-stage *F*-statistic). However, the *J*-test for overidentifying restrictions is based on the untestable assumption that at least one of the restrictions is valid such that we cannot give an absolute verdict on the causal effect of trust on macroeconomic imbalances. While we interpret the empirical findings as highly indicative for the argument put forth in this paper, we advise to take the results with a grain of salt.

---

[16] As explained in the beginning of this section, including fixed effects would not be warranted by our sample structure with $T \ll N$. Indeed, estimating such a model would yield an adjusted $R^2<0$ while leaving the effect of trust large and significant at a 10 per cent-level.

[17] The coefficient of lagged trust in the original equation becomes insignificant once lagged imbalances are controlled for, thus indirectly indicating a valid exclusion restriction.

[18] Adding additional controls such as years of schooling or institutional quality in the IV 2SLS regressions does not have a sizable effect on either magnitude or significance of the results.

[19] Note that this result may be driven by data issues in developing countries rather than by structural reasons.

Table 9

Robustness: OLS, RE and AR(1)
(dependent variable: Imbalances index)

	(1)	(2)	(3)
	OLS	**RE**	**AR(1)**
Trust	–0.35***	–0.37***	–0.31**
	(0.12)	*(0.11)*	*(0.12)*
Real GDP per capita (PPP)	–0.02**	–0.02*	0.00
	(0.01)	*(0.01)*	*(0.01)*
Imbalances Index (–1)			0.49***
			(0.11)
Observations	123	123	78
Adjusted R^2	0.319	.	0.323

Notes: Column (1) provides pooled OLS estimates, column (2) estimates from a random effects model, and column (3) estimates from the following AR(1) model:

$$Imbalance_{it} = \alpha + \varphi Imbalance_{t-1} + \beta T\,rust + \gamma_t \lambda_t + \delta\theta\theta_{it}$$

All models include time dummies. The imbalances index (*Imbalance*) and trust are standardised. Robust standard errors (clustered at country level) in parentheses; significance levels: *** 1 per cent, ** 5 per cent, and * 10 per cent.

7 Results for the euro area

Having assessed the relationship between trust and macroeconomic imbalances across a large sample of countries, we now shift the focus to the euro area.

7.1 Macroeconomic imbalances in the euro area

Macroeconomic imbalances between euro area countries accumulated throughout the first decade of the single currency. Low interest rates and lax financial conditions led to large private capital flows from low-yield to high-yield countries, where excessive credit and borrowing fuelled domestic demand and inflationary pressures.[20] Public debt and deficits rose. The accumulation of net financial liabilities often went hand in hand with an increase in current account deficits, while competitiveness losses manifested themselves, for instance, in increasing unit labour costs (see Figure 4). The opposite happened in low-yield countries that provided credit to high-yield countries. With relatively high saving rates, domestic demand remained subdued and price pressures contained. Gains in competitiveness, often supported by a high degree of wage moderation, were reflected in current account surpluses. When private capital flows stopped, the debt overhang of high-yield countries triggered large distress in financial markets. Of course, this process needs to be seen against the background of global trends, where financial integration enabled countries to accumulate ever larger external liabilities.

---

[20] Although we make use of the stylised terms euro area low-yield and high-yield countries, it needs to be stressed that important differences within both groups prevail. For instance, foreign capital was not used for the same purposes in all high-yield countries. While Greece and Portugal mainly used foreign capital to finance consumption, it helped funding construction booms in Spain and Ireland (Gros 2012).

Table 10

OLS and IV estimates
(dependent variable: Imbalances index)

	(1) OLS	(2) IV[1]	(3) OLS	(4) IV[1]	(5) IV[2]	(6)* OLS	(7)* IV[1]
Trust	–0.468***	–0.474***	–0.345***	–0.234	–0.241**	–0.375**	–0.579***
	(0.103)	*(0.151)*	*(0.118)*	*(0.208)*	*(0.105)*	*(0.141)*	*(0.193)*
Real GDP per capita	N	N	Y	Y	Y	Y	Y
$Imbal_{t-1}$	N	N	N	N	Y	N	N
Instruments	.	Rel., Prot.	.	Rel., Prot.	$Trust_{t-1}$	.	Rel., Prot.
Observations	126	126	123	123	58	56	56
R^2	0.276	0.276	0.341	0.332	0.402	0.483	0.446
J-test (*P*-value)	.	0.23	.	0.50	.	.	0.22
K-P test for underidentification (*P*-value)	.	0.002	.	0.009	0.002	.	0.031
First-stage *F*-statistic (excluded instruments)	.	58.4	.	31.1	458	.	20.7

Notes: Pooled OLS or IV as indicated in each column, including time dummies. In the IV estimates the instrumented variable is always Trust while the instruments are as follows. IV[1]: Religiosity and Share of Protestants (see Table 16); IV[2]: $Trust_{t-1}$. (*) (6) and (7) contain advanced countries only. The Imbalances Index and Trust are standardised. Robust standard errors (clustered at country level) in parentheses; significance levels: ***1 per cent, **5 per cent, and *10 per cent.

Guiso *et al.* (2012) provide a stylised game-theoretical framework for analysing how differences in civic capital may play out within a currency union. They show that the single currency has brought together European countries with fundamentally different values and attitudes. Instead of two separate "*cheat and forgive*" and "*responsible actions and commitment to punish otherwise*" equilibria, countries within the currency union now find themselves trapped in a suboptimal "*cheat and punish*" equilibrium. The authors interpret civic capital as a political economy friction in the sense that political leaders are limited in their choice of policies by the underlying norms of the electorate. To alleviate this "*conformity constraint*" the authors argue for deeper fiscal integration in the euro area.

However, one may conjecture that the currency union itself, where supranational constraints on national fiscal policies have existed since the very beginning in the form of the Stability and Growth Pact, has already had a mitigating effect, at least on fiscal imbalances. In our analysis, we therefore test whether such an effect, a kind of *vincolo esterno*, is observable in the data. For this purpose we look at the original eleven members of the euro area plus Greece which joined in 2001 (henceforth referred to as EA12). Only in those countries should we expect a measurable difference in the link between trust and imbalances, when comparing the pre-euro decades to the euro-decade.[21]

7.2 The estimated model for the euro area

We estimate the following equation:

$$Imbalance_{it} = \alpha+\beta_1 Trust_{it}+\beta_2 \Delta EA_{it}+\beta_3 \Delta EA_{it} * Trust_{it}+\beta_4 \Delta EA_{it} * Euro_{it}+\gamma_t \lambda_t+\delta \theta \theta_{it} \quad (3)$$

where *Euro* is a dummy taking the value 1 in the third decade (the 2000s), during which the euro existed, and 0 otherwise. ΔEA is a measure of intra-euro area differences. It takes the value 1 if the country is a euro area low-yield country, –1 if it is a euro area high-yield country, and 0 otherwise. We define as euro area low-yield countries those EA12 countries with a long-term sovereign credit rating of AA or higher. Accordingly, euro area high-yield countries are those EA12 countries with a long-term sovereign credit rating of BBB+ or lower.[22]

Euro area low-yield and high-yield countries therefore include the following:

- Low-yield: Austria, Belgium, Finland, France, Germany, Luxembourg, the Netherlands;
- High-yield: Greece, Ireland, Italy, Portugal and Spain.

Since this categorisation itself is not independent of macroeconomic imbalances, we include ΔEA separately in the regression to control for any potential self-selection effects. The interaction term $\Delta EA_{it} * Trust_{it}$ will consequently only pick up the additional effect of trust on macroeconomic imbalances for EA12 low-yield or high-yield countries.

---

[21] Not only have the EA12 been sharing the common currency for more than 10 years. Even before the introduction of the euro in 1999 the convergence criteria, which a country needs to fulfil to be able to adopt the euro imposed de facto restrictions on national economic policies.

[22] Credit ratings by Standard & Poor's, data cut-off: 19 December 2012.

7.3 Differences in civic culture in the euro area

Moving to our results for the euro area, we next address our second main research question: *Does the level of trust between euro area countries vary, and, if so, how significant is this variation compared to the rest of the world?* While Figures 3 and 5 suggest that there are considerable cross-country differences in trust levels across Europe, they do not reveal whether they are also large by international standards. To assess this question, we regress trust and the other cultural variables on ΔEA_{it} as shown in Table 11. A regression on this dummy variable allows to test whether differences between low-yield and high-yield countries are systematically bigger than in the global control group. A positive coefficient indicates lower values in the high-yield and higher values in the low-yield countries. We find that, with the exception of propensity to save, differences go in the expected direction but are not statistically significant. This suggests that, from an international perspective, heterogeneity in trust and overall civic culture within the euro area is not particularly large. Table 12 reports the same analysis for advanced countries only which corroborates the finding that the only detectable systematically larger difference is the propensity to save.

We also include an interaction term with a time dummy for the third decade (the 2000s). A negative and significant coefficient would indicate that there had been a process of cultural convergence since the establishment of the euro, *i.e.*, that differences in civic capital have been reduced. For most of the variables, we find no evidence of such cultural convergence. This is hardly surprising given the persistence of values and norms over time.[23] Furthermore, a Chow-test for joint significance of EA12 and EA12 interacted with trust in an augmented baseline regression does not indicate the existence of significant structural differences. As regards the variance of trust across EA12 countries compared to the rest of the world, we find that it is likely to be smaller within EA12 countries.[24]

7.4 The nexus in the euro area and the impact of the euro

We now turn to our third main research question: *Has euro area membership weakened the link between civic capital and macroeconomic imbalances,* possibly by having introduced rules and institutions that foster sustainable economic policies and constrain behaviour at the national level? To start with, in column (1) of Table 13, we regress *Imbalance* on the same dummy used in Table 11 (*i.e.*, a variable taking the value 1 for euro area low-yield countries and –1 for euro area high-yield countries). We find that there is a large and statistically significant difference in *Imbalance* between low-yield and high-yield countries. How much is this relation driven by differences in trust between the two country groups? Controlling for trust in column (2) removes about one fifth of the difference, leaving four fifths unexplained. Adding a euro-area difference interaction term with trust in column (3), we find that the link between trust and macroeconomic imbalances may have been weaker in EA12 countries over the entire time horizon: the coefficient is positive and significant, thereby lowering the overall attenuating effect that trust has had on the emergence of macroeconomic imbalances.

---

[23] For instance, regressing trust on time fixed effects only yields a R^2 of 0.071, suggesting that variation over time is rather small indeed.

[24] Conducting a one-sided variance ratio test with the H0 : σTrust Non−EA12/σT rust EA12 ≤ 1, we can reject the H0 on a 10 per cent level.

Table 11

Differences in Civic Culture: EA vs. All Countries

	(1) **Competition Is Good**	(2) **Obedience**	(3) **Control**	(4) **Trust**	(5) **Work Ethic**	(6) **Propensity to Save**	(7) **Honesty**	(8) **Civic Culture**
Δ*EA*	0.06	–0.24	0.06	0.17	0.12	0.44**	0.13	0.26
	(0.28)	*(0.20)*	*(0.20)*	*(0.23)*	*(0.13)*	*(0.17)*	*(0.14)*	*(0.21)*
Δ*EA**Euro	–0.01	–0.10	0.05	0.28**	0.04	–0.13	0.03	0.14
	(0.18)	*(0.14)*	*(0.09)*	*(0.11)*	*(0.07)*	*(0.10)*	*(0.09)*	*(0.12)*
Observations	153	175	172	175	175	175	175	172
R^2	0.097	0.018	0.002	0.088	0.442	0.095	0.084	0.076

Notes: Pooled OLS based on decade-level data, for the whole set of countries in Table 1. All regressions include time dummies. The variable Δ*EA* takes value 1 if a country belongs to an EA12 country with an S&P rating of AA or higher (low-yield) and –1 for EA12 countries with a rating below (high-yield) as of 19 December 2012. "Euro" takes value 1 if the observation stems from the third decade of the sample. *Civic culture* is constructed as the first principal component of all seven cultural variables which are described in detail in Table 17. Robust standard errors (clustered at country level) in parentheses; significance levels: *** 1 per cent, ** 5 per cent, and * 10 per cent.

Table 12

Differences in Civic Culture: EA vs. Advanced Countries

	(1) **Competition Is Good**	(2) **Obedience**	(3) **Control**	(4) **Trust**	(5) **Work Ethic**	(6) **Propensity to Save**	(7) **Honesty**	(8) **Civic Culture**
Δ*EA*	–0.08	0.13	–0.12	–0.01	–0.13	0.49**	0.30*	–0.04
	(0.38)	*(0.30)*	*(0.30)*	*(0.38)*	*(0.18)*	*(0.19)*	*(0.16)*	*(0.35)*
Δ*EA**Euro	0.02	–0.26	0.14	0.43***	0.22	–0.24*	–0.01	0.34
	(0.29)	*(0.17)*	*(0.17)*	*(0.15)*	*(0.16)*	*(0.13)*	*(0.19)*	*(0.22)*
Observations	59	69	68	69	69	69	69	68
R^2	0.160	0.048	0.005	0.051	0.524	0.194	0.061	0.174

Notes: Pooled OLS based on decade-level data, for the whole set of countries in Table 1. All regressions include time dummies. The variable Δ*EA* takes value 1 if a country belongs to an EA12 country with an S&P rating of AA or higher (low-yield) and –1 for EA12 countries with a rating below (high-yield) as of 19 December 2012. "Euro" takes value 1 if the observation stems from the third decade of the sample. Civic culture is constructed as the first principal component of all seven cultural variables which are described in detail in Table 17. Robust standard errors (clustered at country level) in parentheses; significance levels: *** 1 per cent, ** 5 per cent, and * 10 per cent.

Table 13

Euro Area Differences
(dependent variable: Imbalances index)

	(1)	(2)	(3)	(4)	(5)
Δ*EA*	–0.51***	–0.40***	–0.47***	–0.35***	–0.42***
	(0.18)	*(0.11)*	*(0.12)*	*(0.12)*	*(0.11)*
Trust		–0.34***	–0.37***	–0.34***	–0.35***
		(0.11)	*(0.12)*	*(0.11)*	*(0.12)*
Δ*EA**Trust			0.21*		
			(0.12)		
Δ*EA**Euro				–0.12	
				(0.22)	
Δ*EA**Euro*Trust					0.27
					(0.19)
Observations	147	123	123	123	123
Adjusted R^2	0.238	0.353	0.355	0.348	0.352

Notes: Pooled OLS based on decade-level data. All regressions include time dummies and real GDP per capita. The imbalances index (Imbalance) and trust are standardised. The variable ΔEA takes value 1 if a country belongs to an EA12 country with an S&P rating of AA or higher (low-yield) and –1 for EA12 countries with a rating below (high-yield) as of 19 December 2012. "Euro" takes value 1 if the observation stems from the third decade of the sample. Robust standard errors (clustered at country level) in parentheses; significance levels: *** 1 per cent, ** 5 per cent, and * 10 per cent.

The next two columns try to address the questions of (i) whether the difference between low-yield and high-yield countries has been influenced by the euro (interaction term with a dummy variable covering the 2000s), and (ii) whether the nexus between trust and imbalances has itself been influenced by the euro (the euro as a straightjacket). In neither case do we find evidence that the adoption of the euro has made any difference. The euro and trust in conjunction have had no significant impact.[25]

For further illustration purposes, Table 14 reports the same analysis for the non-standardised components of the imbalances index. As one would expect from Table 6, the reduction in the effect of Δ*EA* on Imbalance seems to be driven by inflation and, to an even stronger degree, by the fiscal balance. As regards the latter, controlling for (the positive effect of) trust reduces the difference in the fiscal balance between low-yield and high-yield countries from 1.72 to 1.22 p.p. of GDP. Again, the transmission mechanism seems to be largely running through the inflation rate and the fiscal balance. The current account remains essentially unaffected.

[25] However, this result should be taken with a pinch of salt considering the large drop in the number of observations when employing an interacted dummy for the last time period only.

Table 14

Euro Area Differences (Non-standardised)

	Inflation		**Fiscal Balance**		**Current Account**	
	(1)	(2)	(3)	(4)	(5)	(6)
Δ*EA*	–1.01	–0.44	1.72*	1.22*	2.17***	2.32***
	(0.62)	*(0.80)*	*(0.94)*	*(0.70)*	*(0.60)*	*(0.60)*
Trust		–0.11**		0.10***		0.04
		(0.05)		*(0.04)*		*(0.05)*
Real GDP per capita (PPP)	–0.21***	–0.18***	0.02	–0.02	0.11**	0.08
	(0.05)	*(0.05)*	*(0.03)*	*(0.03)*	*(0.04)*	*(0.06)*
Observations	183	139	147	123	185	140
Adjusted R^2	0.197	0.262	0.0650	0.172	0.140	0.131

Notes: Pooled OLS on decade-level data, including time dummies. None of the variables are standardised. Fiscal balance and current account are measured in percentage of GDP. The variable Δ*EA* takes value 1 if a country belongs to an EA12 country with an S&P rating of AA or higher (low-yield) and –1 for EA12 countries with a rating below (high-yield) as of 19 December 2012. Robust standard errors (clustered at country level) in parentheses; significance levels: *** 1 per cent, ** 5 per cent, and * 10 per cent.

The last table, Table 15, presents an alternative analysis of the nexus between trust and macroeconomic imbalances in the euro area. Starting with a general euro area high-yield dummy we subsequently add trust, euro area membership and the interaction terms of interest. Under this specification, the impact of trust becomes even more evident. The positive association of Imbalance with high-yield is reduced by almost 40 per cent once trust is controlled for. Additionally, and different from Table 13, this effect does not vanish when trust is interacted with high-yield countries, suggesting that the transmission mechanism in these countries is not different from that in the rest of the world. Hence, the weaker link between trust and imbalances detected in column (3) of Table 13 must primarily be driven by a weaker link in the euro area low-yield countries. It seems that the comparatively high readings of trust in the low-yield countries have decreased the *Imbalance* values to a lesser extent than we would have expected from the global estimation results.

The inclusion of an interaction term for the high-yield countries during the years of euro area membership in columns (4)-(7) of Table 13 sheds light on the importance of imbalances under the single currency. Interestingly, the high-yield country effect is not lowered significantly when the interaction term is added individually. However, once trust is added, the high-yield country coefficient drops by almost 70 per cent from column (1) to column (5). This suggests, not surprisingly, that the emergence of macroeconomic imbalances in the euro area high-yield countries was particularly pronounced during the past decade, when low interest rates facilitated the build-up of imbalances. At the same time, this development has been attenuated in countries with higher readings of trust. The result is robust to the inclusion of further interaction terms in columns (6) and (7). The fact that these interaction terms are not significant individually suggests that trust did not matter more or less in the high-yield countries than it did elsewhere. Across all specifications, the effect of trust is significant at around -0.3 which is in the vicinity of our results from Section 6.

Table 15

Trust and Imbalances: Euro Area High-yield Countries
(dependent variable: Imbalances index)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Euro area country: High-yield	1.03***	0.64***	0.61***	0.90***	0.32*	0.32*	0.32*
	(0.26)	*(0.18)*	*(0.16)*	*(0.26)*	*(0.17)*	*(0.17)*	*(0.17)*
Trust		–0.31***	–0.31***		–0.30***	–0.30***	–0.30***
		(0.11)	*(0.11)*		*(0.11)*	*(0.11)*	*(0.11)*
High-yield * Trust			–0.50			–0.27	
			(0.60)			*(0.44)*	
High-yield * Euro				0.37	0.81**	0.76**	1.29
				(0.25)	*(0.35)*	*(0.32)*	*(0.97)*
High-yield * Euro * Trust							–1.91
							(3.11)
Observations	147	123	123	147	123	123	123
Adjusted R^2	0.279	0.353	0.351	0.277	0.363	0.359	0.359

Notes: Pooled OLS based on decade-level data. All regressions include time dummies and real GDP per capita. The imbalances index (*Imbalance*) and trust are standardised. The variable *High-yield* takes value 1 for EA12 countries with a S&P rating below AA as of 19 December 2012. "Euro" takes value 1 if the observation stems from the third decade of the sample. Robust standard errors (clustered at country level) in parentheses; significance levels: *** 1 per cent, ** 5 per cent, and * 10 per cent.

Papademos (2007) points out that intra-euro area differences in civic capital are mirrored by different social models. He singles out the Nordic, Anglo-Saxon, Continental, and Mediterranean social models which persist "*precisely because the underlying values and preferences are different*". He draws the conclusion that the European Union provides a "*unique cooperative framework*" for policy makers to "*learn from each other (...) and then adapt the most promising ideas about economic institutions and regulations to the local conditions and the prevailing economic cultures*". If such an adaption had happened, the coefficient on trust interacted with intra-euro area differences should have the opposite sign of the trust variable itself. Although this is indeed the case in Table 13, the coefficient of the interacted trust variable is significant only at the 10 per cent-level. Hence, European integration, and the euro in particular, does not seem to have led to a convergence of national economic models towards the most efficient practices over the past two decades.

Overall, it is fair to say that, although differences in civic capital between euro area low-yield and high-yield countries can be observed, they are not particularly large when put into international perspective. Indeed, for trust and most other socio-cultural variables, the difference between low-yield and high-yield countries is not statistically significant. Controlling for trust removes about one fifth of the difference between low-yield and high-yield countries in terms of Imbalance, leaving the other four fifths unexplained. In order to give an idea of the economic significance of our findings, Figure 5 plots the three components of *Imbalance* against trust in the euro area for the period after 1999. We find that there is a noticeable relationship for all of them, but also a considerable deviation across countries from the regression line.

8 Conclusion

So far, the economic research that incorporates cultural elements has mostly focused on the link between culture and economic growth or economic development. This paper adds to the existing body of literature with an analysis of the link between civic capital, in particular interpersonal trust, and macroeconomic imbalances. The key findings of our empirical analysis are as follows. First, our results suggest a strong negative link between trust and macroeconomic imbalances with a transmission factor of around 1⁄4, which runs mainly via the fiscal balance and the inflation rate. Second, differences in civic capital between euro area low-yield and high-yield countries exist but they are not large by international standards. Third, the nexus between trust and imbalances is similarly robust in the euro area before and after the introduction of the euro, with one fifth of intra-euro area variation in imbalances being attributable to differences in interpersonal trust.

Taken together, the results indicate that there has indeed been a "cultural contribution" to the build-up of imbalances in the global economy and between euro area countries in particular. The finding that euro area membership has not affected the link between civic capital and macroeconomic imbalances suggests that monetary union and EU fiscal rules have not imposed a straightjacket on national economic policies which could be explained by the improper enforcement of fiscal and economic rules in the euro area throughout the first decade of the euro's existence (Ioannou and Stracca, 2012).

As discussed in the paper, a number of caveats apply to our analysis with regard to comparability of survey data, mutual interdependence or the selection of appropriate instruments. However, with regard to the overall interpretation of our results, we share Akerlof's (2007) conviction that "*in the study of the effect of norms on macroeconomics (...) endogeneity may sometimes dampen, but will rarely nullify, the conclusions*". Regarding theoretical predictions, a

promising task for future research would be the devel¬opment of a formal model to illustrate the transmission channel which we only sketched.

If macroeconomic imbalances depend on cultural factors that cannot (and perhaps should not) be changed in the short run, should we resign ourselves to live with unsolvable imbalances and ever expanding economic divergence in the euro area? Certainly not. Given that only a small fraction of euro area imbalances can be explained by differences in civic capital there is ample scope for public policies, both at the national and euro area level, to compensate for the negative impact of low levels of civic capital on imbalances. Ideally, we would like to repeat the estimation in a few years time to see whether the newly introduced EU macroeconomic coordination tools, such as the Macroeconomic Imbalances Procedure, have succeeded in severing the link between interpersonal trust and imbalances.

At the same time, understanding the link between trust (and culture more generally) and economic imbalances is crucial for the successful implementation of such policies since low levels of trust might impose informal constraints. Eventually, any new rule or institution is unlikely to work efficiently if it does not correspond to the population's underlying preferences (Tabellini, 2010). Policy makers should therefore also focus on setting surroundings that are conducive to enhanced trust and honesty between citizens, to a higher acceptance of free market structures and an increased feeling of individual self-determination. Potentially valuable initiatives could, for example, comprise the creation of fair tax systems, labour market reforms that alleviate insider-outsider problems, and the reduction of corruption and nepotism in the public sector.

APPENDIX

Table 16

Descriptionof Variables and Sources I

Variable	Description	Source
Imbalances Index		
Fiscal Balance	Government balance (per national definiton) to GDP ratio *(percent)*	IMF WEO
Current Account Balance	Current account balance to GDP ratio *(percent)*	IMF WEO
Inflation	Growth rate of consumer price index *(percent)*	IMF WEO
Controls		
Income	PPP converted GDP per capita (chain series), at 2005 constant prices *(thousand dollars)*	Penn World Table (Heston *et al.*, 2012)
Institutional Quality	International Country Risk Guide (ICRG) indicator of quality of government. Measured as the mean of the ICRG variables "Corruption", "Law and Order" and "Bureaucracy Quality" (originally scaled 0-1), standardised. Higher values indicate higher quality of government	PRS Group (2009), Teorell *et al.* (2011)
Confidence in national institutions	Principal component analysis of responses to the survey question: "I am going to name a number of organizations. For each one, could you tell me how much confidence you have in them: is it a great deal of confidence, quite a lot of confidence, not very much confidence or none at all?" i) The parliament, ii) The justice system (Note: The original scale runs from 1 to 4. Therefore, we invert the sign of all values such that a higher value of the variable indicates a higher level of confidence in institutions.)	WVS (2009), EVS (2011)
Education	Average schooling years in the total population aged 25 and over (data available in five year intervals)	Barro and Lee (2010)
Old-age dependency	Old-age dependency ratio (Age 65+ / Age 20-64) *(percent)*	United Nations (2011)
Geography	Latitude of the capital, in degrees between 0° and 90°	Acemoglu *et al.* (2005)
Oil trade balance	Oil trade balance to GDP ratio *(percent)*	IMF WEO
Financial openness	The Chinn-Ito index measures a country's degree of capital account openness, standardised	Chinn and Ito (2006)
Financial Development	Private credit to GDP ratio *(percent)*	Global Financial Development Database, The World Bank
Post-communist country	Dummy that takes value 1 if country was communist before the fall of the Soviet Union and 1 if otherwise	n.a.
Instruments		
Religiosity	First principal component of mean of answers to the following WVS / EVS survey questions: i) "Independently of whether you attend religious services or not, would you say you are .. ?" Share of respondents: *a religious person* (Alternatives: *Not a religious person; A convinced atheist; Other answer*) (ii) "Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five (out of 16)." Share of respondents: *Religious faith*	WVS (2009), EVS (2011)
Share of Protestants	"Do you belong to a religion or religious denomination?" Share of respondents: *Protestant*	WVS (2009), EVS (2011)
Other		
Household saving rate	Percentage of disposable household income. Includes OECD countries only	OECD Economic Outlook
Gross national savings	Gross national income less total consumption plus net transfers	Worldbank WDI

Table 17

Descriptionof Variables and Sources II

Variable	Survey Question	Asked since	Aggregation
Competition Is Good	Now I'd like you to tell me your views on various issues. How would you place your views on this scale? 1 means you agree completely with the statement on the left; 10 means you agree completely with the statement on the right; and if your views fall somewhere in between, you can choose any number in between. *(i) Competition is good. It stimulates people to work hard and develop new ideas vs. Competition is harmful. It brings out the worst in people.* (+) *(ii) People can only get rich at the expense of others vs. Wealth can grow so there's enough for everyone.* (–)	1990	First principal component (PC) of mean of answers
Obedience	I. Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five (out of 16): (i) obedience (+), (ii) independence (–) II. People have different ideas about following instructions at work. Some say that one should follow one's superior's instructions even when one does not fully agree with them. Others say that one should follow one's superior's instructions only when one is convinced that they are right. With which of these two opinions do you agree? Percentage of mentions of *(i) Follow instructions. (Alternatives: (ii) Must be convinced first, (iii) Depends, (iv) Don't know.)*	1981	First PC of percentage of mentions
Control	Some people feel they have completely free choice and control over their lives, while other people feel that what they do has no real effect on what happens to them. Please use this scale where 1 means "none at all" and 10 means "a great deal" to indicate how much freedom of choice and control you feel you have over the way your life turns out.	1981	Average
Trust	Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people? *Most people can be trusted* [1] vs. *Can't be too careful* [0]	1981	Average
Work Ethic	I. Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five (out of 16). *Hard work.* II. For each of the following aspects, indicate how important it is in your life. Would you say it is: *Very important, Rather important, Not very important, Not at all important*	1981	First PC of percentage of mentions
Propensity to Save (Thrift)	Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five (out of 16). *Thrift, saving money and things*.	1981	Percentage of mentions
Honesty	Please tell me for each of the following statements whether you think it can always be justified, never be justified, or something in between (Scale from 1 to 10, ranging from never to always). *(i) Cheating on taxes if you have a chance* *(ii) Avoiding a fare on public transport* *(iii) Failing to report damage you've done accidentally to a parked vehicle*	1981 discontinued in 1990	First PC of mean of answers

Notes: The five WVS waves were conducted in (1) 1981-84, (2) 1989-93, (3) 1994-99, (4) 1999-2004, (5) 2005-08. The four EVS waves were conducted in (1) 1981, (2) 1990, (3) 1999, (4) 2008. In case more than one survey question is listed per cultural trait, the cultural variable used in the regression is constructed by taking the first principal component on the averaged answers to the respective questions. Source: WVS (2009), EVS (2011).

Table 18

Summary Statistics

	Mean	Min.	Max.	Standard Deviation	Number of Observations
Cultural Variables					
Trust	0.28	0.04	0.70	0.14	175
Trust *(standardised)*	0.00	–1.69	2.97	1.00	175
Competition is good	–0.16	–2.39	2.74	0.93	153
Obedience	0.18	–2.34	3.07	1.19	175
Control	6.81	4.68	8.28	0.70	172
Work ethic	0.01	–2.64	1.93	0.91	175
Propensity to save	0.35	0.02	0.63	0.13	175
Honesty	–0.10	–5.44	1.84	1.17	175
Macroeconomic Imbalance Indicators					
Imbalances index	–0.23	–7.51	5.53	1.93	152
Imbalances index *(standardised)*	–0.00	–3.78	2.99	1.00	152
Fiscal balance *(percent of GDP)*	–2.09	–15.28	12.83	3.60	152
Current account *(percent of GDP)*	–0.81	–24.11	18.77	5.50	191
Inflation *(percent)*	7.31	–0.41	48.60	7.61	191
Controls					
GDP per capita (PPP) *(thousand dollars)*	16.60	0.86	72.33	12.40	188
Confidence in national institutions	0.07	–3.66	4.49	1.38	100
Institutional quality *(standardised)*	0.00	–2.67	1.45	1.00	168
Education	7.29	1.78	12.25	2.53	133
Old-age dependency ratio *(percent)*	17.90	6.69	29.42	7.01	192
Latitude of capital, in degrees	37.65	2.30	65.00	16.16	174
Oil trade balance	–0.49	–24.08	38.23	7.48	159
Financial openness *(standardised)*	–0.00	–1.60	1.74	1.00	174
Financial development	0.58	0.00	1.89	0.42	196
Post-communist country	0.30	0.00	1.00	0.46	192
Instruments					
Religiosity	0.22	–2.90	3.35	1.35	175
Protestant *(share)*	0.14	0.00	0.96	0.23	175
Other					
Household saving rate	6.86	–5.70	18.40	5.53	49
Gross national savings	23.28	11.10	54.00	7.06	165

Notes: For sources and exact definition of the variables see Tables 2, 16 and 17.

Table 19

Correlation Matrix: Imbalances Index and Components

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Imbalances Index	1										
(2) Imbalances Index 2	0.954***	1									
(3) Imbalances Index 3	0.464***	0.554***	1								
(4) Imbalances Index 4	0.867***	0.799***	0.636***	1							
(5) Imbalances Index 5	0.928***	0.965***	0.443***	0.719***	1						
(6) Imbalances Index 6	0.298***	0.185**	0.506***	0.457***	0.003	1					
(7) Inflation	0.497***	0.289***	0.201**	0.632***	0.139*	0.785***	1				
(8) Fiscal Balance	–0.755***	–0.817***	–0.672***	–0.828***	–0.823***	–0.019	–0.089	1			
(9) Current Account	–0.786***	–0.785***	–0.074	–0.373***	–0.836***	0.0129	–0.175**	0.377***	1		
(10) Institutional Quality	–0.124	0.025	–0.018	–0.187**	0.030	–0.257***	–0.361***	–0.031	0.049	1	
(11) Net Foreign Assets	–0.184**	–0.207**	–0.021	–0.100	–0.205**	0.042	–0.016	0.123	0.061	0.191**	1

Notes: Correlations are based on decade-level data (1980s, 1990s and 2000s). Imbalances index: $Imbalance_{it} = -fb_{it} + \pi_{it} - ca_{it}$, $Imbalance2_{it} = -fb_{it} + |\pi_{it}| - ca_{it}$, $Imbalance3_{it} = -fb_{it} + |\pi_{it}| + |ca_{it}|$, $Imbalance4_{it} = -fb_{it} + \pi_{it}$, $Imbalance5_{it} = -fb_{it} - ca_{it}$, $Imbalance6_{it} = (fb_{it} * 100)^2 + (\pi_{it} * 100)2 + (ca_{it} * 100)^2$. Net foreign assets are expressed as percentages of GDP. For a detailed description of the remaining variables see Table 16. Significance levels: *** 1 per cent, ** 5 per cent, and * 10 per cent.

Table 20

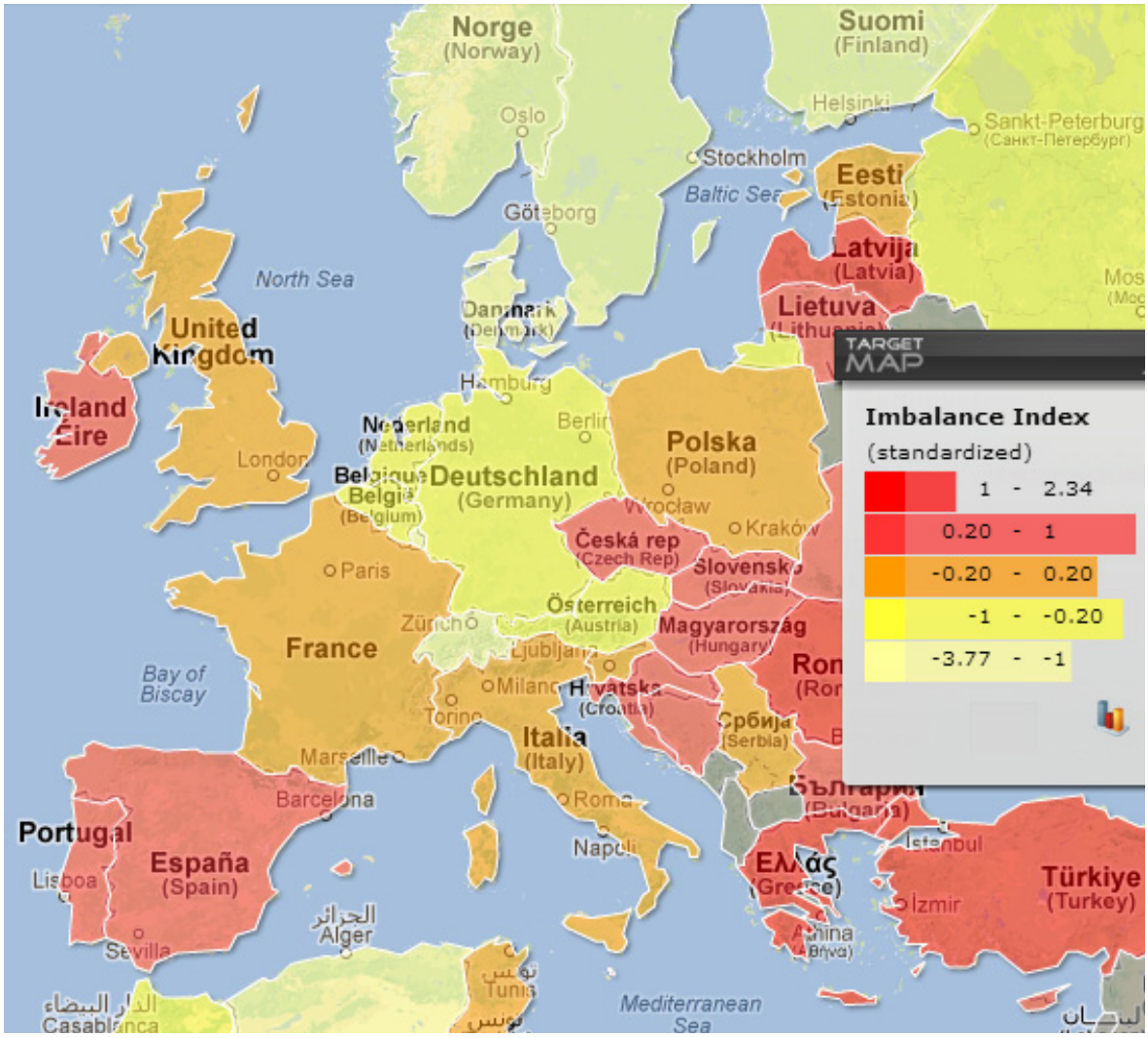
Correlation Matrix: Civic Culture and Components

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Competition Is Good	1										
(2) Obedience	0.037	1									
(3) Control	–0.087	–0.052	1								
(4) Trust	0.0653	–0.486***	0.184**	1							
(5) Work Ethic	–0.259***	–0.465***	0.098	0.111	1						
(6) Propensity to Save	–0.076	–0.205***	–0.275***	–0.154**	0.322***	1					
(7) Honesty	–0.390***	–0.150**	0.201***	0.256***	0.092	–0.061	1				
(8) Civic Culture	–0.299***	–0.813***	0.373***	0.607***	0.684***	0.182**	0.398***	1			
(9) Confidence in Institutions	0.005	–0.251**	0.070	0.429***	–0.020	0.108	0.189*	0.237**	1		
(10) Household Saving Rate	0.164	0.310**	–0.381***	–0.451***	–0.151	0.390***	0.013	–0.368**	–0.134	1	
(11) Gross National Savings	0.215**	–0.108	–0.023	0.185**	0.168*	0.178**	0.186**	0.131	0.401***	0.203	1

Notes: Correlations are based on decade-level data (1980s, 1990s and 2000s). *Civic culture* is constructed as the first principal component of all seven cultural variables which are described in detail in Table 17. Significance levels: *** 1 per cent, ** 5 per cent, and * 10 per cent.

Figure 2

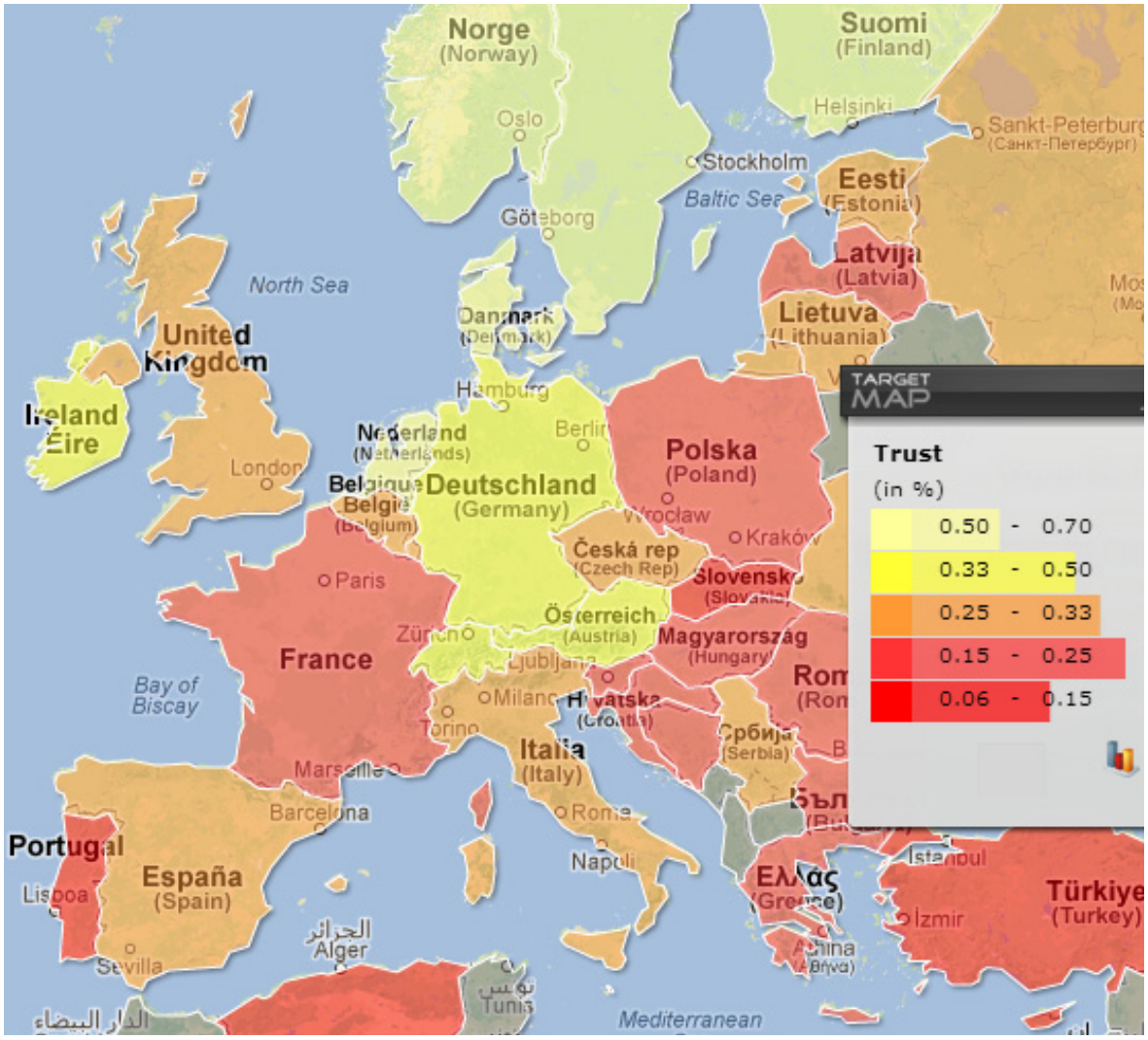
Imbalances Across Europe



Notes: *Imbalance* is measured as the standardised 2000-10 average of (i) the inflation rate minus (ii) government net lending in percentage of GDP minus (iii) the current account of the balance of payments in percentage of GDP, where each component has also been standardised.
Source: WVS, EVS, TargetMap, and own calculations.

Figure 3

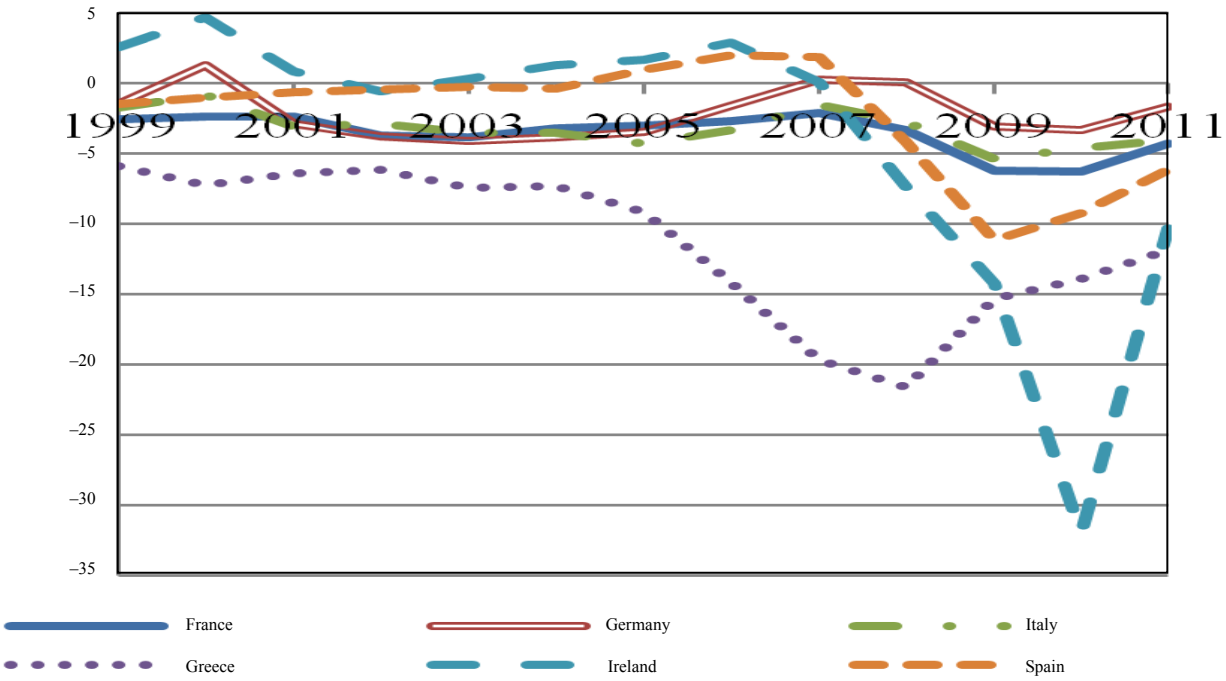
Trust Across Europe



Notes: Trust is measured as the percentage of responses "Most people can be trusted" to the question "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?", averaged between 2000-10.
Source: WVS, EVS, TargetMap, and own calculations.

Figure 4

Imbalance Indicators in Selected Euro Area Countries
(a) Fiscal Balance
(percent of GDP)



(b) Current Account
(percent of GDP)

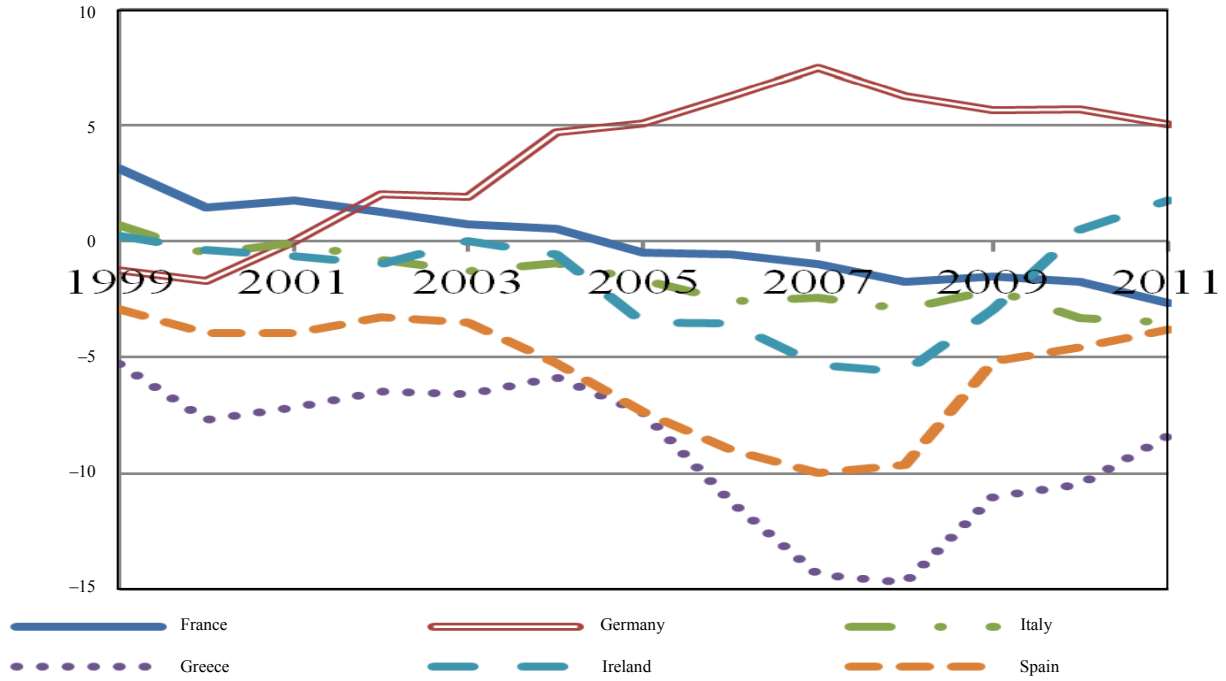
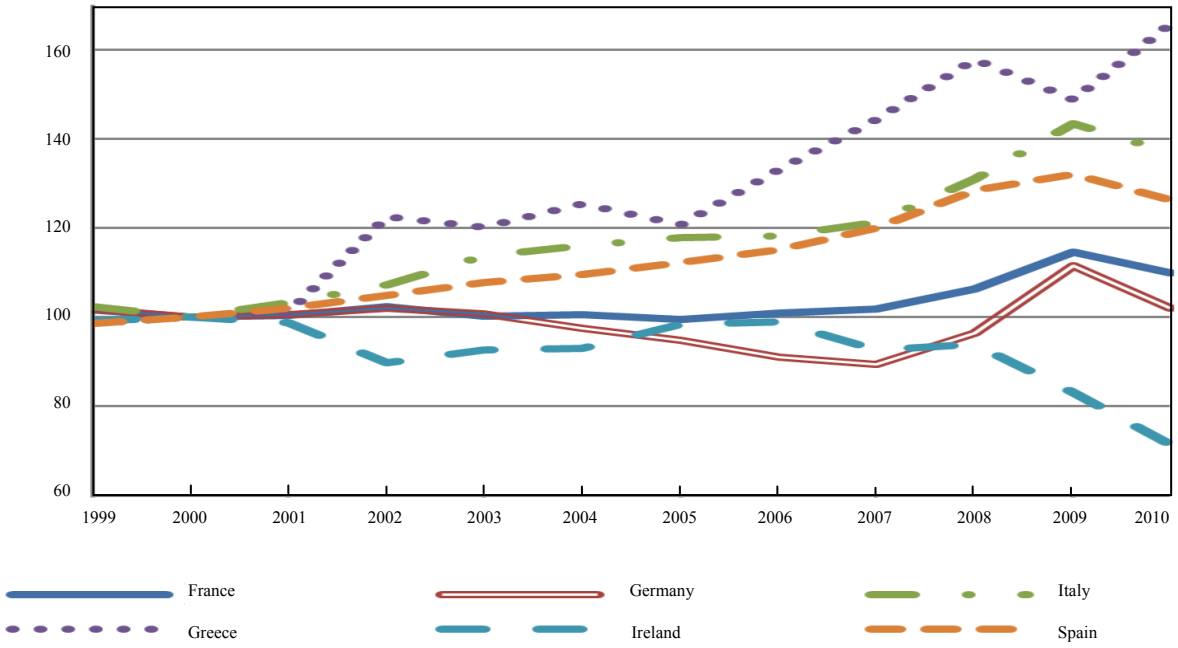
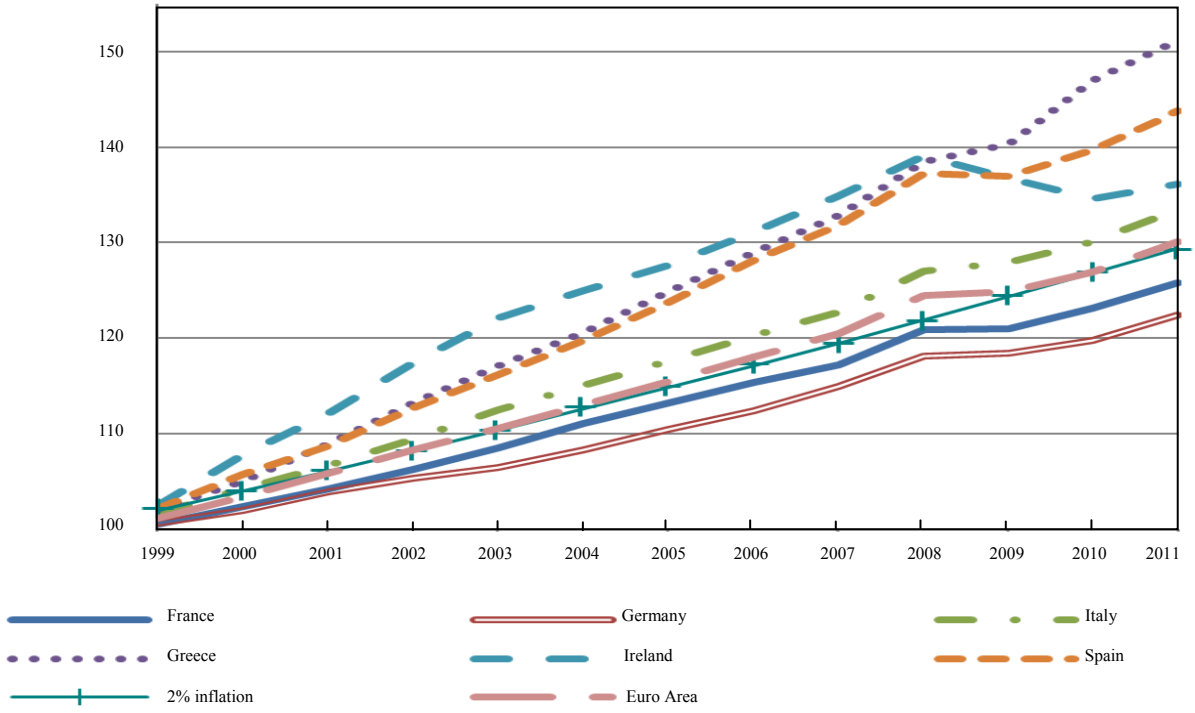


Figure 4 (continued)

Imbalance Indicators in Selected Euro Area Countries
(c) Unit Labour Costs (Manufacturing)
(index 2000=100)



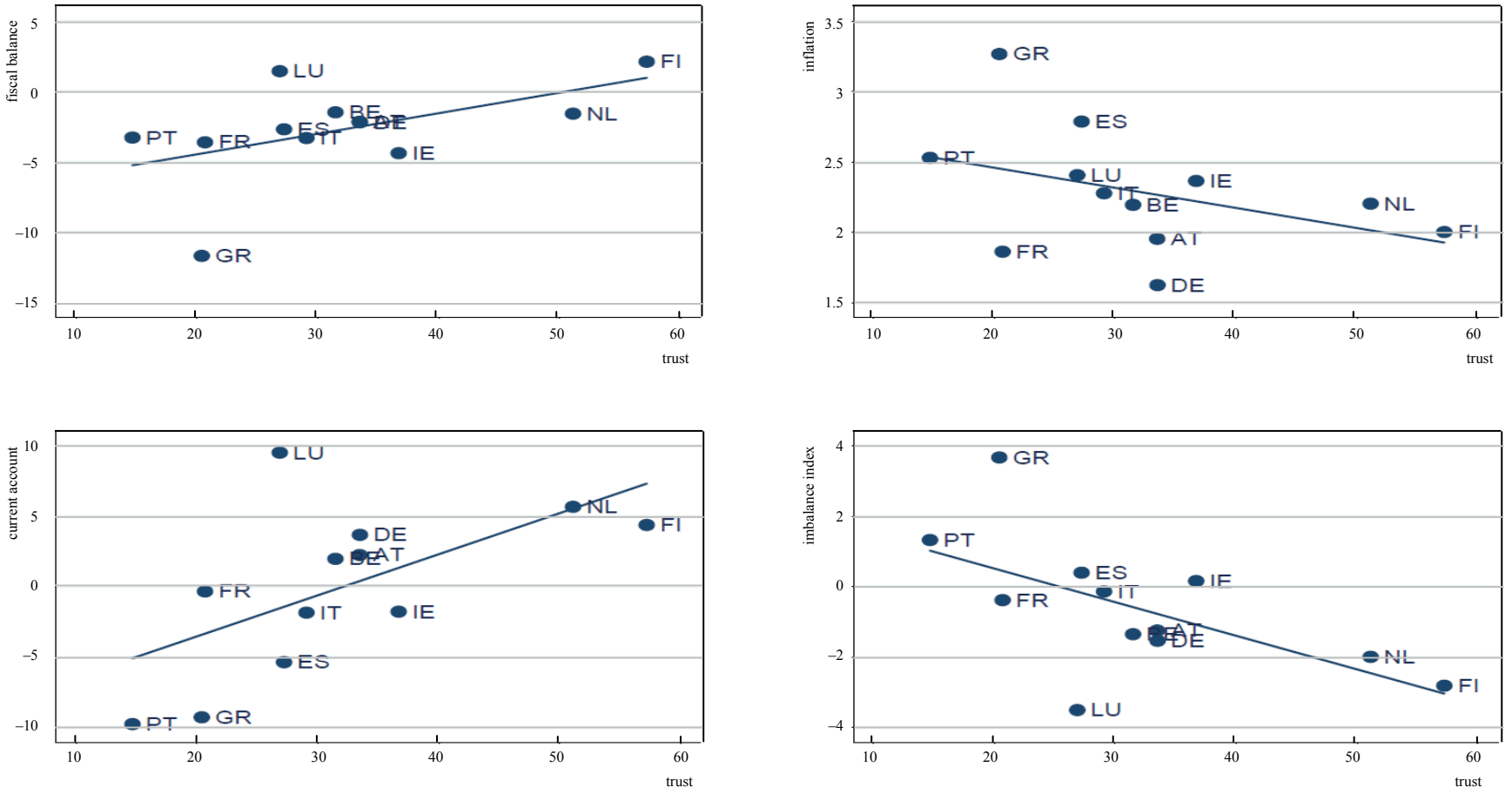
(d) Price levels in the euro area (cumulative inflation)
(index 1998=100)



Source: IMF World Economic Outlook, OECD Main Economic Indicators, own calculations.

Figure 5

Trust and Macroeconomic Imbalances: Euro Area, 2000-10



Notes: The values represent averages between 2000-10. Current account and fiscal balance are expressed as ratios to GDP. *Imbalance* is measured as the standardised 2000-10 average of (i) the inflation rate minus (ii) the fiscal balance in percentage of GDP minus (iii) the current account in percentage of GDP, where each component has also been standardised (for details see Section 4.1).
Source: IMF World Economic Outlook.

REFERENCES

Acemoglu, D., S. Johnson and J.A. Robinson (2002), "Reversal Of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution", *The Quarterly Journal of Economics*, Vol. 117, No. 4, pp. 1231-94.

Akerlof, G.A. (2007), "The Missing Motivation in Macroeconomics", *American Economic Review*, Vol. 97, No. 1, pp. 5-36.

Alesina, A. and A. Drazen (1991), "Why Are Stabilizations Delayed?", *American Economic Review*, Vol. 81, No. 5, pp. 1170-88.

Alesina, A. and R. Perotti (1995), "The Political Economy of Budget Deficits", IMF, Staff Papers, Vol. 42, No. 1, pp. 1-31.

Algan, Y. and P. Cahuc (2010), "Inherited Trust and Growth", *American Economic Review*, Vol. 100,No. 5, pp. 2060-92.

Arrow, K.J. (2010), "Gifts and Exchanges", *Philosophy & Public Affairs*, Vol. 1, No. 4, pp. 343-62.

Banfield, E.C. (1958), "The Moral Basis of a Backward Society", Glencoe (IL), The Free Press.

Barro, R.J. and J.W. Lee (2010), "A New Data Set of Educational Attainment in the World, 1950-2010", National Bureau of Economic Research, Working Paper, No. 15902.

Beugelsdijk, S. and R. Maseland (2011), "Culture in Economics", Cambridge, Cambridge University Press.

Brehm, J. and W. Rahn (1997), "Individual-level Evidence for the Causes and Consequences of Social Capital", *American Journal of Political Science*, Vol. 41, No. 3, pp. 999-1023.

Carroll, C.D., B.K. Rhee and C. Rhee (1994), "Are There Cultural Effects on Saving? Some Cross-Sectional Evidence", *The Quarterly Journal of Economics*, Vol. 109, No. 3, pp. 685-99.

Chinn, M. and H. Ito (2006), "A New Measure of Financial Openness", *Journal of Comparative Policy Analysis*, Vol. 10, No. 3, pp. 307-20.

Delhey, J. and K. Newton (2005), "Predicting Cross-national Levels of Social Trust: Global Pattern of Nordic Exceptionalism?", *European Sociological Review*, Vol. 21, No. 4, pp. 311-27.

D'Hernoncourt, J. and P.G. Méon (2012), "The Not So Dark Side of Trust: Does Trust Increase the Size of the Shadow Economy?", *Journal of Economic Behavior & Organization*, Vol. 81, No. 1, pp. 97-121.

Eichengreen, B. (2012), "Europe's Trust Deficit", Project Syndicate, 12 March, available at: http://www.project-syndicate.org/commentary/europe-s-trust-deficit, accessed on 27 July 2012.

European Commission (2012), "Scoreboard for the Surveillance of Macroeconomic Imbalances", Occasional Paper, No. 92.

EVS (2011), "European Values Study 1981-2008 Longitudinal Data File", ZA4804 Data File Version 2.0.0 (2011-12-30), GESIS Data Archive, Cologne, Germany.

Feld, L.P., and B.S. Frey (2002), "Trust Breeds Trust: How Taxpayers Are Treated", *Economics of Governance*, Vol. 3, No. 2, pp. 87-99.

Gordon, R.J. (1975), "The Demand for and Supply of Inflation", *Journal of Law and Economics*, Vol. 18. No. 3, pp. 807-36.

Gorodnichenko, Y. and G. Roland (2010), "Culture, Institutions and the Wealth of Nations", National Bureau of Economic Research, Working Paper, 16368.

Gros, D. (2012), "Macroeconomic Imbalances in the Euro Area: Symptom or Cause of the Crisis?", Centre for European Policy Studies, Paper, No. 6865.

Guiso, L., H. Herrera and M. Morelli (2012), "A Culture-based Theory of fiscal Union Desirability", mimeo.

Guiso, L., P. Sapienza and L. Zingales (2004), "The Role of Social Capital in Financial Development", *American Economic Review*, Vol. 94, No. 3, pp. 526-56.

——————(2006), "Does Culture Affect Economic Outcomes?", *Journal of Economic Perspectives*, Vol. 20, No. 2, pp. 23-48.

——————(2010), "Civic Capital as the Missing Link", National Bureau of Economic Research, Working Paper, No. 15845.

Hall, R.E. and C.I. Jones (1999), "Why Do Some Countries Produce So Much More Output per Worker Than Others?", *The Quarterly Journal of Economics*, Vol. 114, No. 1, pp. 83-116.

Heinemann, F. and B. Tanz (2008), "The Impact of Trust on Reforms", *Journal of Economic Policy Reform*, Vol. 11, No. 3, pp. 173-85.

Herrmann, B., C. Thöni and S. Gächter (2008), "Antisocial Punishment Across Societies", *Science*, No. 319, pp. 1362-67.

Heston, A., R. Summers and B. Aten (2012), "Penn World Table Version 7.1", Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, July.

Ioannou, D. and L. Stracca (2012), "Have Euro Area and EU Economic Governance Worked? Just the Facts", *European Journal of Political Economy*, forthcoming.

Knack, S. (2000), "Social Capital and the Quality of Government : Evidence from the U.S. States", The World Bank, Policy Research, Working Paper, No. 2504.

Knack, S. and P. Keefer (1997), "Does Social Capital Have an Economic Payoff? A Cross-country Investigation", *The Quarterly Journal of Economics*, Vol. 112, No. 4, pp. 1251-88.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer and R. Vishny (1997), "Trust in Large Organizations", *American Economic Review*, Vol. 87, No. 2, pp. 333-38.

McCleary, R.M. and R.J. Barro (2006), "Religion and Economy", *Journal of Economic Perspectives*, Vol. 20, No. 2, pp. 49-72.

Papademos, L. (2007), "Economic Performance, Institutions, and Human Values", speech at the *Second International Symposium on Universal Values: Science, Technology and Human Values*, The Academy of Athens, 2 May.

Phelps, E. (2006), "Economic Culture and Economic Performance: What Light Is Shed on the Continent's Problem?", lecture at the *Perspectives on the Performance of the Continent's Economies Conference* of CESifo and Center on Capitalism and Society, Venice, 21-22 July.

PRS Group Inc. (2009), "International Country Risk Guide (ICRG) Researchers' Dataset (computer file)", 2009 ed., East Syracuse (NY), The PRS Group, Inc.

Putnam, R.D. (1993), "Making Democracy Work. Civic Traditions in Modern Italy", Princeton University Press.

Spring, E. and V. Grossmann (2013), "Does Bilateral Trust Affect International Movement of Goods and Labor?", CESifo, Working Paper, No. 4235.

Tabellini, G. (2010), "Culture and Institutions: Economic Development in the Regions of Europe", *Journal of the European Economic Association*, Vol. 8, No. 4, pp. 677-716.

Teorell, J., N. Charron, M. Samanni, S. Holmberg and B. Rothstein (2011), "The Quality of Government Dataset, version 6 Apr 2011", University of Gothenburg: The Quality of Government Institute, available at: http://www.qog.pol.gu.se

United Nations (2011), "World Population Prospects: The 2010 Revision", CD-ROM Edition, Department of Economic and Social Affairs, Population Division.

Weber, M. (1904/05), "Die Protestantische Ethik und der Geist des Kapitalismus", Archiv für Sozialwissenschaft und Sozialpolitik 20: 1-54 and 21: 1-110. Reprinted in: Gesammelte Aufsätze zur Religionssoziologie, 1920: 17-206. English translation: The Protestant Ethic and the Spirit of Capitalism, translated by Talcott Parsons, 1930/2001, London: Routledge Classics.

Wooldridge, J.M. (2002), *Econometric Analysis of Cross-section and Panel Data*, The MIT Press.

WVS (2009), "World Value Survey 1981-2008 Official Aggregate v.20090902", World Values Survey Association, www.worldvaluessurvey.org. Aggregate File Producer: ASEP/JDS Data Archive, Madrid, Spain.

Zak, P.J. and S. Knack (2001), "Trust and Growth", *Economic Journal*, Vol. 111, No.470, pp. 295-321.

THE MULTIFACETED RELATIONSHIP BETWEEN FISCAL AND OTHER MACROECONOMIC IMBALANCES

Carlos Herrero García,[*] *Pedro Hinojo Gonzáles,*[*] *Pilar Mas Rodríguez*[*]

This paper aims at shedding light on how fiscal policy relates to other macroeconomic imbalances in Spain. An Error Correction Model is estimated to assess the effect of the public balance on the current account, obtaining a co-movement in sync with conventional wisdom. Furthermore, a Vector Autoregressive Model is used to examine the interaction between fiscal policy and domestic macroeconomic imbalances such as unemployment, credit and private investment. Within this empirical framework, booms of credit, investment and low unemployment are found to improve substantially public accounts. In turn, fiscal consolidation also tends to anchor good expectations and can engender these private imbalances. Finally, some empirical tests are performed to assess the sustainability of the Spanish fiscal position, obtaining evidence of weak sustainability.

1 Introduction

Fiscal policy refers to those discretionary actions put in place to alter public revenues or expenditures. The objective of those measures may be microeconomic, like correcting some market failures or attaining some redistributive gains, or macroeconomic. The traditional macroeconomic role of fiscal policy was limited to smoothing the economic cycle. Nonetheless, a more modern view considers other dimensions of macroeconomic stability, like the sustainability of public finances and the potential to address other macroeconomic imbalances. Furthermore, the public sector intervention in the economy should contribute to achieve a sustainable rate of growth in the long term, by focusing on the quality and efficiency of expenditures and by designing a growth-friendly tax system.

Setting aside the role of the public sector to promote long term growth, the most daunting and at the same time appealing task, this paper aims at shedding light on that modern notion of fiscal policy that goes well beyond output and employment stabilisation in the very short term. We put the lens on Spain, perhaps one of the most paradigmatic cases in this regard.

The long-term sustainability of public finances has been an issue profusely explored by the literature in the last 25 years. To that end, methodologies and tests have been developed to assess whether public expenditures and revenues have sustainable trends, compatible with the satisfaction of the intertemporal budget constraint (Trehan and Walsh, 1988 and 1991, and Quintos, 1995). This analytical framework has been applied to Spain as well (De Castro, 2005; and Bajo-Rubio *et al.*, 2010). This analysis is of utmost importance, given that, in order for the fiscal policy to promote macroeconomic stability, ensuring a sustainable path of expenditures and revenues should be first and foremost.

A more novel branch of research could be the potential of fiscal policy to address other macroeconomic imbalances, like the current account, competitiveness developments or asset, credit

---

[*] Ministry of Economy and Competitiveness of Spain. Macroeconomic Analysis and International Economy Unit. This paper has been elaborated for research purposes, so the views expressed in it are those of the authors and do not necessarily reflect the official position of their institution.

Contact details: Carlos Herrero, Pedro Hinojo at herrerohinojo@gmail.com

We would like to thank Juan Bógalo, Mercedes Guerenabarrena, José Miguel Ramos and Lucía Rodríguez for their help and suggestions. Any errors contained in this paper are the sole responsibility of the authors.

and housing markets bubbles. The relevance of these imbalances in the global crisis and, especially, in the Euro Area has placed these issues under the spotlight of the theoretical and institutional debate, as the development of the Macroeconomic Imbalances Procedure (MIP) in the European Union signals. Some examples of the issues that could be studied in this regard are the macroeconomic impact of the fiscal stance on the current account (Lee *et al.*, 2008; and Salto and Turrini, 2010) and other imbalances, the effects of tax measures on the current account (de Mooij and Keen, 2012) and on other imbalances (Andrews *et al.*, 2011), or even the assessment of how a higher quality composition of expenditure can tame these imbalances.

Furthermore, macroeconomic imbalances and fiscal policy are interrelated in a bidirectional manner. In other words, these imbalances also impact public expenditures and revenues and hence deficit and debt. For instance, in some European countries (including Spain) excessive credit growth and other imbalances were inflating nominal revenues and public balances, although the underlying structural or permanent indicators were not that solid.

This paper aims at covering most issues raised in this first introductory section and, for that purpose, it is organized as follows. Section 2 allows for a bird's eye view of fiscal policy in Spain in the last three decades. Section 3 sets a model for interpreting the effects of fiscal policy on the current account from a macroeconomic point of view. Section 4 analyses, from an empirical perspective too, the interactions between fiscal policy and domestic macroeconomic imbalances. Section 5 takes a look at the long term sustainability of Spanish public finances through orthodox empirical tests. Section 6 contains the concluding remarks.

2 An overview of fiscal policy in Spain

Since the advent of democracy in 1975, the size of public revenues and expenditures relative to GDP started to increase in Spain, given the creation of a full-blown Welfare State, the construction of a decentralized fiscal framework and the design of a modern tax mix (De Castro, 2005). Therefore, public deficit and debt widened in the downward phases of the economic cycle (like the early ’80s or the early ’90s), owing to the play of automatic stabilizers and discretionary stimuli.

Nonetheless, the fiscal stance changed substantially in the mid 1990s. After the European Monetary System crisis in 1992 and the subsequent currency devaluations, Spain entered a sustained economic growth phase which would last more than a decade. This macroeconomic stability facilitated the success in fulfilling the Maastricht criteria in terms of lowering public debt and deficit, interest rates and inflation. In turn, the soundness in public finances laid the groundwork for nominal and real convergence with the European Union, anchoring expectations. This context can provide evidence of the non Keynesian effects of fiscal policy.

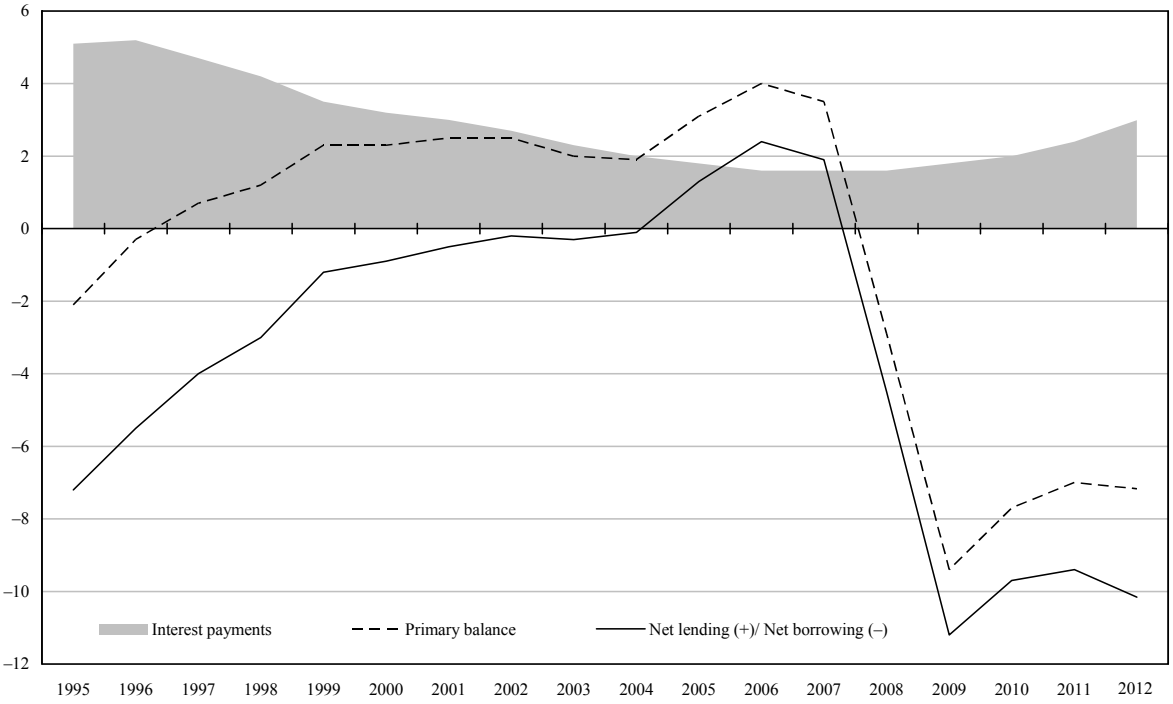
Figure 1 pictures these changes. Public balance improved from almost –7 per cent of GDP in 1995 to +1.9 per cent of GDP in 2007, while gross public debt went down from around 70 per cent of GDP to 36 per cent.

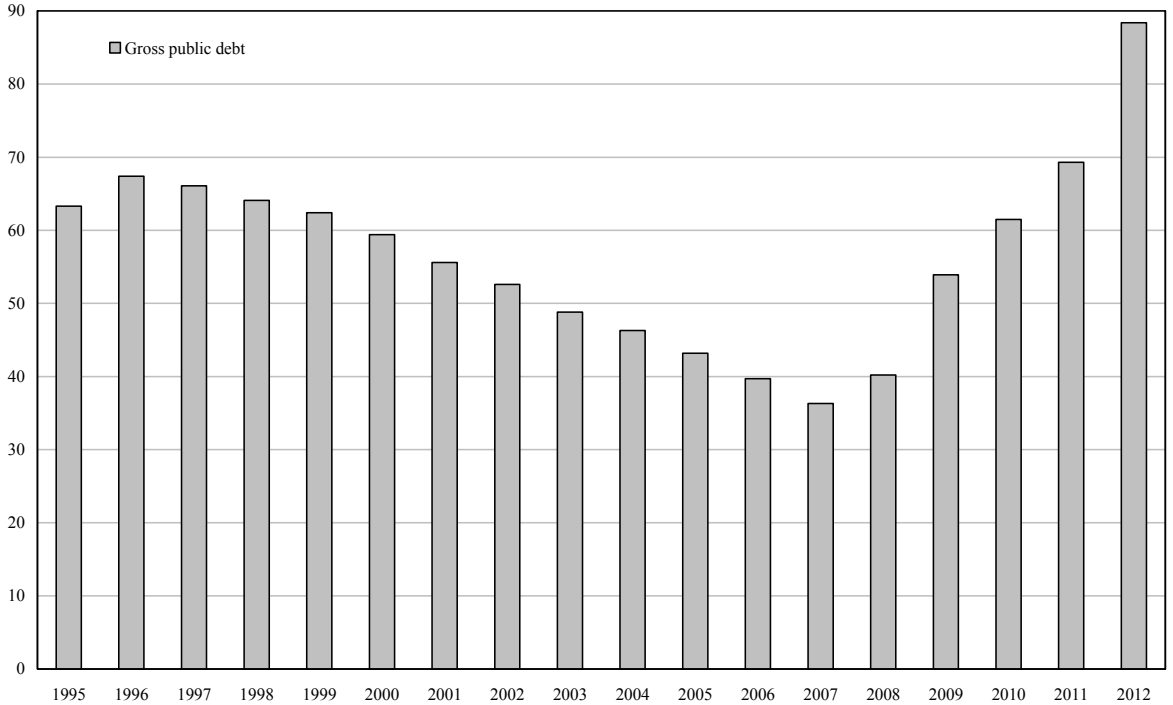
The first analysis carried out in the early 2000s pointed out that fiscal consolidation achievements in the mid and late 90s were due not only to the economic cycle and the lower interest payments, but also to the contraction in the cyclically adjusted primary balance (Hernández de Cos and Ortega, 2005). Moreover, the reduction in cyclically adjusted primary expenditure was the main driver behind the structural adjustment, as revenues kept more stable (Briotti, 2004).

In a nutshell, in the first phase of fiscal consolidation government spending declined substantially, well beyond the positive effects of the economic cycle and the lower interest rates. This allowed for statutory tax rate cuts not to affect total tax revenue amid an environment of

Figure 1

Evolution of Public Finance Benchmark Indicators in Spain from 1995
(percent of GDP)





Source: AMECO and Eurostat.

strong private demand. In this regard, that policy contributed positively to macroeconomic stability by improving the soundness of public finances and by creating a more flexible and competitive economy. In contrast, a consolidation strategy based on tax hikes would have been more harmful for economic growth in the medium term.

Furthermore, even if public revenues were stable relative to GDP, there were qualitative changes within them. The tax mix started to step more at indirect taxes and less at direct taxes (Von Hagen *et al.*, 2001). In principle, this combination could be conducive to the correction of the external deficit and other imbalances, providing a friendlier framework to growth and competitiveness.

The initial relative satisfaction with the fiscal consolidation process in Spain can be better understood thanks to Figure 2. The improvement in the public balance from 1995 to 2007 amounted to more than 8 percentage points of GDP. Nonetheless, the structural primary balance correction was equivalent to around 3 percentage points. Furthermore, that "discretionary impulse" took place in two relatively short periods. The first, between 1995 and 1997, consisted in cuts in structural expenditure, what could explain the initial complacency with the consolidation. The second period, between 2003 and 2007, stepped at cyclically-adjusted revenues increase, which perhaps were not that "permanent".

After taking into consideration the whole period of consolidation, and with the benefit of hindsight, the analysis has drawn different conclusions from the pieces of research abovementioned (Bank of Spain, 2011). The roaring tax collection in the 2000s casted some doubts on whether and how much of the revenue base increase was structural. The booming development of construction and real estate fuelled output and public revenues (IMF, 2009a and 2011). This growth model was impacting and inflating the fiscal position through indirect tax collection due to housing sales and, more subtly, through social security contribution and personal income taxes (given the labour intensity of these sectors). Even the corporate income tax (a figure which is very procyclical and suffers from hysteresis) was bound to be generating windfall revenues (IMF, 2009b). When the housing market and the pattern of growth collapsed, a substantial part of the tax base seemed to vanish.

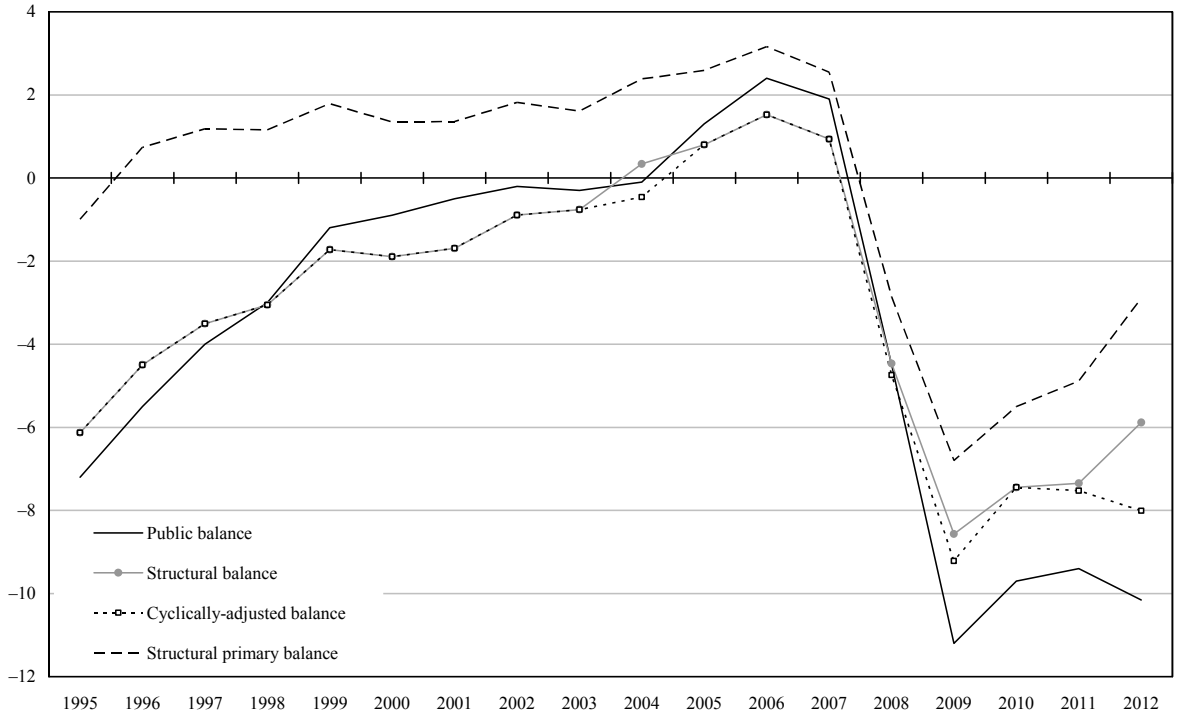
Given the shortcomings related to the measurement of potential output and the cyclically-adjusted balance (thoroughly assessed in De Castro *et al.*, 2008), it seems plausible that the Spanish structural fiscal position was overestimated. Some experts (IMF, 2009b, and Bank of Spain, 2011) point out that the outstanding improvement in the public balance (over 8 percentage points of GDP) between 1995 and 2007 was due to cyclical developments, the drop in the interest burden and, especially, a *dark matter* unexpected jump in public revenue (over 5 percentage points of the GDP). The cyclically-adjusted primary expenditure barely contributed and the revenue-side would have played an expansionary role, given the legal tax cuts. In this regard, it has been argued that the improvement in the public balance from 2005 to 2007 seems to be due mainly to non-discretionary efforts, most likely to higher tax elasticities than the ones assumed (OECD, 2010).

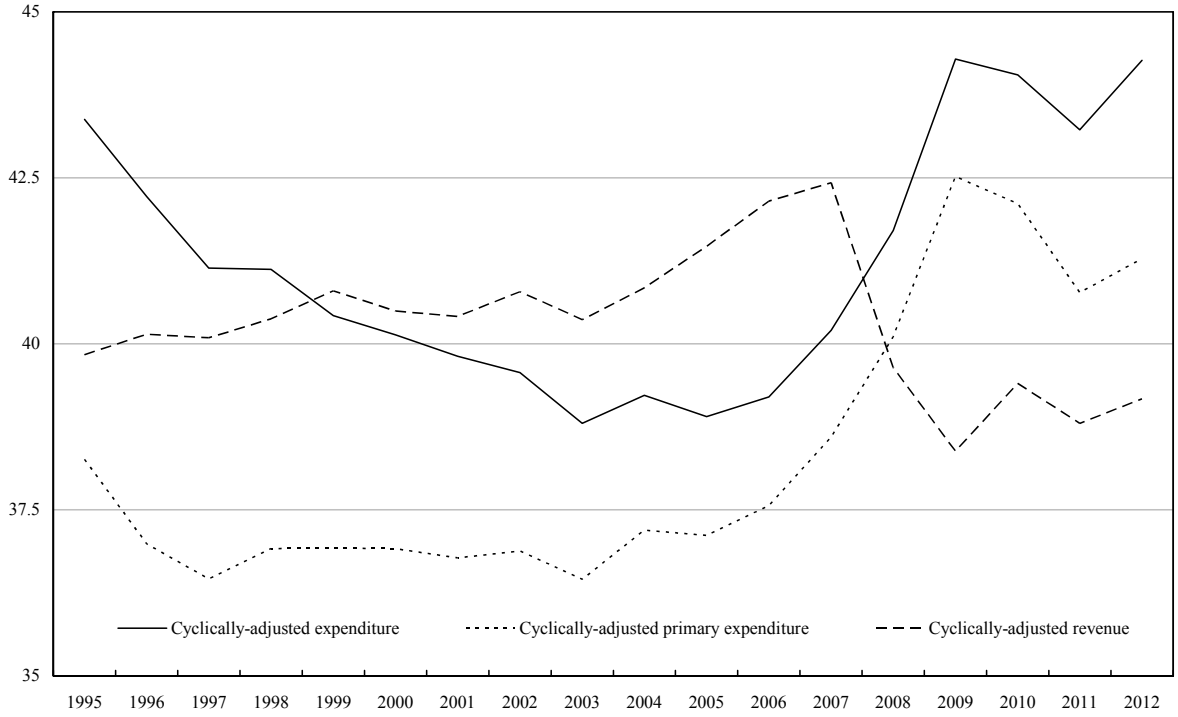
Nevertheless, the decline in interest payments (one of the forces behind fiscal consolidation) should not be considered as totally exogenous or away from the control of the authorities, given that lower sovereign debt yields also reflect confidence in the government's policies. Furthermore, the decrease in interest payments was caused as well by the descent in public debt, which responds to changes in deficit and to other policies. For instance, in the late 1990s Spain implemented far-reaching privatization policies which paved the way for public deleveraging.

In any case, it is reasonable to assume that fiscal policy did not contribute enough to macroeconomic stability or to address other imbalances. Another issue often raised is the role of the tax treatment of the housing market in its different dimensions, especially as far as the

Figure 2

Evolution of Structural Budget Indicators in Spain from 1995
(percent of GDP)





Source: AMECO and Eurostat.

deductibility of mortgage interest payments is concerned. In Spain, like in other developed countries (Andrews *et al.*, 2011), the tax incentives in favour of ownership encouraged households to take on an excessive amount of debt.[1] This fuelled the financial and housing bubbles and could be behind other imbalances, such as the internal and domestic competitiveness loss.

Despite a good performance in structural competitiveness (as evidenced by export market shares), the growth model was taking a heavy toll on price competitiveness. The appreciation of the real effective exchange rates (REER) and the stubborn increases of unit labour costs (ULC) were the most remarkable warning signs of that trend. They were provoked by the abnormal growth of a low-productivity non-tradable sector like construction.

The current account (CA) deserves an in-depth analysis given its connection with all the issues aforementioned. The drag on price competitiveness, the boom in internal absorption and the credit intensity of construction and real estate activities laid the groundwork for the external deficit. Furthermore, some research shows that the fiscal policy stance could have contributed to the external deficit (IMF, 2006), given that primary expenditure outpaced real GDP growth in the 2000s and the increase in revenues was rather cyclical and was not exerting a balancing bias.

Whatever the case may be, the public balance (even if the bias was not countercyclical enough) was actually recording a surplus and therefore alleviating the external financing needs, in a sign of the so-called "twin divergence" (Kim and Roubini, 2008). In principle, this would collide with the observed contribution of the public balance to the current account (Lee *et al.*, 2008; and Salto and Turrini, 2010), which normally tends to co-move in sync with the hypothesis of twin deficits. On the contrary, in the 2000s, Spanish households and firms appeared to behave in a Ricardian manner rather than Keynesian (Cardoso and Doménech, 2010).

One likely explanation for this result would be the role of credit constraints in the optimising behaviour of private agents (Galí *et al.*, 2003). This relaxation of borrowing conditions (linked to the euro adoption, the global liquidity glut and a sound macroeconomic framework) allowed households and firms to smooth their consumption and investment decisions, bringing forward future income. A lower share of credit-constrained households (Bussière *et al.*, 2005) set the basis for a "twin divergence" in Spain. The improvement of public finances in the 2000s should have contributed to the external adjustment, but the actual effect was quite different. Indeed, perhaps fiscal consolidation exacerbated the good expectations, encouraging private agents to assume even more debt.

Since the crisis triggered, the landscape has changed drastically, and the imbalances have begun to unwind. Price competitiveness indicators, such as REERs and ULCs, have partially corrected their eroded position. The weight of construction and real estate in GDP and in employment has adjusted quite abruptly, weighing on the health of public accounts.

Again, the linkages between the current account and the fiscal stance deserve a second thought, and that is why Figure 3 zooms in on the saving-investment balance. This figure illustrates how private demand was affected by financial constraints and precautionary savings amid an environment of high uncertainty and unemployment. The current account started its adjustment, particularly intense in 2009 when commodity prices bottomed out.

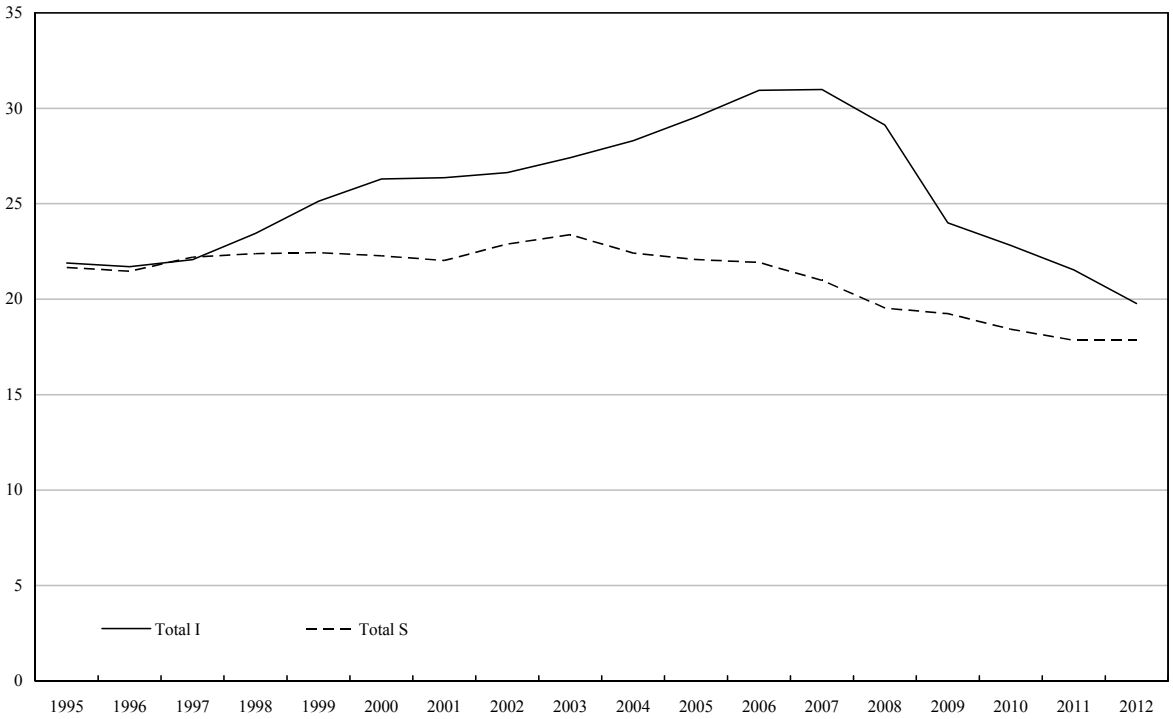
Meanwhile, the public sector took an undeniably expansionary role, sparing no effort in its discretionary action. Therefore, the initial quarters of the crisis lived another period of "twin divergence", in this case with an external private-led adjustment and a public balance deterioration.

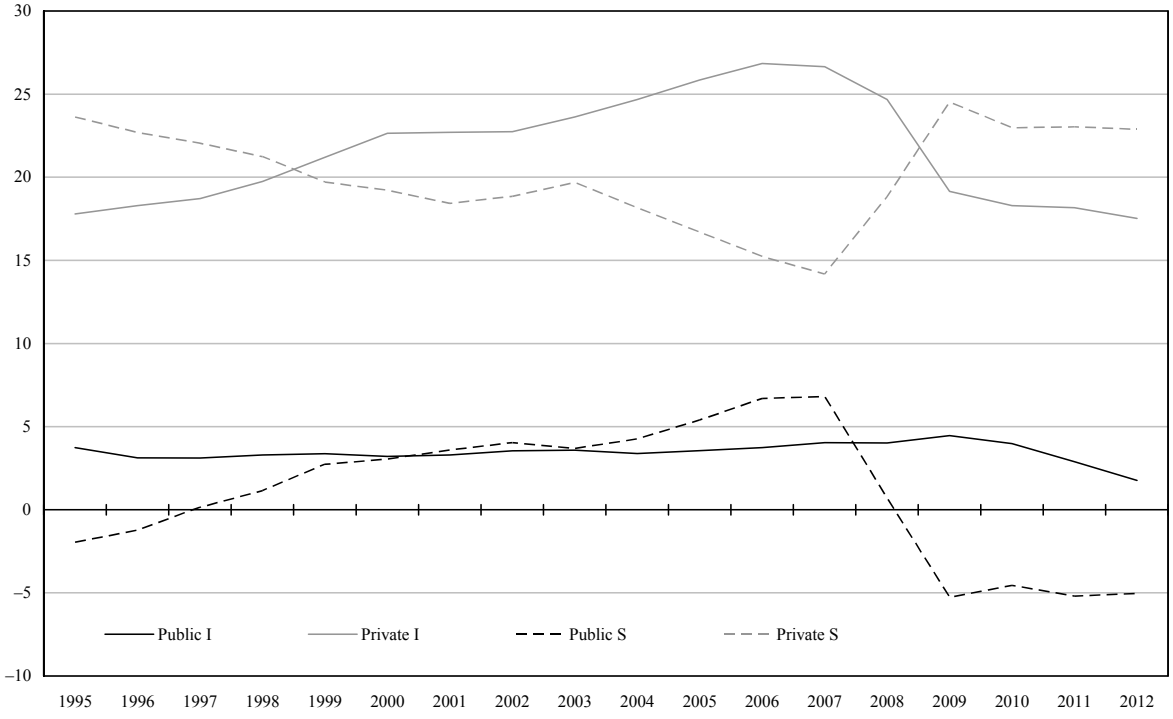
---

[1] Other drivers of the housing bubble were historically low real interest rates (together with other lax financial conditions, such as lengthening maturities), real disposable income growth, good expectations, immigration flows and increases in population.

Figure 3

Evolution of the Saving (S)-Investment (I) Balance in Spain from 1995
(percent of GDP)





Source: AMECO, Eurostat and Bank of Spain.

Since 2010, when credit constraints have started affecting both private and public agents, external and public accounts co-move in the traditional sense. The fiscal consolidation is having a direct effect on the external adjustment, which adds to the private deleveraging. Currently, the fiscal stance is, without a shadow of a doubt, very contractionary. Indeed, looking back at Figure 2, we can check how the structural primary adjustment in the last 3 years has been over 3 percentage points of GDP, almost equivalent to the adjustment between 1995 and 2007.

In order to shed light on this paradigmatic and volatile behaviour, we are going to put the focus on the link between fiscal policy and external imbalances. The interaction of fiscal policy with other imbalances will be analysed later.

3 The contribution of the public balance to external accounts

Given the depth and relevance of the interactions between the fiscal stance and the current account, it is worth studying this issue in detail. The methodology herein applied tries to mirror the one used in Brissimis *et al.* (2011), which studies external sustainability and current account determinants for Greece.

The long run determinants of the current account are estimated according to an error correction model (ECM), which follows a two-step approach (Engle and Granger, 1987). First, a long-run equation for the current account is estimated, taking advantage of a cointegration relationship between the current account and other economic variables, provided that they are integrated of order one $I(1)$. Secondly, a short term equation is estimated to explain the variations of the current account in function of the lagged variations of the explanatory variables and the residuals of the long term equation.

For the purpose of our research, we are particularly interested in the ECM for the current account (CA) and, especially, in the role of the public balance. The stepping stone is the identity between the current account and the difference between national savings (S) and investment (I). Furthermore, we divide the saving-investment balance into the private and the public sector[2]. The current account and the saving and investment rates are expressed in terms of nominal GDP (on a per unit basis).

$$CA = S - I = (S_{priv} - I_{priv}) + (S_{pub} - I_{pub}) \tag{1}$$

These macroeconomic aggregates are interrelated among themselves. For instance, according to the Feldstein-Horioka puzzle, the main effect of an increase in domestic saving is a rise in domestic investment, being the impact on the current account marginal. In the same vein, the public sector could exert an influence on the private balance if agents behaved in a Ricardian manner. In that scenario a worsening (improvement) of the public balance would be followed by an equal improvement (worsening) of the private balance, with no impact on the current account. Therefore, we will estimate a single equation, which will take on board all these interlinkages.

There are other variables which play an important role too. We include the ratio of the stock of credit to the private sector to the GDP (*CREDIT* in logarithms), which will be bound to increase domestic investment and hence worsen the CA. It could be argued that the flow of credit could be a better variable to include in the model, since the CA reflects a flow, not a stock. However, since the variables to be included in the ECM long-run equation must be $I(1)$, we include the stock of credit

[2] The variable we use to refer to saving-investment balance in the public sector is the net lending/borrowing, although this is not purely correct, because the latter (in contrast to the former) does include the capital account. For those countries, such as Spain, that have received sizeable capital transfers, the difference can amount to 1 per cent of GDP. Nonetheless, the theoretical or empirical impact on our estimation approach is meaningless.

instead of the flow, which is integrated of order zero, $I(0)$. With this representation, and if the variable has the expected negative sign, a positive (negative) change in the stock of credit, *i.e.*, positive (negative) flows, will tend to reduce (augment) the *CA*.

In addition, the competitiveness performance of an economy is of utmost importance to determine its external position. We have decided to take an index (on a per unit basis) of unit labour cost (*ULC*) whose increase (decrease) shows an erosion (enhancement) of competitiveness. Hence, this variable is expected to have a negative sign: an augmentation (a reduction) should lead to a lower (higher) *CA*.

We consider as well the unemployment rate (*U*, on a per unit basis) as a key variable that affects agents' decisions directly, as it tends to reduce their spending, and indirectly, as it generates uncertainty and leads households to restrain their consumption and investment even further. This variable is likely to hold a positive sign: an increase (decline) would imply a better (worse) *CA*.

As for the role of the ratio of private investment to the GDP (*GFCF*, on a per unit basis), it should present a negative sign. A higher (lower) ratio will tend to deteriorate (ameliorate) the *CA*, as the country will need, *ceteris paribus*, foreign funds to feed its domestic absorption. If the Feldstein-Horioka hypothesis were to be valid, the coefficient would be zero: higher (lower) domestic investment would only take place if and only if local agents saved more (less), without any effect on the current account.

Finally, the public balance, measured as the net lending (+)/borrowing (–) in terms of GDP (*PB*, on a per unit basis), ought to have a positive sign. A worse (better) health of the governments' accounts is likely to translate into a *CA* reduction (enhancement), resorting to foreign savings to satiate the public financing needs. Should the consumers behave in a totally Ricardian way, the coefficient would be zero: the decrease (increase) in public savings would be followed by an equivalent surge (descent) in private savings.

In theory, it could happen that the elasticity of the *CA* against the *PB* could take negative values. For instance, if the correction in the public accounts generated a wave of positive expectations among private agents, they could end up responding with an increase in demand sufficiently high to more than offset the moderation of the government's expenditure. In the same manner, a serious deterioration in the public deficit could trigger a wave of pessimism and uncertainty that might slash private demand in an amount that increases national saving through the precautionary behaviour of households.

In order to check whether the coefficients have the expected signs we test the following equation.

$$CA = C + \underbrace{\beta_1}_{(-)} CREDIT + \underbrace{\beta_2}_{(-)} GFCF + \underbrace{\beta_3}_{(+)} PB + \underbrace{\beta_4}_{(-)} ULC + \underbrace{\beta_5}_{(+)} U + \varepsilon_t \qquad (2)$$

CA is the current account ratio to the GDP, on a per unit basis, extracted from the Bank of Spain and the Spanish Ministry of Economy and Competitiveness data. *C* is the intercept and β_i are the coefficients with their expected signs.

CREDIT is the stock of private credit ratio to the GDP, in logarithms, obtained from the Bank of Spain data of credit to the non-financial private sector. *GFCF* is the private gross fixed capital formation ratio to the GDP, on a per unit basis, got from Eurostat. *PB* is the public balance ratio to the GDP, on a per unit basis, extracted from BDREMS (see Boscá *et al.*, 2007) and Eurostat. *ULC* is a unit labour cost index from Eurostat, introduced on a per unit basis. *U* is the Labour Force Survey unemployment rate, on a per unit basis, from the Spanish National Statistics Institute.

Table 1

ECM Long-run Relationship

Dependent Variable: CA
Method: Least Squares
Sample (adjusted): 1980Q1 2011Q4
Included observations: 128 after adjustments

Variable	Coefficient	Std. Error	*t*-Statistic	Prob.
C	0.136582	0.035903	3.804201	0.0002
CREDIT_CORR	–0.022024	0.007394	–2.978715	0.0035
GFCF	–0.664839	0.142689	–4.659357	0.0000
PB	0.270724	0.083337	3.248560	0.0015
U	0.167205	0.076717	2.179488	0.0312
ULC	–0.021907	0.007968	–2.749404	0.0069
R^2	0.883165	Mean dependent var		–0.027361
Adjusted R^2	0.878377	S.D. dependent var		0.030979
S.E. of regression	0.010804	Akaike info criterion		–6.17212
Sum squared resid	0.014240	Schwarz criterion		–6.038432
Log likelihood	401.0157	Hannan–Quinn criter.		–6.117802
F-statistic	184.4420	Durbin–Watson stat		0.34691
Prob(*F*-statistic)	0.000000			

The data are introduced with a quarterly frequency during the period considered from 1980, 1st quarter, to 2011, 4th quarter. All the variables are adjusted for seasonal variations and calendar effects with Tramo-Seats (Gómez and Maravall, 1996; and Bógalo, 2004). After running the pertinent tests (Dickey and Fuller, 1979 and 1981), the variables are found to be $I(1)$. Furthermore, once we estimate the long-run equation, the residuals, ε, are found to be $I(0)$.

Finally, it is important to recall that other variables usually considered in the literature, such as the dependency ratio or the relative income per capita, were not included in the model because of the lack of reliable quarterly data for them and the concerns that would raise a time disaggregation. The REER was as well included in the initial phases of the estimation, although it did not bear satisfactory fruits.

The following table contains the final estimation output. All the explanatory variables have the expected signs and are statistically significant, including the intercept.

The elasticity of the current account with respect to credit is relatively low. Given that credit is introduced as a stock, this is a reasonable result. Changes in the stock of credit would impact the current account only when they are large, *i.e.*, only when flows are elevated.

The influence of the unit labour cost is as well relatively short, although significant. As this is again an index, it is logical to believe that its changes do not have a big effect on the *CA*. Furthermore, competitiveness indicators tend to move slowly and do not induce dramatic changes in the external accounts, even if they do have persistent effects.

On the contrary, the unemployment rate coefficient is much higher and positive. The labour market conditions determine directly the purchasing power of households, so a bad cyclical context will improve the current account because of lower demand. Furthermore, the unemployment rate can be used as a proxy for uncertainty too (Bógalo, 2012), so it exerts an additional influence on domestic absorption.

The coefficient for the private investment rate to the GDP is negative and sizeable. As we said before, the fulfilment of the Feldstein-Horioka puzzle would have required a value of zero. A coefficient of one would mean that the increases in private investment are totally funded by external credit. The value obtained in this long term relationship implies that Spain has been closer to the latter scenario than to the former. An increase in private investment would be funded in two thirds by the external credit and in only one third by domestic savings.

Finally, focusing on the coefficient in which we are mostly interested, the impact of the public balance on the current account is also considerable. Each percentage point of improvement in the government's net lending or borrowing will help to ameliorate the external imbalance in 0.27 percentage points. This coefficient is in line with the results obtained in other exercises applied to panel data for a wide group of countries (Lee *et al.*, 2008; and Salto and Turrini, 2010), so Spain would not be very different in this aspect.

The interpretation of these variables' role is richer when we take into account the error correction model, whose goal is the explanation of the mechanisms by which the *CA* in the short-run goes back to its long term value determined by its fundamentals. In the short term model, the dependent variable is the change in the current account and the explanatory variables are the lagged changes in the current account, the lagged changes in the long-run determinants and the lagged residuals from the long-run equation (RESIDOLS).

As we are dealing with quarterly data, the strategy adopted in this model consisted in including the first four lags in the explanatory variables and then picking those from them which came out to be statistically significant. The estimation output is shown below, with the coefficient for the lagged residuals presenting the expected negative sign.

The second and third lags of the change in the *CA* have virtually offsetting signs, although the positive value of the third lag coefficient is faintly bigger. That would imply that the *CA* has a slight inertial trend.

In the same vein, the second and four lags of the change in the ULCs have very similar values with opposite sign. But, as the third lag is marginally bigger, the negative figure has more influence, indicating than when the ULCs accelerate, the *CA* worsening also accelerates.

As far as credit is concerned, its third lag has an expected negative sign. When the stock of credit accelerates, *i.e.*, the flow of credit increases, the current account tends to worsen.

The sign for private investment changes in the short term relationship, as the third and fourth lags exhibit positive signs. The intuition behind a negative coefficient in the long-run relationship (which describes levels) and positive coefficients in the short-run equation (which describes changes) is that investment does tend to deteriorate the current account although with decreasing returns. This would have the effect of cushioning the elevated coefficient we obtained in the long-run, in the sense that the increase in investment would not lead to an explosive augmentation of the external deficit.

Similarly, the sign for the public balance is different in the short term equation, and the explanation is analogous. The long-run equation points out that when the public accounts worsen, so does the *CA*, but again with decreasing returns.

Table 2

ECM Short-run Dynamics

Dependent Variable: DCA
Method: Least Squares
Sample (adjusted): 1981Q2 2011Q4
Included observations: 123 after adjustments

Variable	Coefficient	Std. Error	*t*-Statistic	Prob.
DCA(–2)	–0.170578	0.080297	–2.124335	0.035800
DCA(–3)	0.184841	0.079114	2.336389	0.021200
DCREDIT	–0.070952	0.029391	–2.414089	0.017400
DGFCF(–3)	0.244129	0.097315	2.508654	0.013500
DGFCF(–4)	0.312974	0.093336	3.353201	0.001100
DPB(–2)	–0.213319	0.069163	–3.084292	0.002600
DU(–1)	0.573001	0.102839	5.571822	0.000000
DULC(–2)	–0.210991	0.094647	–2.229227	0.027800
DULC(–4)	0.199309	0.096426	2.066952	0.041000
RESIDOLS(–1)	–0.108253	0.045875	–2.359749	0.020000
R^2	0.489127	Mean dependent var		–0.000106
Adjusted R^2	0.448438	S.D. dependent var		0.006559
S.E. of regression	0.004871	Akaike info criterion		–7.733082
Sum squared resid	0.002682	Schwarz criterion		–7.504449
Log likelihood	485.5845	Hannan–Quinn criter.		–7.640212
Durbin-Watson stat	1.864632			

The last two ideas have important implications in a period of rebalancing like the one Spain is experiencing now. The reduction in private investment and the fiscal consolidation undoubtedly help to the external rebalancing. Nonetheless, there are decreasing returns, *i.e.*, these two trends are effective up to a certain limit.

In short, in order to consolidate the external account improvement, some additional shocks or measures would be needed. Structural reforms that help to regain and boost price and non-price competitiveness would be essential in this regard.

After examining how the fiscal stance relates to a benchmark indicator of imbalances like the current account, we are going to change the direction of causality and widen the scope. The next section will assess how other imbalances may interact with the public balance.

4 The impact of other imbalances on the public accounts

In the previous section we have studied the interactions between the current account and the public balance in Spain. In this section we estimate a vector autoregressive (VAR) model to look further to the interactions between fiscal policy and macroeconomic imbalances. As it has been previously argued, the current account summarizes some of the main issues concerning the external

imbalances of the Spanish economy. Nevertheless, it is also linked to other domestic macroeconomic imbalances, including some of the determinants of the current account, such as credit to the private sector and the rate of unemployment.

The VAR methodology has been widely applied to study the macroeconomic effects of fiscal policy. Blanchard and Perotti (2002) estimate a VAR for the US economy with three variables: public expenditure, net taxes and GDP and identify the model based on institutional information about tax and expenditure programs. De Castro (2005) applies this approach to study the macroeconomic effect of fiscal policy and the size of fiscal multipliers in Spain.

However, our aim here is different. We do not want to study the dynamic effects of fiscal policy changes (Fatás and Mihov, 2000). We will focus on the interactions between fiscal policy and domestic macroeconomic imbalances. Therefore, the variables included in the VAR model are the public balance, the private sector credit flow, the private sector gross fixed capital formation and the rate of unemployment.

These variables are considered to be quite representative of the domestic imbalances of the Spanish economy. As Figure 4 shows, private investment increased from a level of 18 per cent of GDP in 1995 to 27 per cent at its peak in 2007 and, at the same time, credit rose almost exponentially. These developments were mainly linked to a boom in construction and were a clear reflection of the build up of imbalances during the growth phase. As it has been explained, the fiscal position improvement was partially due to the windfall revenues from the boom in the construction sector. Therefore, it seems plausible to think that the internal imbalances played a key role in the fiscal developments during the growth phase.

As for unemployment, it was not a major source of concern during the boom. The unemployment rate fell from 22 per cent in 1994 to a historically low of 8 per cent in 2007. However, as the crisis emerged, unemployment started to rise to high levels. As a result, unemployment is currently one of the main imbalances in the Spanish economy and it has a direct influence on the situation of the public accounts, through the payment of unemployment benefits and through lower revenues from social security contributions.

From all this it follows that internal macroeconomic imbalances have direct consequences for the public accounts. On the other hand, the fiscal stance has also an impact on domestic macroeconomic imbalances. From a classical point of view, a surplus in the public balance could crowd-in credit to the private sector, encouraging private investment. Alternatively, from a Keynesian point of view, public expenditure could contribute to reduce unemployment. Therefore, we could expect the VAR model to show that private investment and credit to the private sector tend to increase when the public balance improves, while unemployment tends to fall when public balance deteriorates.

Before describing the VAR model, it should be also noted that all these variables, except for the private sector gross capital formation, are included in the European Union's Macroeconomic Imbalances Procedure Scoreboard. The public sector net lending/borrowing is alluded indirectly through the inclusion of public debt in the MIP.

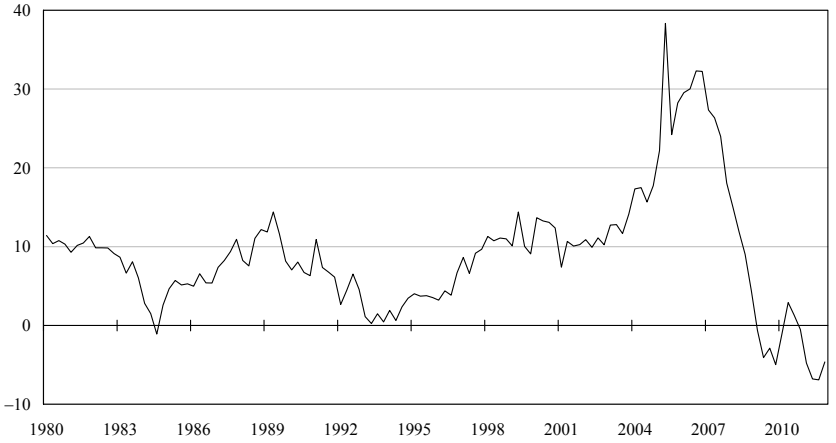
Some other variables included in the MIP as indicators of internal imbalances, such as the private sector debt and the growth of total financial liabilities, could have also been informative. However, they have not been included in the model due to the lack of long series of reliable quarterly data.

The variables included in the VAR model are defined as in the previous section, except for credit. In this section, we use the flow of credit to the private sector (CREDIT_FLOW) as a percentage of GDP, since in this case, all variables have not to be necessarily $I(1)$.

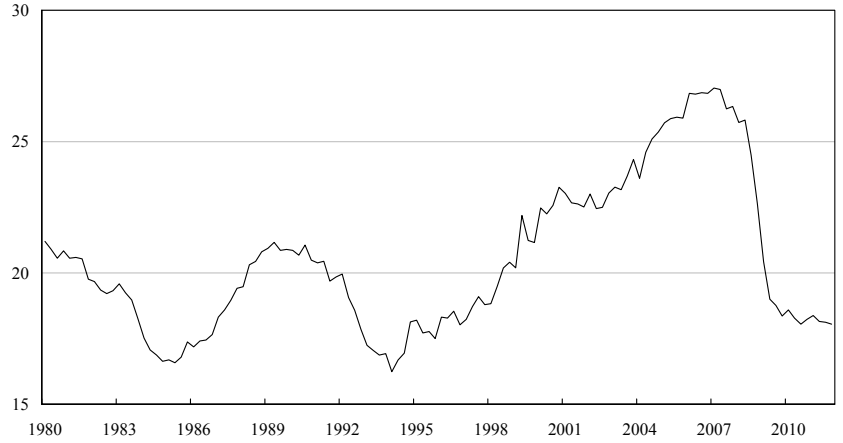
Figure 4

Evolution of Public Balance, Private Investment, Private Stock of Credit and Unemployment

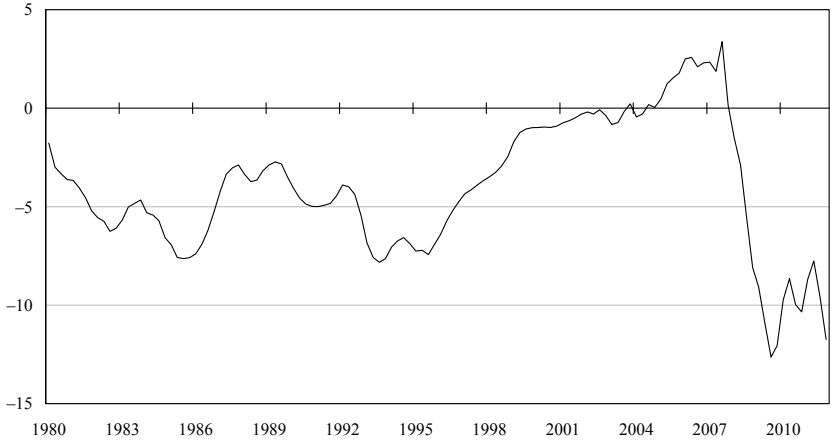
Credit Flow to the Private Sector
(percent of GDP)



Private Investment
(percent of GDP)



Public Balance
(percent of GDP)



Unemployment Rate
(percent)

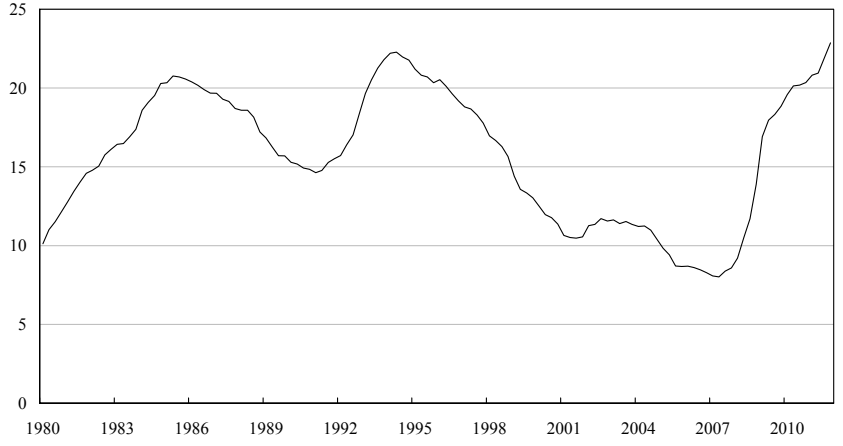


Table 3

Johansen Test

Sample: 1980Q1 2011Q4
Included observations: 123
Series: CREDIT_FLOW PB GFCF U
Lags interval: 1 to 4

Selected (0.05 level*) Number of Cointegrating Relations by Model

Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept No Trend	Intercept No Trend	Intercept No Trend	Intercept Trend	Intercept Trend
Trace	0	0	0	0	0
Max-Eig	0	0	0	0	0

*Critical values based on MacKinnon-Haug-Michelis (1999).

In order to estimate the VAR model, firstly, we tested for cointegration relationships between the variables. We perform the Johansen test for variables in levels and for different lag structures. The results show that the hypothesis of cointegration can be rejected according to both the trace test and the eigenvalues test. Since there is not cointegration between the variables and PB, U and GFCF are *I*(1) we have estimated the VAR model with all the variables in first differences.

Therefore, we estimate the following model:

$$dX_t = C + \sum_{j=1}^{k} \mathrm{B}_j dX_{t-j} + \mathrm{E}_t \tag{3}$$

where $dX_t = [dPB_t, dCREDIT\_FLOW_t, dGFCF_t, dU_t]$ is the vector of the endogenous variables in differences, C is is a vector of constants, B_j is the matrix of coefficients for the lag j and E_t is the vector of residuals. The model is estimated by ordinary least squares. The order of the VAR is set at four according to the likelihood ratio tests, the final prediction error and the Akaike information criterion. The Lagrange Multipliers (LM) test shows that it is possible to reject the null hypothesis of correlation in the residuals up to the lag five.

We assume two identification schemes based on different assumptions and assess the sensitivity of the results to these two schemes.

Our first specification is based on the assumption that credit is the most exogenous variable and it is not affected by the contemporaneous shocks of other domestic variables. As some analysis point out (European Commission, 2012) the international conditions, such as the global liquidity glut and the low international interest rates pushed capital flows towards Spain. These global factors would have been behind the large accumulation of credit and debt by the private sector.

Then, we assume that credit holds sway over private investment. The lax financial conditions and the low real interest rates boosted private investment, mainly in the construction sector, as has been already mentioned. Given that this sector is labour-intensive, we consider that unemployment responded to the increase in private investment.

Finally, as stated above, the public balance is defined as the most endogenous variable in the model. In this way, we capture the idea that good financial and employment conditions could be improving the public balance.

Figure 5 shows the accumulated impulse response functions with this set of assumptions. The public balance is very sensitive to the labour market conditions, so that an increase in unemployment leads to a persistent deterioration in public finances. The effect of credit is very remarkable, especially if we bear in mind that we are dealing with credit flows. Positive changes in credit flows lead again to a substantial improvement of the public balances. The effect of private investment growth on the public accounts, although positive, is much more modest than expected.

Figure 6 tries to depict the role of fiscal policy, finding evidence of non-Keynesian effects. The improvement in public accounts tends to foster real investment and employment creation in the short and the medium term. This could be due to the more traditional thesis of the crowding-out or to more modern considerations related to expectations. As for the former effect, fiscal consolidation would in this case crowd-in private investment, paving the way for unemployment reduction. Regarding the latter effect, the soundness of public accounts generates good expectations among private agents.

The evidence of these two channels of non-Keynesian effects is confirmed by the behaviour of credit. Be it because of the crowding-in effect, because of expectations or because of both, private credit responds positively and persistently to a fiscal contraction. This facilitates a permanent improvement in public finances, as the positive effects on unemployment, investment and credit add to the initial consolidation effort.

From all this, there are some lessons and some caveats. The first idea would be that the orientation of fiscal policy in the boom periods has been adequate in essence. Given that budgetary consolidation tends to generate credit and private investment imbalances (driven by good expectations), one should not draw the conclusion that the best contribution of public policy to tame private imbalances ought to be registering an actual deficit.

On the contrary, this exercise should serve to guide the implementation of fiscal policy according to a precautionary basis. When private expectations are good, a credit-fuelled boom in investment and employment can take place. As a consequence, the running of fiscal policy should be more prudent, because revenues would rise and expenditure would fall automatically owing to the play of automatic stabilizers. Furthermore, credit booms have a particular positive impact on public accounts and could lead to an overestimation of structural balances (De Castro *et al.*, 2008; and Borio *et al.*, 2013).

In order to widen the scope of the analysis and also as a robustness check, we try an alternative specification, which considers the public balance as the most exogenous variable. This would suggest that it is an aggregate under an almost perfect control by the authorities, which could be accurate according to the behaviour of public expenditure, but not so much given the factors behind revenue collection (Fatás and Mihov, 2000; Blanchard and Perotti, 2002; Perotti, 2002; and De Castro, 2005).

Then, we assume that private credit is the variable which responds next, as financial aggregates are likely to move quicker. Afterwards, private investment responds to credit conditions. Finally, unemployment is the most endogenous, responding again to the demand environment.

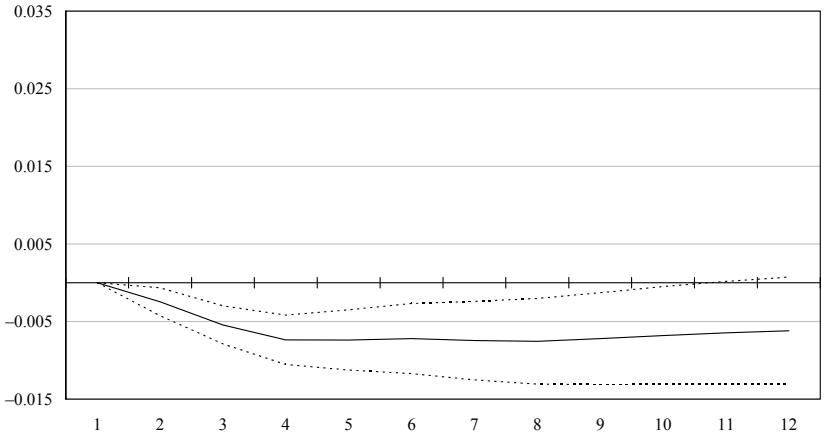
With this set of assumptions, the first aspect worth analysing is the macroeconomic effect of fiscal policy, depicted in Figure 7. We obtain again non-Keynesian effects similar to those of the previous specification (Figure 6) or even more powerful, especially in the case of credit flows. The

Figure 5

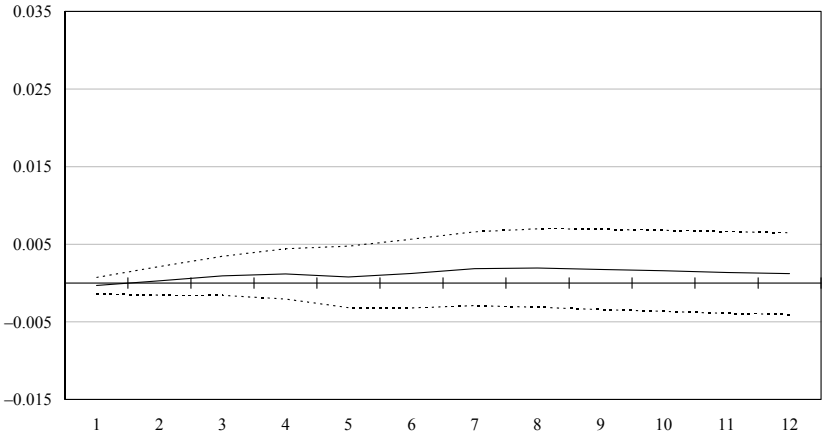
Response of the PB to Different Shocks in the Model Specification Where It Is the Most Endogenous

(12 quarters, accumulated response to Cholesky One S.D. Innovations ± 2 S.E.)

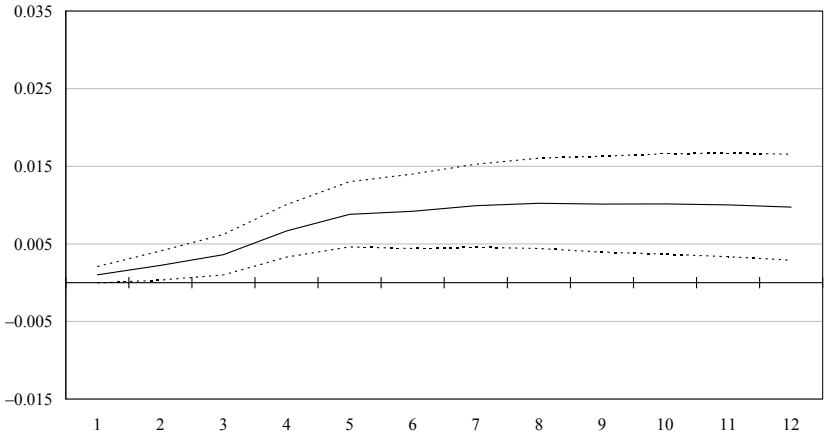
Accumulated Response of DPB to DU



Accumulated Response of DPB to DGFCF



Accumulated Response of DPB to DCREDIT_FLOW



Accumulated Response of DPB to DPB

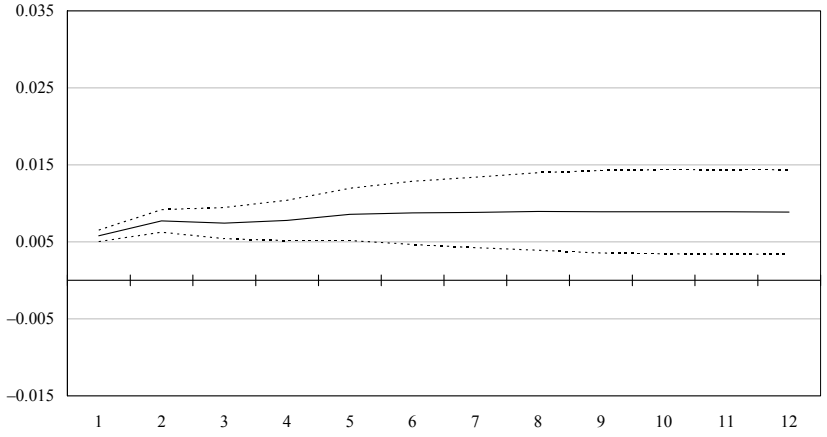
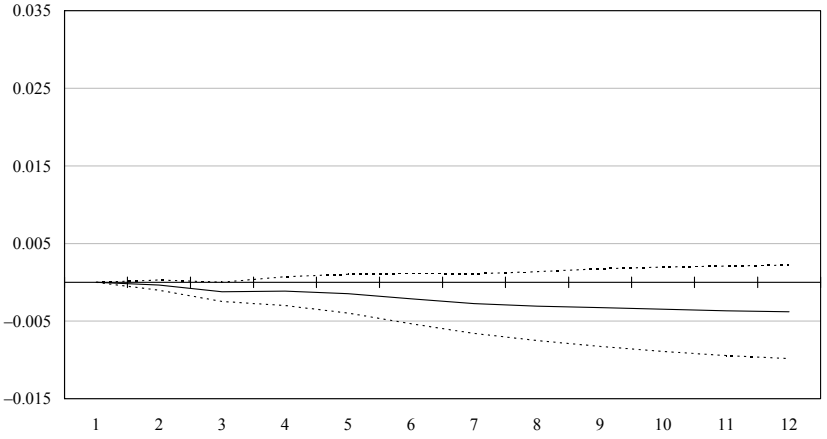


Figure 6

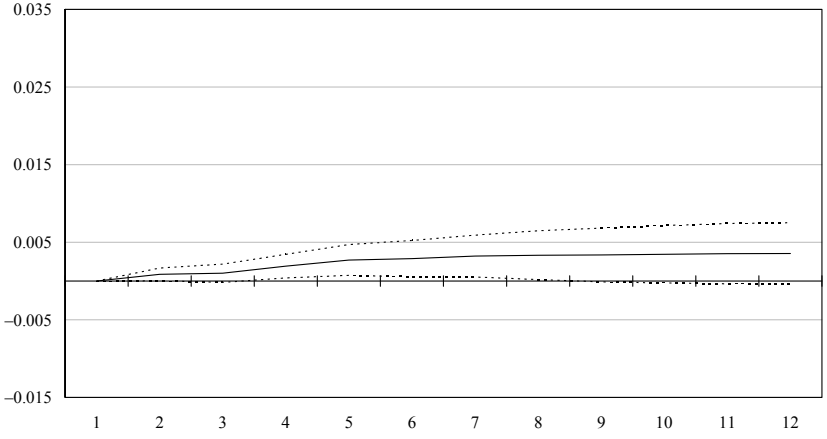
Response of the Different Variables to a PB Shock in the Model Specification Where It Is the Most Endogenous

(12 quarters, accumulated response to Cholesky One S.D. Innovations ± 2 S.E.)

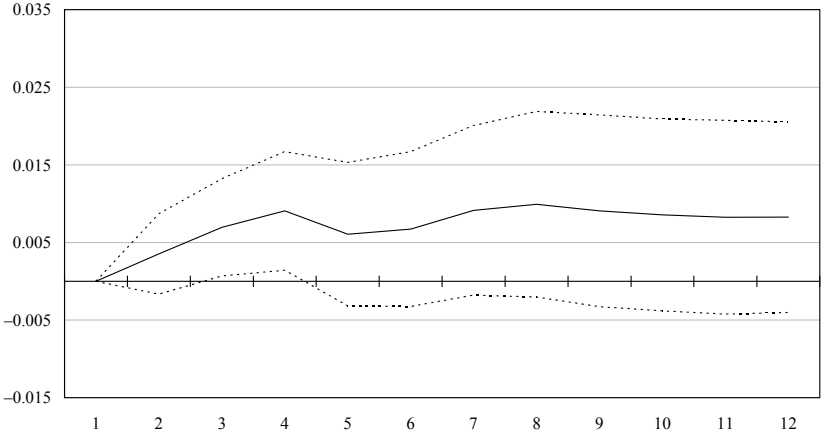
Accumulated Response of DU to DPB



Accumulated Response of DGFCF to DPB



Accumulated Response of DCREDIT_FLOW to DPB



Accumulated Response of DPB to DPB

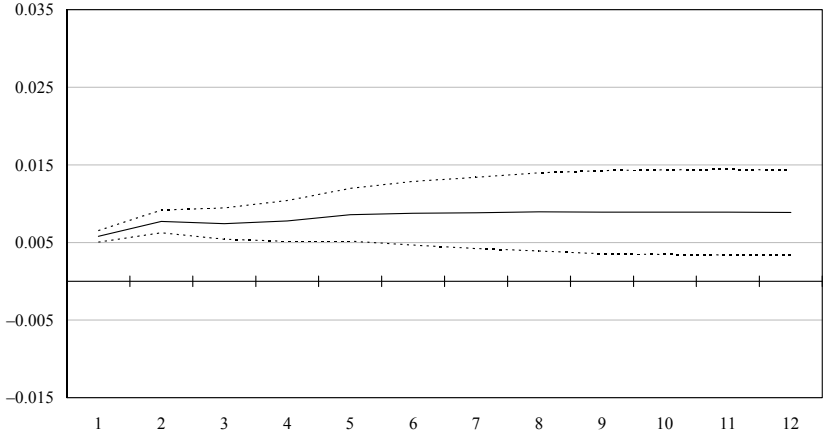
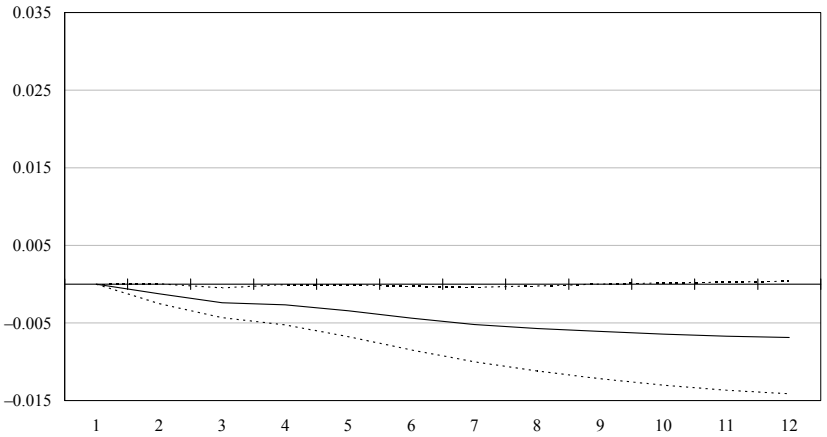


Figure 7

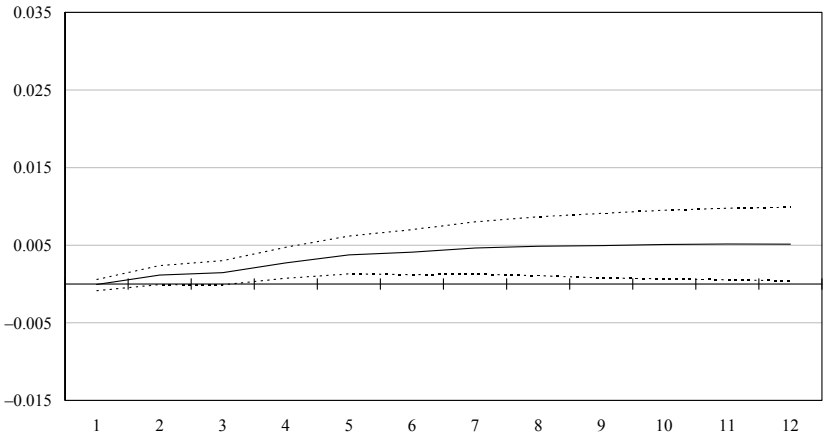
Response of the Different Variables to a PB Shock in the Model Specification Where It Is the Most Exogenous

(12 quarters, accumulated response to Cholesky One S.D. Innovations ± 2 S.E.)

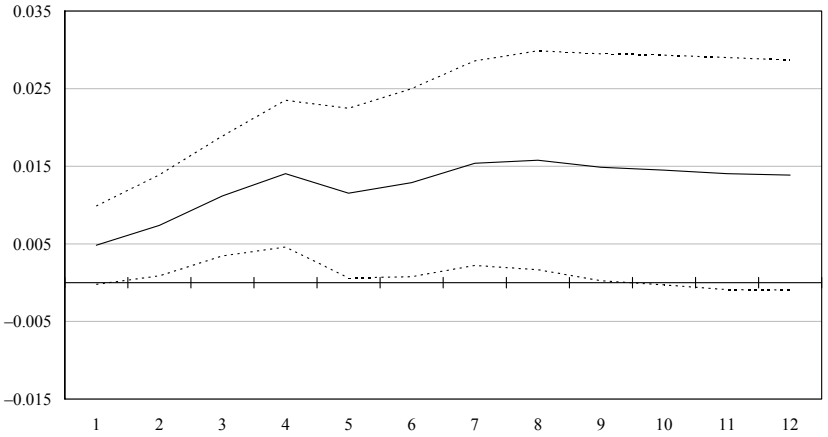
Accumulated Response of DU to DPB



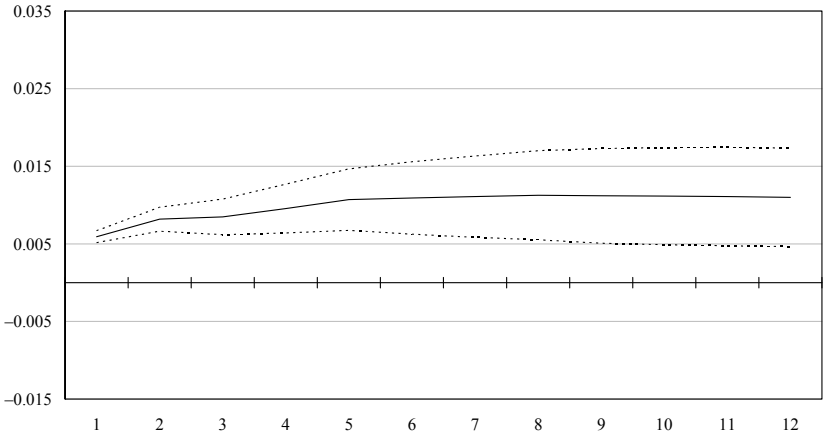
Accumulated Response of DGFCF to DPB



Accumulated Response of DCREDIT_FLOW to DPB



Accumulated Response of DPB to DPB



improvement in public accounts tends to foster credit, investment and employment thanks to better expectations and/or crowding-in effects.

Figure 8 shows the impact of internal imbalances on the public accounts. Obviously, the increase in credit flows and investment and the reduction in unemployment contribute to enhance public finances. The estimated effects are similar to the previous specification (Figure 5), with a slightly milder response of public balance to unemployment.

The consistency of the results obtained from the two especifications is a solid robustness check. Furthermore, it helps to draw coherent conclusions from the interaction between fiscal and other macroeconomic imbalances.

The immediate implication is that internal imbalances, represented by positive dynamics of credit that lead to investment and employment-rich growth impact positively on the fiscal balance. At the same time, the good health of the public accounts may exacerbate the good expectations that foster credit flows, private investment and unemployment reduction.

As we have said before, one should not take the flawed lesson that fiscal deficits would be the solution to domestic imbalances. On the contrary, the management of public accounts has to be even more prudent, given the positive impact that those imbalances have on budgetary positions.

Therefore, the underlying lesson may be that a cautious macroeconomic management may not be enough to address other macroeconomic imbalances. Consequentially, it would be the time to tweak the microeconomic framework of fiscal policy. On the one hand, a growth-friendly tax system is needed to attain a more competitive and sustainable pattern of development, imposing a lower tax burden on employment creation and removing harmful incentives, such as those which encourage households and firms to take on excessive debt. On the other, the public expenditure should target drivers of growth and competitiveness, such as R&D and human capital.

After having seen how fiscal policy interacts with external and internal imbalances, it is time to assess the most essential contribution of fiscal policy to macroeconomic stability, which is its sustainability.

5 An empirical assessment of public finance sustainability

We have analyzed the impact of fiscal policy, measured by the public balance, on external and internal macroeconomic imbalances. As mentioned above, the European Union's Macroeconomic Imbalances Procedure Scoreboard refers indirectly to the public balance, by including sovereign debt as an indicator of internal macroeconomic imbalances, since a large and persistent a deficit also constitutes a macroeconomic imbalance itself. In a situation of sluggish economic growth and increasing interest rates, a persistent deficit could give rise to sustainability concerns of the public debt.

The standard framework to assess public debt sustainability defines different projections for interest rates, GDP growth and primary balance and verifies if the ratio of debt to GDP stabilizes under these projections. For instance, the European Central Bank (2012) has recently applied this approach to Spain and had concluded that there are not sustainability risks.

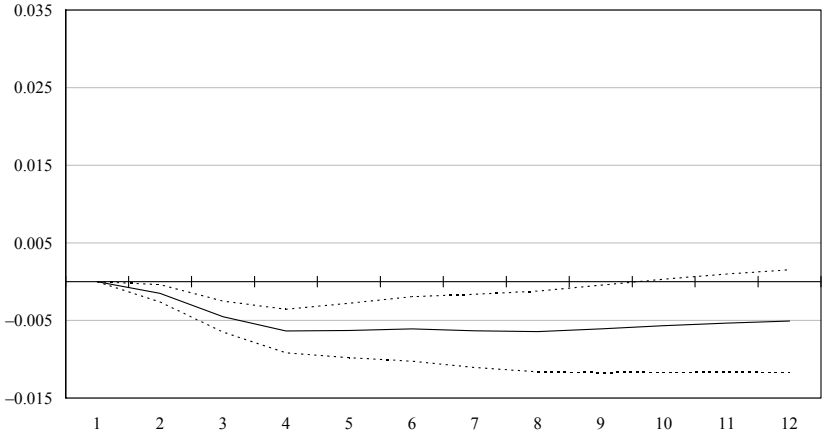
In this section we address the issue of sustainability from an econometric point of view. The econometric approach tries to identify the conditions that guarantee that the government intertemporal constraint is fulfilled and test empirically if these conditions are met. Trehan and Walsh (1991) derive sufficient and necessary conditions for the government intertemporal constraint to be satisfied. They show that cointegration of the primary balance and the real stock of debt and stationarity of the primary balance are sufficient and necessary conditions for sustainability.

Figure 8

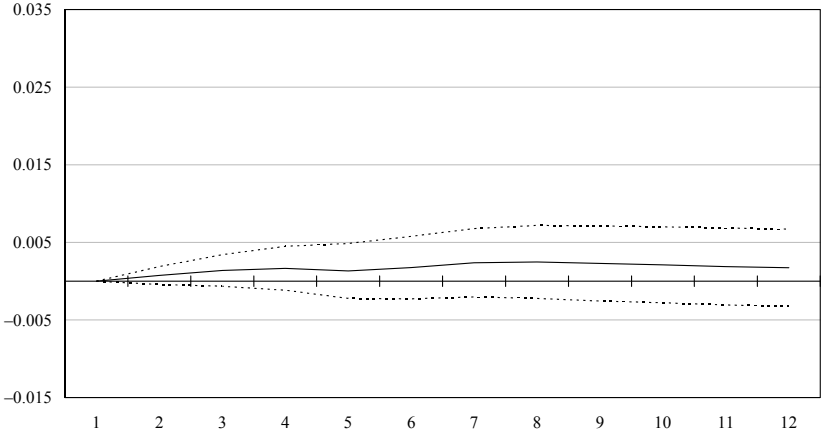
Response of the PB to Different Shocks in the Model Specification Where It Is the Most Exogenous

(12 quarters, accumulated response to Cholesky One S.D. Innovations ± 2 S.E.)

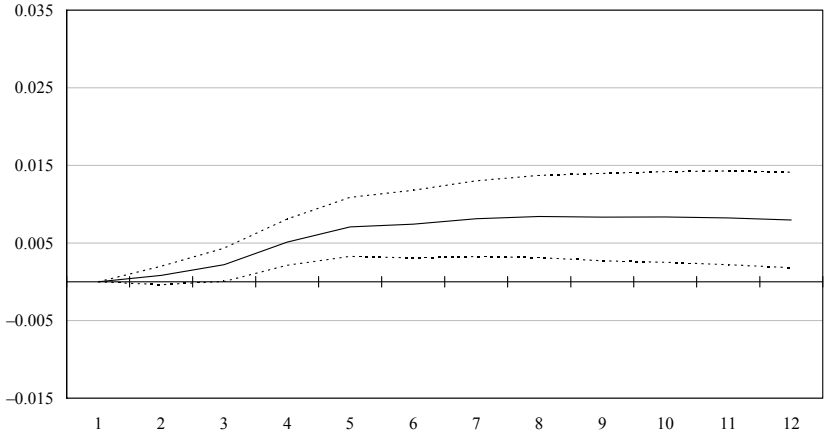
Accumulated Response of DPB to DU



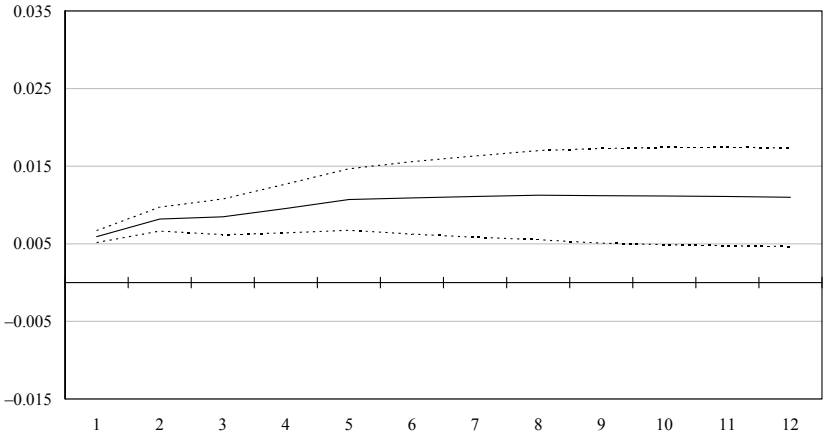
Accumulated Response of DPB to DGFCF



Accumulated Response of DPB to DCREDIT_FLOW



Accumulated Response of DPB to DPB



Hakkio and Rush (1991) focus on cointegration between public revenues and total public expenditures. If public revenues and expenditures are not stationary, cointegration will be a necessary condition for the government to fulfill its intertemporal budget constraint. Therefore, in the following equation:

$$R_t = c + bGG_t + \varepsilon_t \tag{4}$$

where R_t stands for public revenues and GG_t for total public expenditure (including current spending and interest payments), they test the null hypothesis that $b = 1$ and ε_t is stationary. They explain that $b = 1$ is not a strict necessary condition for sustainability, because the government intertemporal budget constraint could also be satisfied with $0 < b < 1$. However, the fact that $0 < b < 1$ may be inconsistent with the requirement that the ratio of debt to GDP must be finite.

Quintos (1995) extends the Hakkio and Rush analysis to introduce the concepts of strong and weak sustainability. If R_t and GG_t are *I*(1) series, she proposes to test the null hypothesis that $b = 0$ against the alternative that $b > 0$. If the null is accepted, public debt will be unsustainable. If the null is rejected, she states that the null hypothesis that $b = 1$ should be tested against the alternative that $0 < b < 1$. If this null hypothesis is rejected, the public debt would be weakly sustainable. If the null is accepted and R_t and GG_t are cointegrated, (that is to say, if ε_t is *I*(0)), public debt will be strongly sustainable. Were R_t and GG_t not to be cointegrated, public debt would be weakly sustainable, even if $b = 1$.

De Castro *et al.* (2005) follow Quinto's methodology to study public finance sustainability in Spain from 1964 to 1998. They find that public deficit was sustainable for this period in a weaker form since $0 < b < 1$. Bajo *et al.* (2010) asses Spain public debt sustainability from 1850 to 2000 and conclude that fiscal policy would have been strongly sustainable over this time span.

Our analysis focuses on the recent developments of public finance in Spain from 1980 to 2011. While Quintos (1995) uses real variables in levels, De Castro *et al.* (2001) point out that any sustainability analysis should be performed using variables as a percentage of GDP, in order to take into account the size of the economy and, therefore, the burden that public debt imposes on the whole economy. Therefore, we perform our tests, with variables defined as a percentage of GDP. We take quarterly data of government net borrowing/lending, total public revenues and total public expenditure from BDREMS (see Boscá *et al.*, 2007). Data for GDP were obtained from Eurostat National Accounts and price deflators have been taken from the Spanish Statistics Institute (INE).

In order to assess public debt sustainability, we first apply the Augmented Dickey and Fuller test to real revenues and to real total expenditure as a percentage of real GDP (defined as current expenditure plus interest payments) and find that they are *I*(1). Since they are *I*(1) we can estimate equation (4) and test for public debt sustainability. The results, that are summarized in Table 4, show that the estimated coefficient $\hat{b} = 0.588$ is statistically different from 0 and 1. From this result, according to Quintos' methodology, it follows that public debt would have been weakly sustainable between 1980 and 2011. Moreover, the null hypothesis of presence of a unit root in the residuals is accepted. Therefore the residuals are not *I*(0) and public revenues and expenditures are not cointegrated.

Quintos (1995) proposes to complement the public debt assessment testing for structural breaks in the long-run relationship. De Castro *et al.* (2001) and Bajo *et al.* (2010) test for structural breaks and find that there is no support for the null hypothesis of the existence of structural breaks in the long-term relationship. Here, we are interested in testing if the result of weak public debt

Table 4

Public Debt Sustainability, 1980-2011

Dependent Variable: Real Revenues *(percent of real GDP)*

Method: Least Squares

Sample: 1980Q1 2011Q4

Included observations: 68

Variable	Coefficient	Std. Error	*t*-Statistic	Prob.
Real Total Expenditure *(percent of GDP)*	0.588740	0.069458	8.476203	0.000000
C	0.123514	0.027482	4.494363	0.000000

Wald test

Null Hypothesis *b*=1

Test Statistic	Value	df	Probability	
t-statistic	–5.9209800	66.000000	0.000000	
F-statistic	35.058000	(1, 66)	0.000000	
Chi-square	35.058000	1.000000	0.000000	

Augmented Dickey-Fuller Test

Null Hypothesis: Real GDP Residual has a unit root

Exogenous: None

Lag Length: 1 (Automatic – based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		–1.547324	0.506500
Test critical values:	1% level	–3.482879	
	5% level	–2.884477	
	10% level	–2.579080	

* MacKinnon (1996) one-sided *p*-values.

sustainability depends on the economic crisis impact on public accounts at the end of the sample. We follow a much simpler approach and introduce a slope dummy variable that is 1 from 2007 to 2011 and zero in the rest of the sample:

$$R_t = c + b_1 GG_t + b_2 \cdot D \cdot GG_t + \varepsilon_t \tag{5}$$

where D is the dummy variable. The results, that are shown in Table 5, imply that the result of weak public debt sustainability does not depend on the effect of the crisis at the end of the sample. The estimated coefficient is $\hat{b}_1 = 0.76$, higher than in the previous case, but still significantly different from 1. Again, according to Quintos' test, public debt would have been weakly sustainable between 1980 and 2007.

Table 5

Public Debt Sustainability, 1980-2011
(with a dummy)

Dependent Variable: Real Revenues *(percent of GDP)*
Method: Least Squares
Sample: 1980Q1 2011Q4
Included observations: 68

Variable	Coefficient	Std. Error	*t*-Statistic	Prob.
Real Total Expenditure *(percent of GDP)*	0.767992	0.075651	10.15178	0.000000
D*Real Total Expenditure *(percent of GDP)*	–0.086156	0.018931	–4.551079	0.000000
C	0.057979	0.000000	1.976579	0.050300

Wald test
Null Hypothesis *b*1=1

Test Statistic	Value	df	Probability
t-statistic	–3.066820	66	0.0027
F-statistic	9.405382	(1, 66)	0.0027
Chi-square	9.405382	1	0.0022

The result of weak public debt sustainability from 1980 to 2011 shows that even if the government intertemporal budget constraint is fulfilled, the situation of the public accounts could constitute a domestic imbalance itself. The weak sustainability implies that the government could have increasing difficulty in marketing its debt and it could have to pay higher interest rates. It also shows that, despite the increase in public revenues and the improvement of the public balance during the boom years, fiscal policy did not become strongly sustainable.

6 Concluding remarks

We have analysed the interaction between fiscal policy and other macroeconomic imbalances in Spain during a relatively long time span. This has allowed us to examine periods with different underlying economic conditions and to draw meaningful conclusions and economic policy lessons.

As obtained in the mainstream literature, public balance tends to co-move with the current account, so fiscal consolidation contributes positively to reshape external imbalances. At the same time, the ECM model showed that there are decreasing returns in this contribution.

An important lesson should be extracted from this and can actually be applied to the ongoing period of rebalancing that Spain is experiencing now. Fiscal consolidation undeniably helps to improve the external position, but up to a limit.

That is why some additional measures could be needed to ensure that the improvement of the current account is permanent. These would include structural reforms in goods, services and factors markets, in order to foster price and non-price competitiveness and to reallocate resources towards more productive and export-oriented sectors.

As far as fiscal policy is concerned, the measures should consider a tax system friendly to external competitiveness and smart public expenditure. Further research could be directed at studying the contribution of the above-mentioned measures to address external imbalances.

Fiscal policy also relates to macroeconomic imbalances beyond the current account. Periods of low unemployment driven by private investment and credit improve the public balance. In this juncture, revenues would rise and expenditure would fall automatically owing to the play of automatic stabilizers. Actually, credit booms have a particular positive impact on public accounts. Therefore, the management of fiscal accounts has to be prudent in order not to overestimate the structural positions.

Besides, a contractionary fiscal stance seems to be a necessary but not a sufficient condition to correct these private imbalances. Therefore, there are more issues to mull over, mainly within the microeconomic dimension of fiscal policy. The tax system should facilitate a competitive and sustainable pattern of development, reducing the tax burden on productive factors and removing harmful incentives that encourage an excessive build-up of debt. As for public expenditure, it should spot sources of growth and competitiveness, such as R&D and human capital.

Finally, we have concluded that Spanish fiscal position has been weakly sustainable. This shows that, even an apparently sound fiscal stance, such as the one previous to the crisis, is not enough to ensure strong sustainability.

REFERENCES

Andrews, A., A. Caldera Sánchez and Å. Johansson (2011), "Housing Markets and Structural Policies in OECD Countries", OECD, Economics Department, Working Paper, No. 836.

Bajo-Rubio, O., C. Díaz-Roldán and V. Esteve (2010), "On the Sustainability of Government Deficits: Some Long-term Evidence for Spain, 1850-2000", *Journal of Applied Economics*, Vol. XIII, pp. 263-81.

Banco de España (2011), *Informe anual*.

Blanchard, O. and R. Perotti (2002), "An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes on Output", *Quarterly Journal of Economics*, Vol. 117, No. 44, pp. 1329-68.

Bógalo, J. (2004), "TS: una interface de Matlab para Tramo-Seats", *Boletín Trimestral de Coyuntura del INE*, No. 92, pp. 131-46.

——————(2012), "A Quarterly Private Consumption Model", Documentos de Trabajo de la Dirección General de Análisis Macroeconómico y Economía Internacional, No. 2012/1.

Borio, C., P. Disyatat and M. Juselius (2013), "Rethinking Potential Output: Embedding Information About the Financial Cycle", Bank for International Settlements, Working Paper, No. 404.

Boscá, J., A. Bustos, A. Díaz, R. Doménech, J. Ferri, E. Pérez and L. Puch (2007), "The REMSDB Macroeconomic Database of The Spanish Economy", Documentos de Trabajo del Ministerio de Economía y Hacienda, No. WP-2007-04.

Boscá, J.E., R. Doménech, J. Ferri and J. Varela (2011), *The Spanish Economy. A General Equilibrium Perspective*, Palgrave Macmillan.

Briotti, G. (2004), "Fiscal Adjustments Between 1991 and 2002: Stylised Facts and Policy Implications", ECB, Occasional Paper, No. 9.

Brissimis, S.N., G. Hondroyiannis, C. Papazoglou, N.T. Tsaveas and M.A. Vasardani (2010), "Current Account Determinants and External Sustainability in Periods of Structural Change", ECB, Working Paper, No. 1243.

Bussière, M., M. Fratzscher and G. Müller (2005), "Productivity Shocks, Budget Deficits and the Current Account", ECB, Working Paper, No. 509.

Cardoso, M. and R. Doménech (2010), "On Ricardian Equivalence and Twin Divergence: The Spanish Experience in the 2009 Crisis", in "External Imbalances and Public Finances in the EU", European Commission, European Economy, Occasional Paper, No. 66.

De Castro, F. (2005), "Una evaluación macroeconométrica de la política fiscal", Banco de España, Estudio Económico, No. 76.

De Castro, F., Á. Estrada, P. Hernández de Cos and F. Martí (2008), "Una aproximación al componente transitorio del saldo público en España", *Boletín Económico*, Banco de España, June.

De Castro, F., J.M. González-Páramo and P. Hernández de Cos (2001), "Evaluating the Dynamics of Fiscal Policy in Spain: Patterns of Interdependence and Consistency of Public Expenditure and Revenues", Banco de España, Working Paper, No. 0103.

De Mooij, R. and M. Keen (2012), "Fiscal Devaluation and Fiscal Consolidation: The VAT in Troubled Times", IMF, Working Paper, No. 12/85.

Dickey, D.A. and W.A. Fuller (1979), "Distributions of the Estimators for Autoregressive Time Series with a Unit Root", *Journal of the American Statistical Association*, No. 74, pp. 427-31.

——————(1981), "The Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root", *Econometrica*, No. 49, pp. 1057-72.

Engle, R.F. amd C.W.J. Granger (1987), "Co-integration and Error Correction: Representation, Estimation, and Testing", *Econometrica*, No. 55, pp. 251-76.

European Central Bank (2012), *Monthly Bulletin*, April.

European Commission (2012), "Current Account Surpluses in the EU", *European Economy*, No. 9/2012.

Fatás, A. and I. Mihov (2000), "The Macroeconomic Effects of Fiscal Policy", mimeo, INSEAD.

Feldstein, M. and C. Horioka (1980), "Domestic Saving and International Capital Flows", *The Economic Journal*, No. 90, pp. 314-29.

Galí, J., J.D. López-Salido and J. Vallés (2004), "Understanding the Effects of Government Spending on Consumption", ECB, Working Paper, No. 339.

Gómez, V. and A. Maravall (1996), "Programs TRAMO (Time series Regression with Arima noise, Missing observations and Outliers) and SEATS (Signal Extraction in Arima Time Series), Instructions for the User", Banco de España, Documento de Trabajo, No. 9628.

Hakkio, C.S. and M. Rush (1991), "Is the Budget Deficit 'Too Large'?", *Economic Inquiry*, Vol. XXIX, pp. 429-45.

Hernández de Cos, P. and E. Ortega (2005), "El análisis de la política fiscal", in Servicio de Estudios del Banco de España (eds.), *El análisis de la economía española*, pp. 241-68, Alianza Editorial, Madrid.

Johansen, S. (1988), "Statistical Analysis of Cointegrating Vectors", *Journal of Economic Dynamics and Control*, No. 12, pp. 231-54.

——————(1991), "Estimation and Hypothesis Testing of Cointegrating Vectors in Gaussian Vector Autoregressive Models", *Econometrica*, No. 60, pp. 1551-80.

Johansen, S. and K. Juselius (1990), "Maximum Likelihood Estimation and Inference on Cointegration with Applications to the Demand for Money", *Oxford Bulletin of Economics and Statistics*, No. 52, pp. 169-210.

International Monetary Fund (2006), *Spain. Selected issues*, IMF, Country Report, No. 06/213.

——————(2009a), *Spain – Staff Report for the 2008 Article IV Consultation*, IMF, Country Report, No. 09/128.

——————(2009b), *Spain. Selected issues*, IMF, Country Report, No. 09/129.

——————(2011), *Spain. Selected issues*, IMF, Country Report, No. 11/216.

Kim, S. and N. Roubini (2008), "Twin Deficit or Twin Divergence? Fiscal Policy, Current Account, and Real Exchange Rate in the U.S.", *Journal of International Economics*, Vol. 74, No. 2, pp. 362-83.

Lane, P.R. (2002), "The Cyclical Behaviour of Fiscal Policy: Evidence from the OECD", *Journal of Public Economics*, Vol. 87, No. 12, pp. 2661-75.

Lee, J., G.M. Milesi-Ferretti and L.A. Ricci (2008), "Real Exchange Rates and Fundamentals: A Cross-Country Perspective", IMF, Working Paper, No. 08/13.

MacKinnon, J.G., A. Haug and L. Michelis (1999), "Numerical Distribution Functions of Likelihood Ratio Tests for Cointegration", *Journal of Applied Econometrics*, Vol. 14, No. 5, pp. 563-77.

Perotti, R. (2002), "Estimating the Effects of Fiscal Policy in OECD Countries", European Central Bank, Working Paper, No. 168.

Quintos, C.E. (1995), "Sustainability of the Deficit Process with Structural Shifts", *Journal of Business and Economic Statistics*, No. 13, pp. 409-17.

Salto, M. and A. Turrini (2010), "Comparing Alternative Methodologies for Real Exchange Rate Assessment", European Commission, European Economy, Economic Paper, No. 427.

Trehan, B. and C.E. Walsh (1988), "Common Trends, the Government's Budget Constraint, and Revenue Smoothing", *Journal of Economic Dynamics and Control*, No. 12, pp. 425-44.

————(1991), "Testing Intertemporal Budget Constraints: Theory and Applications to U.S. Federal Budget and Current Account Deficits", *Journal of Money, Credit, and Banking*, No. 23, pp. 206-23.

Von Hagen, J., A. Hugues Hallet and H. Strauch (2001), "Budgetary Consolidation in EMU", European Commission, European Economy, Economic Paper, No. 148.

MACROECONOMIC IMBALANCES AND FISCAL POLICY IN NEW ZEALAND

Anne-Marie Brook[*]

Over the past decade or so, New Zealand has experienced persistent macroeconomic imbalances, and relatively disappointing economic growth outcomes. Key features of the macroeconomy include: a very negative net international investment position, underpinned by persistently large current account deficits; a significant build-up in household debt, linked to strong house price increases; a persistently overvalued exchange rate; and a failure of our relatively low productivity to converge toward the productivity levels of wealthier economies. At first glance, these outcomes seem puzzling given New Zealand's generally sound fiscal framework and attractive business environment. This paper discusses the role that fiscal policy may have played in contributing to these imbalances. Unlike in many other OECD countries, fiscal policy sustainability issues are not considered to be an important contributing factor. Likewise, while pro-cyclical fiscal policy is likely to have played a role in widening imbalances in the mid-2000s, it is likely to be able to explain the persistence New Zealand's imbalances. By contrast, the more microeconomic aspects of fiscal policy (the structure role of fiscal policy) – such as tax policy and retirement income policy – may be playing a more important role.

1 Introduction

A useful analytical framework for assessing the impact of fiscal policy on economic growth is provided by Barker, Buckle and St Clair (2008) who discuss fiscal policy as seen through three lenses: fiscal sustainability, fiscal stabilisation and fiscal structure (Figure 1). This paper uses the same analytical framework for assessing the impact of fiscal policy on macroeconomic vulnerability.

To inform the discussion, Section 2 starts by summarising the key macroeconomic vulnerabilities currently faced by New Zealand. The following three sections then discuss the extent to which these vulnerabilities could be mitigated by improvements to each of the three dimensions of fiscal policy. Section 3 focuses on fiscal sustainability, and considers the importance of sound public finances. Despite the recent deterioration in New Zealand's fiscal balances in recent years, it is concluded that fiscal sustainability is not currently putting undue pressure on macroeconomic imbalances. Section 4 considers the stabilisation role of fiscal policy and – drawing on the experiences of the mid-2000s when pro-cyclical fiscal policy seems to have contributed to a build-up in macroeconomic imbalances – discusses ways to make fiscal policy more stabilising in future economic upturns. However, it seems very unlikely that the stabilisation role of fiscal policy has an important role to play in correcting macroeconomic imbalances. By contrast, in discussing the structure role of fiscal policy, Section 5 concludes that there are a number of areas where the combination of microeconomic fiscal policy settings (tax, welfare policy) may be contributing to macroeconomic imbalances. Section 6 concludes.

---

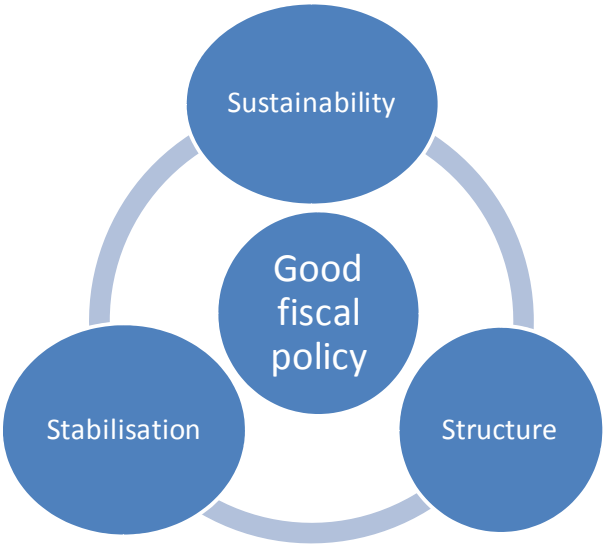
* New Zealand Treasury.

This paper was prepared for the Banca d'Italia Workshop on Fiscal Policy on 4-6 April 2013 in Perugia, Italy.

Please send any comments to anne-marie.brook@treasury.govt.nz

Figure 1

The Three Dimensions of Good Fiscal Policy



2 Macroeconomic imbalances in New Zealand

For several decades now, New Zealand has been running some of the largest and most persistent current account deficits among the advanced economies. The resulting macroeconomic imbalances are regularly highlighted by international credit rating agencies:

Standard and Poor's: AA rating

"The ratings on New Zealand reflect the country's fiscal and monetary policy flexibility, economic resilience, public policy stability, and financial sector that appears to be sound. These strengths are moderated by New Zealand's **very high external imbalances**, which are accompanied by **high household and agriculture sector debt**; dependence on commodity income; and emerging fiscal pressures associated with its aging population." (3 August 2012).

Fitch: AA rating

"The affirmation of New Zealand's (NZ) ratings and Outlook ... reflects Fitch Ratings' view that **high external indebtedness** and below median average incomes remain key vulnerabilities of the sovereign credit profile, particularly when related to its highly rated OECD peers. Offsetting factors are NZ's strong track record of monetary policy management, prudent fiscal management, high level of economic development, and strong governance." (11 September 2012).

Moody's Investor Services: Aaa rating

" New Zealand's **reliance on foreign saving** is a vulnerability. The negative net international investment position is by far the largest of Aaa-rated countries. Partially mitigating this potential vulnerability is the structure of the country's cross-border liabilities, the majority of which are obligations of the large Australian banks that operate in the country." (28 January 2013).

As highlighted by the above quotes (emphasis added), New Zealand's key macroeconomic imbalance stems from the fact that a persistently low rate of saving relative to investment has required significant capital inflows from overseas, reflected in persistent current account deficits (Figure 2). The consequence has been a build-up in New Zealand's net external debt position, which at around 70 per cent of GDP is not much smaller than that in troubled European economies such as Portugal, Ireland, Greece and Spain (Figure 3).

To judge a country's macroeconomic vulnerability, however, the *composition* of external debt is also important. A closer look at the composition of New Zealand's NIIP position highlights some mitigating factors. For example, New Zealand's external borrowing is substantially in domestic currency rather than foreign currency, providing a natural exchange rate hedge. In addition, New Zealand's relatively strong fiscal position (see Section 3 for further discussion), credible institutional structures, and floating exchange rate are also important mitigating features.

Figure 4 illustrates that since peaking at 85 per cent of GDP in March 2009, net external liabilities have declined to just over 70 per cent more recently. This decline has been driven primarily by falls in private sector net borrowing intermediated through the banking system and the temporary effects of earthquake-related claims on international reinsurers.[1] The decline in the private sector's net external liabilities has been partly offset by an increase in the net external debt of the government associated with ongoing fiscal deficits. The short-dotted line in Figure 4 (excluding reinsurance payments associated with the Canterbury Earthquakes) can probably be thought of as closer to the underlying trend level of the net external liability position.

Even if New Zealand's net external debt position is perceived to be less risky than those in some of the European countries that have experienced recent debt crises, its size and New Zealand's ongoing reliance on foreign saving makes the economy relatively more vulnerable than other countries to changes in the availability and cost of external financing. These risks are exacerbated by some internal macroeconomic imbalances – most notably the high degree of leverage in the household and agricultural sectors, together with the fact that house prices are elevated relative to fundamental metrics, such as income and rents (Figure 5). Household debt is largely secured on property assets and a substantial property price correction could result in significant strain on household and bank balance sheets. A similar story can be told for farm prices, as discussed in RBNZ (2012).

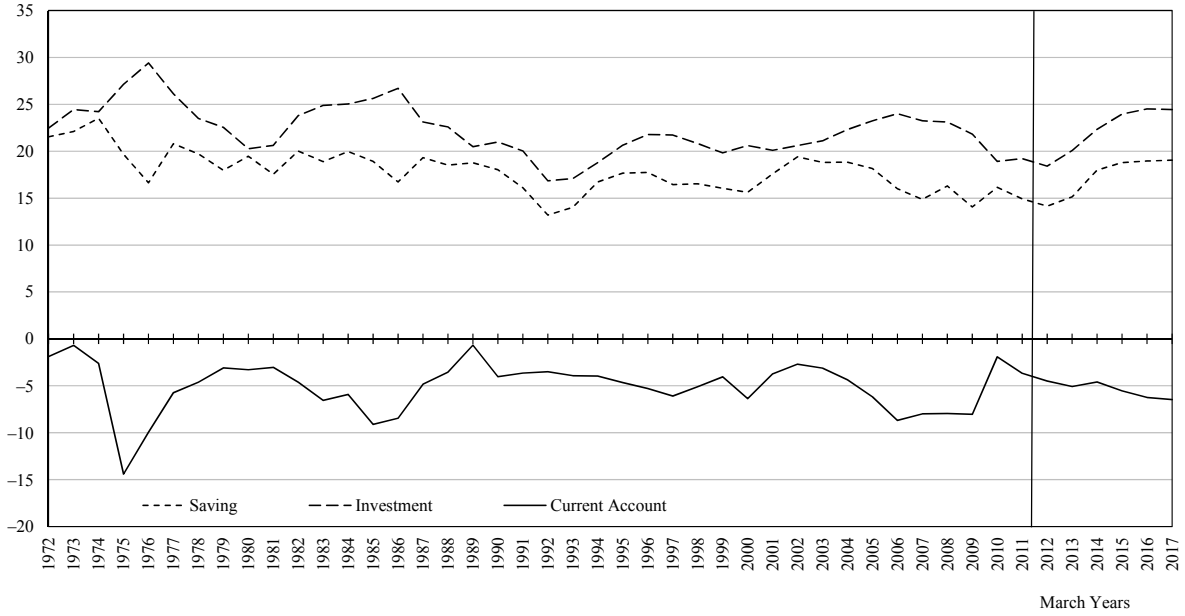
Finally, it is worth noting that these developments have occurred against the backdrop of economic growth performance that has been poor by developed country standards over recent decades, and New Zealand's average incomes remain well below the OECD average (Figure 6).

---

[1] The cash settlements of some insurance claims from the Canterbury earthquakes have increased retail deposits from households and firms, and helped to reduce the banking system's reliance on external funding. As the rebuild progresses, however, much of this effect is likely to reverse.

Figure 2

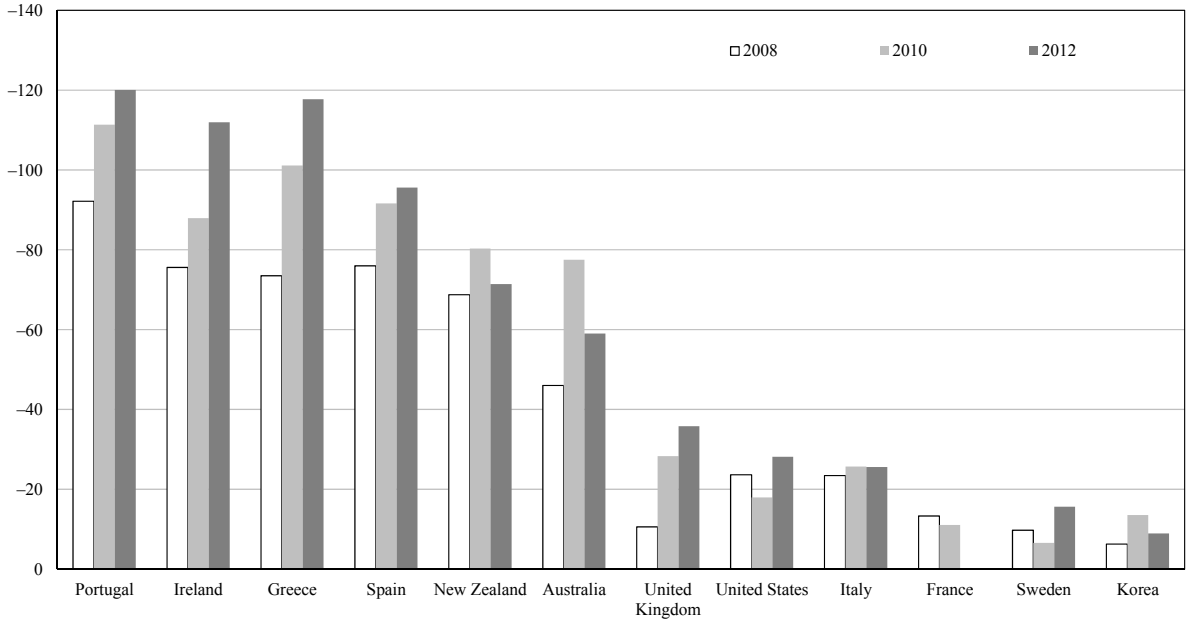
Gross National Saving and Investment in New Zealand
(percent of GDP)



Source: Treasury Half Yearly Economic and Fiscal Update, December 2012.

Figure 3

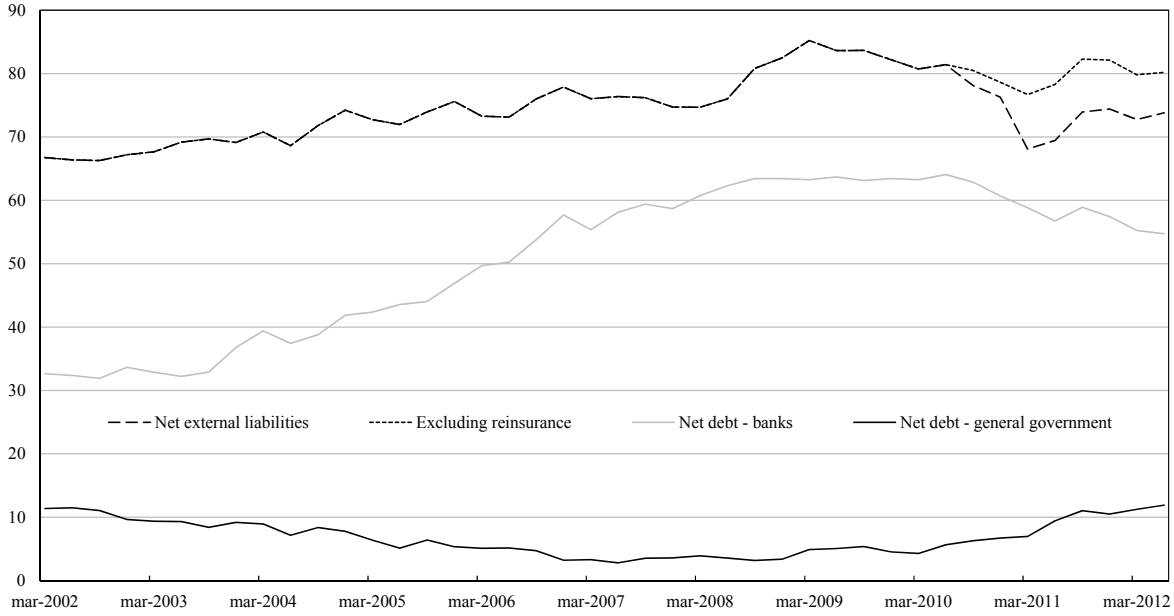
Net International Investment Positions, New Zealand and Selected Countries
(percent of GDP)



Source: Statistics New Zealand and IMF.

Figure 4

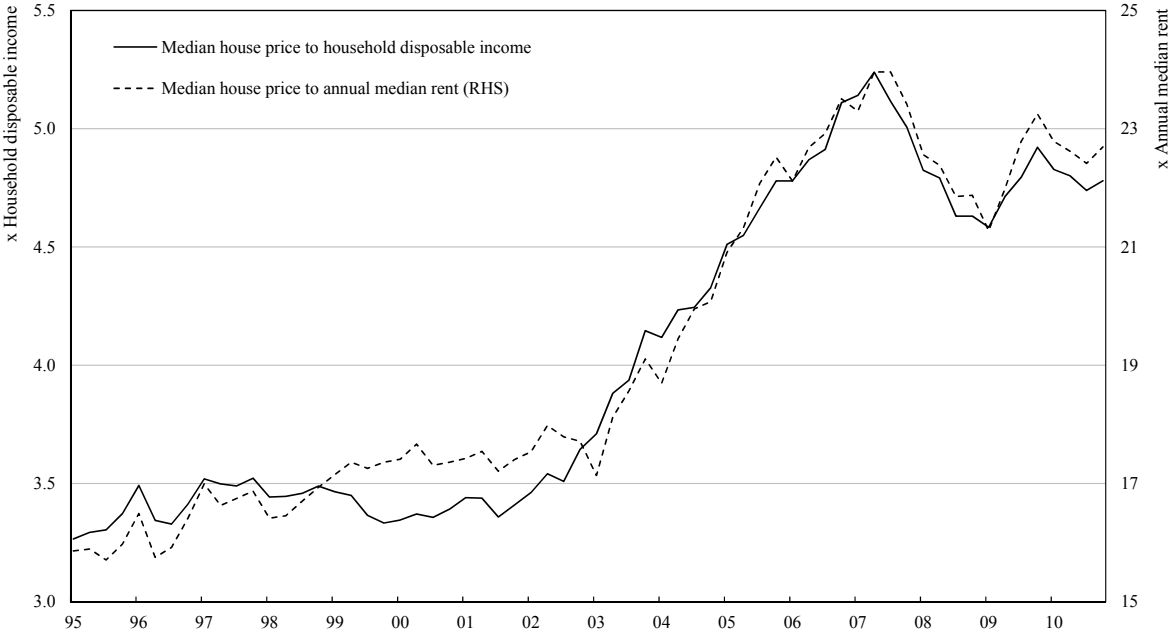
Net External Liabilities
(percent of annual GDP)



Source: Statistics New Zealand.

Figure 5

House Prices Relative to Fundamental Indicators

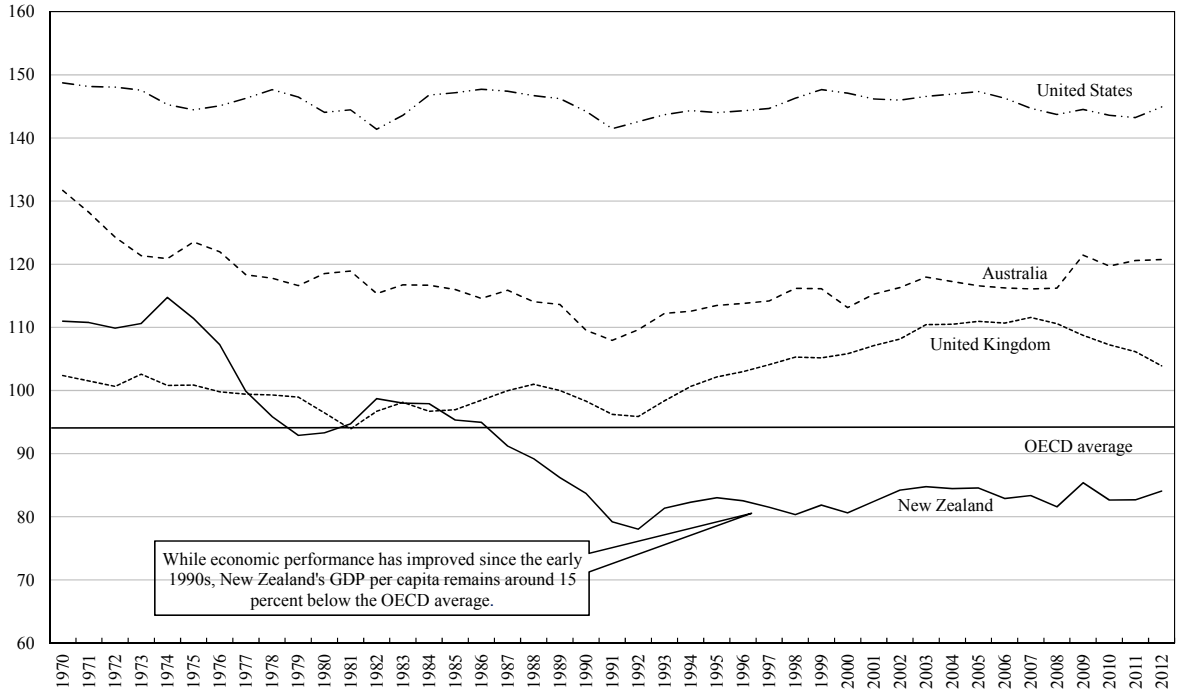


Source: Real Estate Institute for New Zealand, Statistics New Zealand, Department of Building and Housing, Treasury.

Figure 6

New Zealand's GDP Per Capita as a Percent of the OECD Average

(percent of OECD average; index: OECD average = 100, US$ constant prices and PPPs)



Source: OECD.

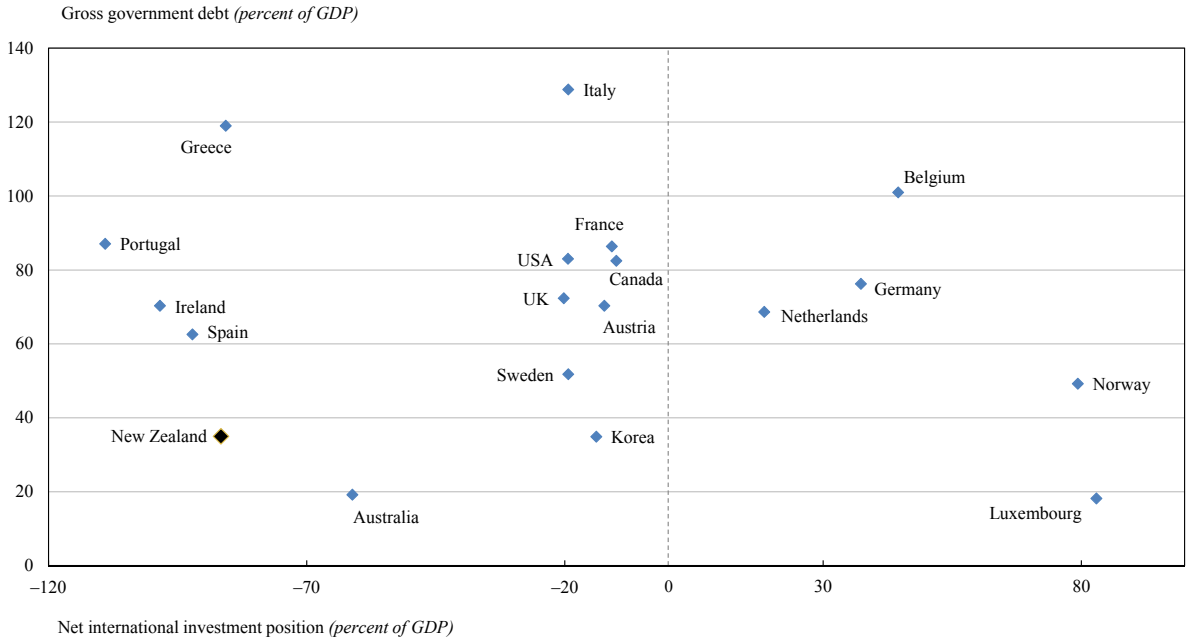
New Zealand has also experienced a persistently overvalued exchange rate, and high average real interest rates over a period of several decades. Labuschagne and Vowles (2010) and Reddell (2013) suggest that these outcomes are most likely closely linked to New Zealand's macro-economic imbalances.

The drivers and policy implications of these macroeconomic imbalances have been widely discussed by a range of commentators, including Burnside (2013), IMF (2012, 2011), OECD (2011), André (2011), Steenkamp (2010) and Edwards (2006). While different economists emphasise different drivers (and none see the probability of an abrupt and costly external adjustment as being high in the near term), they all agree that it would be good to reduce New Zealand's vulnerability to shocks by a gradual unwinding of its imbalances, and all envisage some role for fiscal policy in that. Reasons for wishing to narrow the imbalances including concerns about large and growing external liabilities, as well as concerns that saving investment imbalances have been putting upward pressure of domestic interest rates and the exchange rate, thus damaging New Zealand's growth prospects.

The purpose of this paper is to discuss the potential role of fiscal policy in contributing to these macroeconomic imbalances. To do this, the following three sections discuss the role of fiscal policy as seen through each the three lenses of fiscal sustainability, fiscal structure and fiscal stabilisation. This paper does not attempt to discuss other areas of policy that may also have an important bearing on macroeconomic imbalances – such as economic regulation and competition policy.

Figure 7

New Zealand's Relative Fiscal and Net International Investment Position (2007-11 Average)



Source: OECD, IMF, RBNZ, Treasury.

3 Fiscal sustainability

Generally prudent fiscal management since the early 1990s has meant that public finances have been viewed as a key strength of the NZ sovereign credit profile. Indeed, New Zealand's gross government debt position as a percentage of GDP typically looks just as good relative to our OECD peers, as our NIIP position looks bad (Figure 7). This good record of fiscal management is often attributed to the transparency-based framework for encouraging responsible fiscal policy management, as set out in the Public Finance Act.

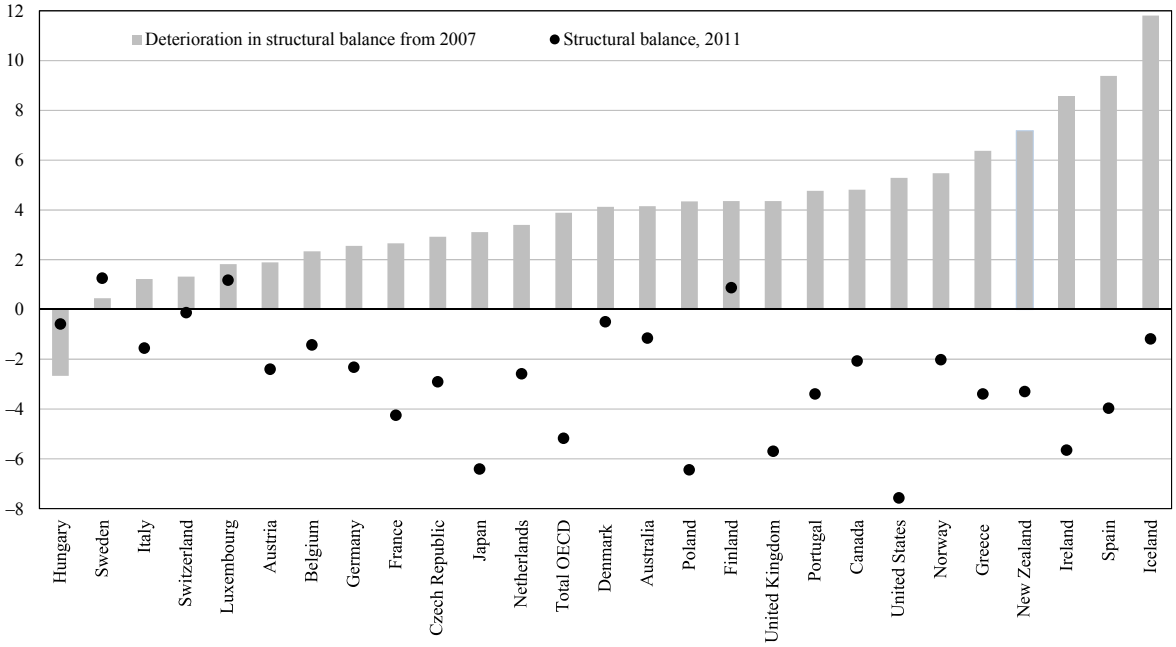
Over the past few years, however, New Zealand's public finances have worsened substantially (Figure 8). Contributing factors have been: weaker than expected economic activity (associated in part with the global recession); tax cuts introduced in 2009; and the unavoidable repair and reconstruction costs associated with the 2010 and 2011 Canterbury earthquakes.

As a consequence, general government debt has risen substantially (Figure 9), increasing the government's exposure to a possible deterioration in sovereign debt markets. To reduce this vulnerability and rebuild fiscal buffers, the Government aims to return to surplus by 2014/15, and bring the net debt to GDP ratio back below 20 per cent of GDP by 2020.

Given New Zealand's vulnerability to shocks, however, a strong case could be made for reducing public debt to a level significantly further below 20 per cent, especially during economic upturns. Moreover, the longer-term fiscal challenges associated with an ageing population and broader pressures on public health expenditures suggest that fiscal sustainability will remain an ongoing challenge. To illustrate, Table 1 provides some long-term projections of the government's budget based on an assumption of unchanged policies in spending areas and a fixed share of tax revenues as a percentage of GDP.

Figure 8

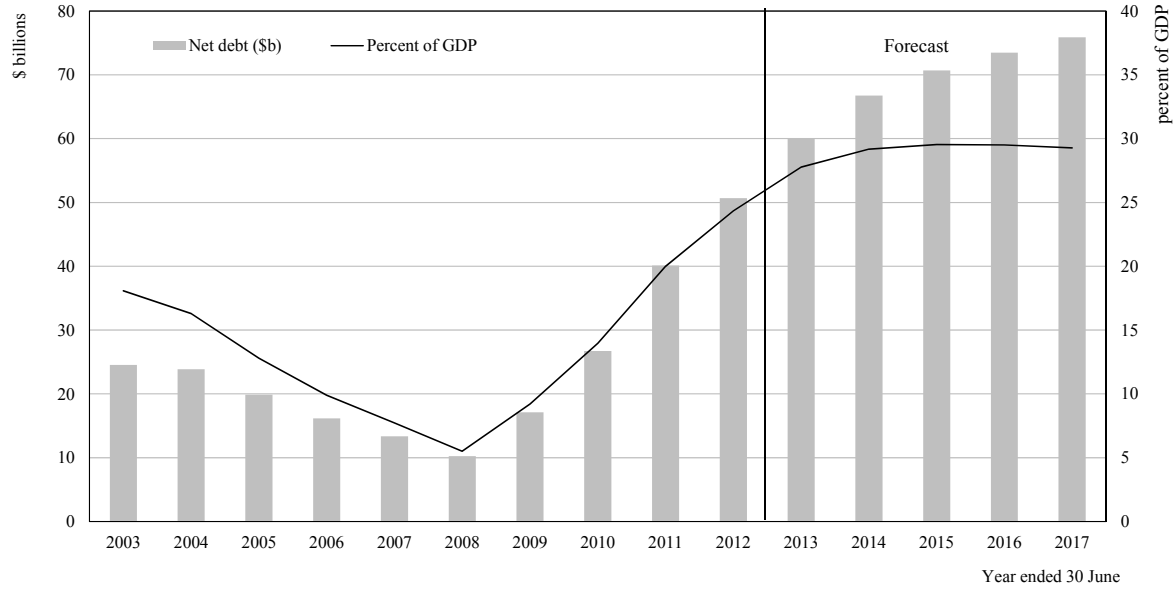
Deterioration in Structural Fiscal Balance
(percent of GDP)



The deterioration is measured by comparing the 2007 underlying balance with each country's lowest underlying balance over 2009-12. The New Zealand estimate has been adjusted by the Treasury to exclude temporary earthquake expenses.
Source: OECD Economic Outlook 92 (December 2012), Treasury.

Figure 9

Net Core Crown Debt



Source: Treasury Half Year Economic and Fiscal Update, December 2012.

Table 1

Long-term Fiscal Scenario Based on Unchanged Policy
(percent of nominal GDP)

	2010	2020	2030	2040	2050	2060
Health	6.8	6.8	7.7	8.9	9.9	10.8
Pensions	4.3	5.1	6.4	7.1	7.2	7.9
Education	6.1	5.3	5.2	5.2	5.1	5.2
Justice	1.7	1.4	1.4	1.4	1.4	1.4
Non–pension Welfare	6.7	4.8	4.4	4.2	4.0	3.8
Other Expenses	6.5	5.6	5.7	5.8	5.9	6.1
Debt financing costs	1.2	1.8	2.5	4.2	7.1	11.7
Total Expenses	33.4	30.8	33.4	36.9	40.6	46.8
Total Revenue (mostly tax)	29.7	31.9	32.2	32.2	32.3	32.6
Gap to Balance Budget	3.6	–1.1	1.2	4.6	8.3	14.3
Net Government Debt	**13.9**	**27.4**	**37.1**	**67.2**	**118.9**	**198.3**

Source: Treasury (2013a).

Of course, the Treasury does not expect the projections in Table 1 to be realised, as it is expected that successive Governments will make adjustments to ensure that the goal of responsible fiscal policy, as set out in the Public Finance Act will be met. In fact, the table directly contradicts the Government's stated goal of bringing the net debt to GDP ratio back to 20 per cent of GDP by around 2020. This difference is due to the fact that the table's assumptions include that government spending will grow broadly in accordance with historical rates beyond the 2014/15 fiscal year, an assumption we do not expect will turn out to be true. The table does, however, demonstrate that the challenge of sustainable fiscal policy is an ongoing one.

The relationship between fiscal policy and macroeconomic imbalances has been examined in a number of studies. Schule (2010) used simulations of the IMF's GIMF model to show that raising government savings in New Zealand permanently by 1 per cent of GDP would improve the current account balance by about ½ per cent of GDP.

In a more recent study, the IMF (2012) looked at 22 country experiences since 1970 where advanced or emerging market economies significantly reduced their net foreign liabilities. This study found that orderly reductions in net foreign liabilities have mostly been achieved at times of improvements in gross public savings – alongside successful fiscal deficit reduction – rather than improvements in private savings. However, in the cases studied, most of the liabilities were held by

the public sector. This contrasts with New Zealand, where the bulk of external liabilities are held by the private sector, bringing into question the ultimate effectiveness of budget deficit reduction in reducing external liabilities. Unfortunately, the international literature has paid much less attention to exploring the sustainability of private external debt levels.[2]

4 Fiscal stabilisation

The stabilisation role of fiscal policy is quite different in a small open economy with a floating exchange rate – such as New Zealand – from that in a more closed economy or for economies operating under fixed exchange rates. This is because interest rate and exchange rate reactions to fiscal shocks tend to be much larger in small open economies, which gives the government in a small open economy much more influence over the policy mix between monetary and fiscal policy, and therefore over the path of the exchange rate (e.g., Allsopp and Vines, 2005; Brook, 2013a).

At the same time, however, this greater control over the policy mix is accompanied by a relative ineffectiveness of using fiscal policy to stabilise output over the cycle. This is reflected in the international evidence which shows that estimated fiscal policy multipliers are often close to zero in countries such as New Zealand that are both open and have a floating exchange rate, whereas they are typically greater than unity for more closed economies or for economies operating under fixed exchange rates, or when monetary policy is impeded by nominal interest rates reaching the lower bound (Beetsma and Giuliodori, 2011; Ilzetzki, Mendoza and Vegh, 2011). New Zealand-specific results, such as Parker and Vehbi (2013) and Fielding, Parkyn and Gardiner (2011) are generally consistent with results from empirical studies for other small open economies with monetary accommodation, reflecting the reaction of interest rates and exchange rates to fiscal shocks. Recognition of this has underpinned a refocusing on what role fiscal policy can and should play in "leaning against the wind" to prevent the build-up of sectoral or external imbalances, and exchange rate overvaluation (e.g., see Lane, 2010 – drawing on Blanchard, 2007).

By contrast, in larger and less open economies, there is more focus on the potential role that fiscal policy can play in stabilising aggregate demand, when fiscal multipliers are positive. This literature focuses almost exclusively on the impact of fiscal policy stimulus during downturns, largely ignoring the impact of fiscal policy prudence during upturns. It also largely fails to consider the open economy dimensions of fiscal policy, making this literature of limited relevance for New Zealand, where the issue of "policy mix" is more pertinent.

For New Zealand, therefore, what this means is that fiscal policy can help to guard against the widening of macroeconomic imbalances by doing whatever it can to avoid pro-cyclical fiscal policy settings. As discussed by Brook (2013a), this goal was not achieved during the mid-part of the 2000s, when a range of fiscal indicators suggest that fiscal policy was insufficiently supportive of low interest rates and strong tradable sector activity over 2005 – 2008.

This failure of fiscal policy to prevent pro-cyclicality seems to reflect two main factors. First, while there was nothing in the Public Finance Act that would *prevent* macro-stability considerations from being given weight in policy advice, the act itself was, at that time, silent on the importance of conducting fiscal policy in a way that best helps to stabilise the macro economy, beyond allowing for the use of automatic stabilisers, and so such considerations tended to be underweighted. Second, when the economy is performing well and fiscal revenues are strong, there are inevitably strong calls to "spend" the surpluses (either on tax cuts or spending increases).

---

[2] *I.e.*, there is no Reinhardt and Rogoff equivalent for private debt.

To address these problems, amendments to the Public Finance Act will include the introduction of a new principle of responsible fiscal management that governments should "formulate fiscal strategy with regard to its interaction with monetary policy". This will not only *require* governments to pay explicit attention to the stabilisation role of fiscal policy, but it should also help to address the political economy problem, by giving a higher profile to this role of fiscal policy.

Other possible reforms that have been suggested to improve the stabilisation role of fiscal policy (e.g., in Brook, 2013a) include the following:

- A more explicit de-linking of spending decisions from revenue outturns. E.g., by clearer *ex ante* specification of spending plans in fiscal strategy documents, or through the use of a well-designed stabilisation fund.
- An increased focus on introducing fiscally costly policy changes more gradually, so as to mitigate the problems of operating fiscal policy under uncertainty.
- Permanent tax policy reforms, such as a capital gains tax that would increase the strength of the automatic stabilisers, while also improving the efficiency of the tax system more generally. Capital gains tax revenues could also be earmarked for a stabilisation fund.
- Consideration of the role that a regular independent review of fiscal policy could play in raising the quality of public debate and transparency and accountability of key fiscal policy judgements.

Overall, however, while it does play a role, the stabilisation role of fiscal policy is not likely to be an important part of either the causes or solutions of New Zealand's macroeconomic imbalances. After all, these imbalances pre-date the episode of pro-cyclical fiscal policy that has been identified. The structure of fiscal policy – discussed in the following section – is likely to be much more important.

5 Fiscal structure

While the links between trends in government saving and external imbalances are well understood, there is much less consensus in the literature about how the structure of fiscal policy (specific tax and spending policies) can best support external balance by encouraging a higher rate of private saving.[3]

Since private saving in New Zealand stands out as being exceptionally low in comparison with other advanced economies (Figure 10, panel A), and in such stark contrast to the generally good record of public saving (panel B), it seems worth exploring what aspects of New Zealand's fiscal policy *structure* (*i.e.*, tax and spending policies) could be contributing to a lower rate of private saving than typically found in other countries?

Three main possibilities present themselves. First, New Zealand's first tier publicly-provided pension – known as New Zealand Superannuation (NZS) – is universal and not means-tested and set at a level that is relatively generous[4] compared to safety-net pensions in other countries. Second, New Zealand is one of only two OECD countries (Ireland is the other) that does not have a tier 2 pension scheme (*i.e.*, a mandatory or quasi-mandatory employment-linked personal retirement saving scheme). Third, New Zealand's TTE tax system (discussed below) provides no tax incentives to encourage voluntary saving.

---

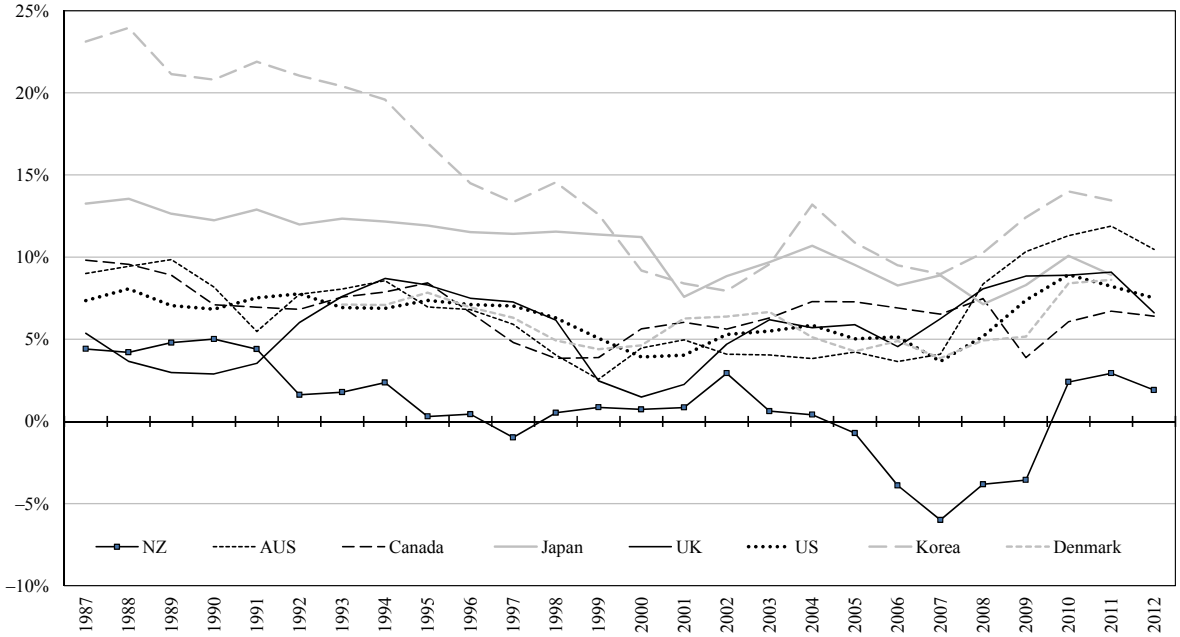
[3] Brook (2013b) provides a more in-depth survey of the literature on this topic.

[4] The level of the pension is "generous" only to the extent that it is sufficient to keep pensioners out of poverty, as defined in a relative sense.

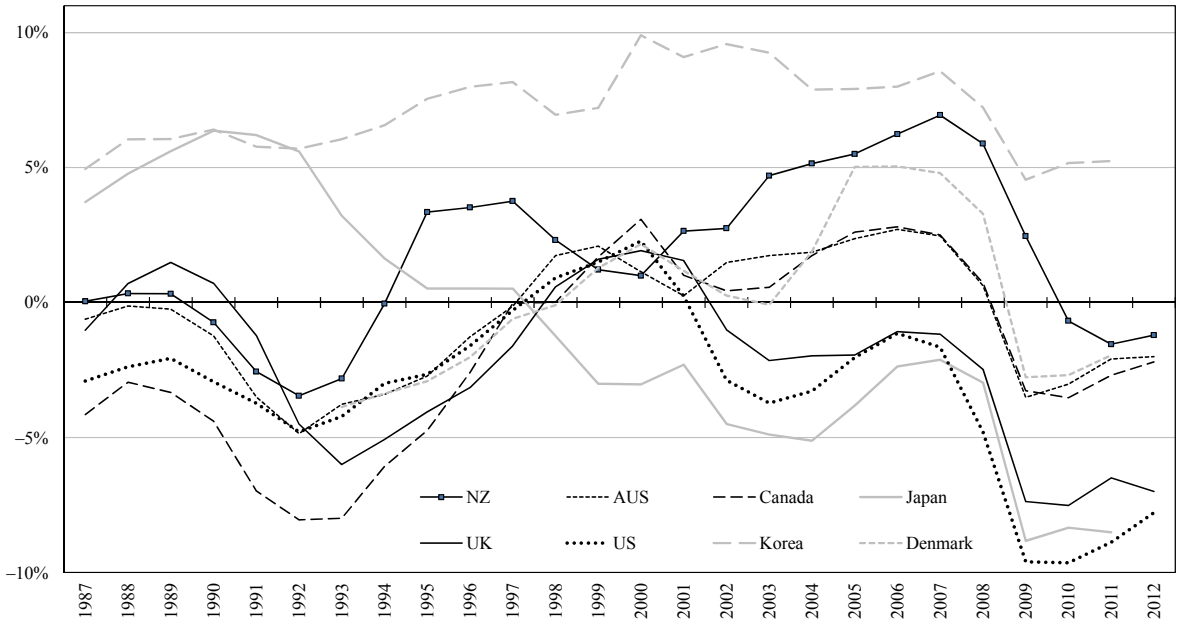
Figure 10

Public and Private Saving Rates in New Zealand and Selected Other Countries

a) Net Private Saving
(percent of GDP)



b) Net Public Saving
(percent of GDP)



Source: Haver Analytics.

Ideally, it would be possible to draw conclusions from the international literature about the links between the unique features of New Zealand's saving environment and our relatively low saving rates. Unfortunately, any such conclusions are difficult to draw due to the difficulties of isolating the impact of policy settings from other drivers of saving. For example, Bernheim (2002) points out that it is not possible to reliably infer the saving effects of saving schemes from simple cross-country correlations or regressions, as countries where voters care more about saving are more likely to introduce tax incentives for saving, creating an endogeneity problem. Multicolinearity problems are also common (López-Murphy and Musalem, 2004). So this paper does not attempt to draw a direct causal link from these institutional settings to New Zealand's poor private sector saving behaviour. It does, however, look at the extent to which changes to fiscal policy structure may have potential to boost private saving, and thus alleviate macroeconomic imbalances.

5.1 The role of tax policy

There are two main ways in which tax policy is likely to affect private sector saving incentives. The first relates to how the tax system influences the timing of individuals' saving versus consumption decisions (*i.e.*, incentives to save now). The second relates to the extent to which the tax system distorts the allocation of savings across different saving vehicles.

5.1.1 New Zealand's choice of a comprehensive tax base has important implications for people's consumption vs saving decisions.

The way in which savings are taxed is a key distinguishing feature of different tax systems and a key characteristic of the tax base. If the tax base is defined as including income from savings as well as labour earnings, and if all components of that tax base are taxed equally, then this is known as a "comprehensive income tax system". Broadly speaking, this is the type of tax system that New Zealand has adopted.[5] Alternatively, if earnings that are saved, and the returns to savings, are not taxed until they are used for consumption, the resulting tax system is an "expenditure tax" or "consumption tax". The difference in the tax treatment of savings is the critical difference between these two tax bases.

An important implication of the choice of tax base is that it has an effect on the incentive to save. An expenditure tax system creates a neutral setting for people to make decisions about whether to consume now or later. By contrast, a comprehensive income tax system taxes people who choose to consume later in life (high savers) more heavily than people who choose to consume earlier in life (low savers). This suggests that a move towards an expenditure tax would increase people's incentives to save. However, since expenditure tax systems can be administratively difficult to implement and can make achieving other objectives more difficult, no country has a pure expenditure tax system. Most countries have ended up with some features of each.

Differences in the taxation of savings are often described in short-hand using the notation of a three-letter acronym of Ts and Es. For example, a comprehensive income tax system, such as New Zealand's, is normally characterised as a TTE regime – where the first T refers to the income tax rate, the second T refers to the tax rate on the return to savings, and the E (=exempt) refers to the fact that no tax is levied on funds when they are withdrawn from a savings account. By contrast, a pure expenditure-based tax system is characterised as EET, which in present value terms is equivalent to TEE (*i.e.*, a regime where income from savings is tax-exempt).

---

[5] New Zealand's tax base falls short of being fully comprehensive as few capital gains are taxed. Also the Portfolio Investment Entity (PIE) regime provides investors with a small tax rate reduction on some investments.

While many other countries' tax systems are also based around a comprehensive tax base, most have attempted to increase saving incentives by introducing various sorts of tax-preferred private saving accounts. In some cases these are EET or TEE tax systems (where returns to savings are fully tax exempt), while in other cases they are TtE or EtT systems (where the small middle t refers to the fact that returns to savings are taxed at a reduced rate). In choosing to offer tax-favoured saving vehicles, these countries are making a judgment that the comprehensive tax base creates too great a disincentive for saving.

However, the empirical evidence on the impact of tax incentives on savings is mixed. Theoretically, the effect of tax incentives in life cycle hypothesis models is ambiguous, since there is both an income and a substitution effect at play. On the one hand, tax incentives for saving make consumption now more expensive relative to future consumption, which should increase current saving. On the other hand, the amount that it is necessary to save to achieve a given level of wealth is reduced. In order for tax incentives to increase saving, the intertemporal elasticity of substitution must be negative (*i.e.*, an increase in the after-tax return on saving must reduce consumption).

Given the theoretical ambiguity, it is perhaps not surprising that the empirical evidence is quite disparate and far from providing a definitive answer. While a significant number of studies have concluded that tax incentives lead mainly to reallocation,[6] there are also a number of studies that conclude that tax incentives create mainly new saving, raising total saving.[7] This wide range of estimates is partly explained by the difficulty in controlling for unobservable heterogeneity in savers' preferences.[8] It also reflects differences in the design of tax incentive schemes across countries. For example, it is generally agreed that high income individuals tend to reallocate savings in the face of tax incentives,[9] while for mid-to-low-income individuals participating in funded pension plans, their contributions tend to come from new saving, so countries where tax incentives are skewed toward lower-income individuals are more likely to conclude that tax increases raise new savings.[10]

An additional way in which the tax system affects saving incentives stems from the fact that tax is levied on nominal rather than real values. Even though inflation rates in New Zealand are now low on average, they are nonetheless still significant in the context of real investment returns. Indeed, as noted by the Savings Working Group (SWG, 2011), the impact of inflation can potentially double effective rates of tax for many investors (while at the same time providing a significant subsidy to borrowers). As also noted by the SWG, there are two reasons why non-indexation may be more distortionary in New Zealand than in other countries: first, because most other countries impose capital gains taxes, which reduce the incentive to borrow to invest in asset classes that increase in value when there is inflation; and second, because most other countries provide households with retirement income vehicles that are less distorted by inflation, because they are taxed more according to expenditure tax principles than income tax principles. For these reasons, the SWG recommended that the Government consider options for indexing the tax system (discussed further below). Alternatively, reducing the tax rate on interest income more generally, could be seen as a proxy for inflation indexation. Indeed, the Henry review on the Australian tax system (Henry *et al.*, 2009) advocated a broad 40 per cent discount on the tax rate on income from

---

6 E.g., Gale and Scholz (1994), Attanasio *et al.* (2004), Disney *et al.* (2007).

7 E.g., Poterba *et al.* (1995, 1996), Engelhardt (2001), Ayuso *et al.* (2007), Gelber (2011).

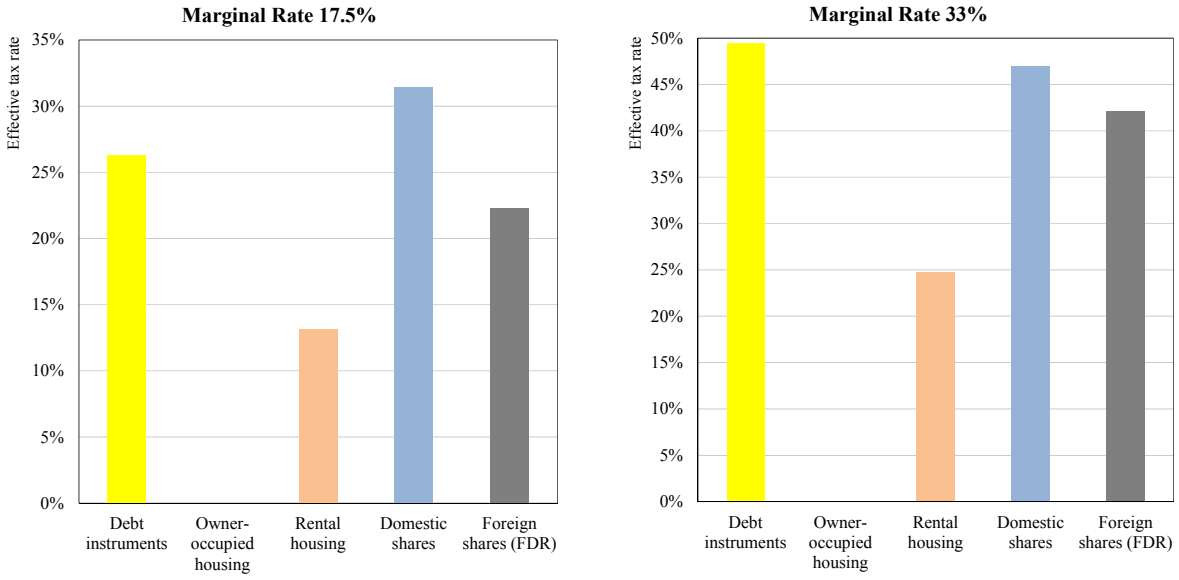
8 Individuals with a high propensity to save are likely to have higher savings in both tax-preferred and non-preferred accounts. Since these unobserved preferences affect both the explanatory variable (saving in tax-favoured accounts) and the dependent variable (total savings), this causes a problem of endogeneity.

9 An exception is for high income individuals close to retirement age, who have been found to increase new saving in response to tax incentives (Ayuso *et al.*, 2007).

10 E.g., Benjamin (2003), Engen and Gale (2000).

Figure 11

Real Effective Tax Rates on Different Investments
(results are sensitive to assumptions)[11]



Source: Savings Working Group (2011).

bank deposits, bonds, rental properties, capital gains and for certain interest expenses, in part to address the distortions created by not inflation-indexing the tax system.

5.1.2 Tax settings in New Zealand also create non-neutralities across saving vehicles

While the taxation of saving has potential to affect the total amount of savings in the economy, it also affects how those savings are allocated across different assets. This can directly affect the amount of capital invested in the economy, and how efficiently it is invested. The key consideration here is the neutrality of taxation of different saving vehicles. Ideally, different forms of saving should be taxed at similar rates.

The non-neutrality of taxation across different saving vehicles in New Zealand is well documented, with the most obvious example of non-neutrality being the fact that financial assets (such as bank deposits or shares) are taxed at a significantly higher rate than housing assets. As Figure 11 illustrates, returns on owner-occupied housing are not taxed at all (TEE), and returns on investments in rental housing are taxed at a much lower rate than returns on financial assets (TtE).[12] Debt instruments are taxed at the highest rates, and since this includes deposits in bank accounts, this is likely to affect the least sophisticated investors.

---

[11] Note that the real effective tax rate shown for investments in companies (*i.e.*, shares) will vary according to the nature of the company's business. The chart gives the case for a company that has no debt financing, and therefore presents the maximum possible tax rate. At the other extreme, the marginal effective tax rate on shares should in principle be negative (e.g., for a highly geared property owning company).

[12] Some measures to remove the tax advantages for rental housing were taken in the 2011 Budget. For example, regulations on Loss Attributing Qualifying Companies (LAQCs) were tightened so as to reduce the extent of attribution of losses to shareholders. At the same time the ability to claim depreciation allowances on most residential and commercial properties was removed.

Some have argued that the tax-favoured nature of the ownership of housing has led to too much of New Zealand's saving being diverted into housing. This is not an argument that there has been too much real investment in housing,[13] but rather an argument that the tax-favoured nature of house ownership – in combination with supply-side constraints – may have contributed to the sharp increase in the real price of houses over the last 20 years. In turn high house price inflation has been found to put downward pressure on private saving rates through a variety of mechanisms. The tax-preference currently enjoyed by housing assets is also likely to have encouraged excessive leveraging in pursuit of tax-preferred income. This may be one of the factors that have influenced the composition of capital inflows.

In most other countries, the neutrality of saving in different forms is further distorted by the presence of tax-favoured saving vehicles. In order for tax incentives to achieve their stated goal of increasing or encouraging saving, at least some of the funds going into tax-favoured forms of saving must come from reductions in individuals' consumption levels as opposed to a simple reshuffling of money from one form of saving to another more tax-preferred form. The evidence on the proportion of new saving is mixed, as discussed above. Nevertheless, results are very sensitive to precise design details, suggesting that there may be some role for well thought-out tax incentives to play. In particular a number of studies have shown that since moderate-income individuals face a lower tax rate, the more they participate in comparison with high income individuals, the lower the tax expenditure for foregone tax revenues (Antolin *et al.*, 2004). OECD (2007) considers the extent to which tax-preferred saving schemes in 11 OECD countries are efficient, where a plan is judged to be efficient if it increases personal and national saving at the lowest possible cost. In summary, the paper suggests that there are two main requirements for efficiency of tax-preferred schemes. First, the design of the scheme must encourage high rates of participation and contributions from middle and low-income households, whose contributions are more likely to come from new savings.[14] Second, tax expenditures must be kept low. Most of the plans reviewed by OECD (2007) did not meet these criteria, as wealthier individuals were typically found to have the highest take-up of tax-favoured schemes,[15] and some schemes offered very expensive tax incentives.

An important difficulty in estimating the impact of tax incentives on *national* saving stems from the fact that we typically don't know what the fiscal policy counterfactual would be. It is here that the overall fiscal strategy becomes important. For example, Gruen and Soding (2011) argue that the foregone tax revenue from tax incentives in Australia has forced the government to achieve the same budget surpluses (which are required as part of the fiscal strategy) by making savings elsewhere in the Budget. So overall they argue that any boost to private saving from the tax-preferred status of superannuation in Australia has not been offset by lower public saving, meaning that the boost to private saving has translated directly into national saving. In other countries, with a less prudent fiscal strategy, however, different conclusions might be reached.

So what might be the main options for tax reform to boost national saving in New Zealand? In the New Zealand debate, acknowledgment of the impact of the comprehensive income tax system on the timing of saving decisions, has often led to suggestions to improve saving incentives by lowering income taxes and raising consumption taxes. Indeed, the tax changes announced in Budget 2010 (which reduced income tax rates, and raised GST from 12.5 to 15 per cent) were

---

[13] Over the past couple of decades, real investment in housing has not seemed consistently out of line with other OECD countries. Indeed, once our strong population growth has been taken into account (not shown), there has probably been less investment in housing than might have been appropriate.

[14] Not only are lower-income individuals likely to contribute more new saving, but the fact that they also face a lower tax rate implies that the cost of tax expenditures on these individuals is normally lower.

[15] There are three main reasons for this pattern. First, tax-free accumulation is worth less to low-income households as they face a lower marginal tax rate. Second, low-income individuals are more likely to be liquidity constrained and less able to reduce their consumption further to fund their contributions. Finally, some plans are provided by employers, and low-income individuals are less likely to work for firms offering such plans.

partly motivated by this consideration. However, it is acknowledged that other objectives of the tax system – particularly equity concerns – pose limitations to the extent to which this is considered acceptable. In particular, there are concerns that the limit to raising GST has already been reached (for equity reasons, or because of concerns that a higher rate would undermine the breadth of the GST base).

With respect to the second of the two distortions – the non-neutrality of the taxation of different forms of saving – the Treasury (2011) and other commentators such as the OECD have recommended raising taxation on housing by introducing a capital gains tax.[16] A capital gains tax would be expected to reduce investment in rental housing and increase investment in debt investments.

Some options have also been considered for shrinking the size of the middle "T" in our TTE tax regime (*i.e.*, moving to more of a TtE system). This is equivalent to a small step away from a comprehensive tax base in the direction of a more expenditure tax regime. As such it would improve the neutrality of the saving-consumption decision. If done well, such a reform could also improve the neutrality of taxation of different saving vehicles.

Recently, a number of options for shrinking the size of the middle 'T' have been evaluated by the Treasury and IRD using a purpose-built CGE model developed by Diamond and Zodrow (DZ model). The DZ model is a computable general equilibrium model that permits us to examine how tax reforms might affect the allocation of capital in New Zealand, as well as the impacts on key variables such as GDP, economic welfare[17] and the level of savings (Treasury and IRD, 2013). The advantage of such a model is that it enables the economy-wide effects of a policy change to be evaluated, including so-called second-round effects in markets not directly affected by the policy under consideration. At the same time, such models also have limitations in that they are quite highly aggregated and not able to provide insight into all the possible effects of a policy change. Importantly, the results obtained from such a model are influenced by the structure of the model itself and its underlying assumptions about producer and consumer behaviour.

Two key options that have been considered for shrinking the middle "T" are as follows:

- **Reducing the tax rate on interest income:** Of all the tax reforms modelled using DZ, this was the one that had the biggest positive impact on saving (although a general personal income tax reduction (shrinking the first "T") showed similar gains for saving). It also increased GDP and welfare. However, its impact on the neutrality of taxation of different saving vehicles was considered mixed.[18] Concern was also expressed about the impact on the complexity of the tax system given the need for anti-arbitrage rules. Overall, however, the report recommended that further consideration be given to this option.
- **PIE regime extension:** Another way of shrinking the middle "T" would be to extend the preferential Portfolio Investment Entity (PIE) tax treatment to other forms of investment.[19] The most obvious other asset class that would be brought under the PIE umbrella by such an expansion would be interest-bearing assets. Thus a PIE regime extension would be an alternative means of achieving a reduction in the tax rate on interest income. Compared with

---

[16] While a comprehensive capital gains tax could be ideal, significant improvements in neutralities across investments would still be achieved even if owner occupied housing was exempted from such a tax. Reasons why owner occupied housing might be exempted, and options for implementing a capital gains tax are discussed in Treasury (2009).

[17] The measure of economic welfare takes account of the fact that some tax changes benefit foreign investors, which would increase GDP, but not the economic welfare of New Zealanders.

[18] On the positive side, a discounted tax rate on interest would reduce the effective tax rate on interest to be closer to the effective tax rate on housing. But it could also increase effective tax rate differentials with other investments (e.g., equities in Figure 11).

[19] A Portfolio Investment Entity (PIE) is a special tax investment entity type for which the tax rate on investment income is lower than for other income types, depending on their personal circumstances (some individuals on the lower marginal tax rates do not qualify for a reduction). Some managed funds are registered as PIEs but not all.

reducing the tax rate on interest income alone, a PIE regime expansion would have greater efficiency advantages (by making the tax treatment of many easily-substitutable forms of capital income more consistent and helping to address the non-neutralities in tax treatment of different investments noted in Figure 11 above). As with the previous options, it would also encourage more domestic saving, given lower tax rates on a broader range of investment.

This option (broadening the PIE regime to include all interest and dividends earned by New Zealand residents) was recommended by the SWG (Savings Working Group, 2011).

If such a reform was to be pursued, the magnitude of the inflation distortion (discussed above) could be used as an objective basis for deciding by how much to shrink the middle "T". The reduction recommended by the Henry Review for Australia, in this context, was 40 per cent (Henry *et al.*, 2009). By contrast, the SWG suggested targeting a rate reduction for all investors of 5 to 10 percentage points (which would imply a reduction in tax rates of somewhere between around 15 – 50 per cent, depending on the individual's normal marginal tax rate (with the larger reductions applying to lower income individuals).

One disadvantage of each of the above two options is that reducing the size of the middle "T" differentially across assets can increase the size of some non-neutralities between different saving vehicles (albeit while reducing others). To avoid this problem some countries have adopted a practice of taxing all forms of capital income – including corporate income – at a standard low rate. This type of tax system – common in the Nordic countries – is known as a dual income tax regime. Dual income tax regimes typically have relatively high taxation of labour income.

- **A dual income tax regime:** A dual income tax regime was modelled using the DZ model and shown to generate some additional saving and investment (which in turn increases GDP), although these gains were found to be smaller than for simple rate changes to personal income taxes or the tax rate on interest income. The model found that a dual income tax did not increase economic welfare because the benefits of the additional investment were outweighed by the loss of tax revenue on existing investments from reducing the corporate tax rate as part of the general reduction in capital taxes. These results are dependent to some extent on the parameterisation of the DZ model, although sensitivity analysis did not produce markedly different results. An important disadvantage of dual income tax regimes is that they add complexity to the tax system (e.g., rules are required to prevent labour income from being reclassified as capital income). It would also be challenging to implement in the near-to-medium term given IRD systems capability. Because of these difficulties, both SWG (2011) and Treasury and IRD (2013) did not recommend pursuing a dual income tax regime at this stage.

Where does this leave us? On the one hand, it seems that New Zealand's relatively poor record of private sector saving could be partly explained by the combination of: a) the non-neutralities in the consumption saving decision inherent in our comprehensive income tax system; and b) the absence of significant tax-favoured savings vehicles to help mitigate these; although it is difficult to know the extent to which this might be the case given the lack of an observable counterfactual. On the other hand, the literature discussed earlier suggests that most tax-favoured saving vehicles are not very efficient. This suggests that any modifications to the balance of how we tax labour and capital income should be designed carefully so as to reduce distortions against saving without introducing new efficiency costs.

Another important consideration is that all options to shrink the middle "T" would likely have distributional implications, since reduced taxation of saving would tend to favour the wealthy. These options would also lower tax revenues. This suggests that any such change may be best paired with other revenue positive tax reforms that would fall more heavily on the wealth. One obvious contender in this context would be a capital gains tax, which as well as raising revenues

would help to reduce non-neutralities between different saving vehicles. However, given the volatile revenue profile of a capital gains tax, other revenue-positive options would also need to be considered.

An interesting question in this context is to consider the interaction between the tax system and saving compulsion. The normal argument for offering tax incentives is to encourage saving. However, if saving were to be made mandatory, and if one adopts the comprehensive income tax base (*i.e.*, that income from saving should be taxed at the same rate as income from labour) then the case for offering any tax incentive on those mandatory savings would evaporate.

Indeed, since 2007 New Zealand already has been following the increasingly popular practice of automatically enrolling employees who start a new job in a savings scheme (KiwiSaver). This is not a mandatory saving scheme as employees have the option to actively opt out if they do not wish to belong. A growing body of international research has found that the setting of such automatic default saving rates has a powerful influence on saving behaviour in a wide range of settings, as many individuals passively accept the default options.[20] The evidence suggests that defaults are particularly influential for low-income employees, most likely because these individuals face higher barriers to active decision-making.[21] Initial evaluations of the impact of KiwiSaver have found similar results for New Zealand; *i.e.*, the automatic enrolment into KiwiSaver of individuals starting a new job has been found to result in increased total saving by some individuals, particularly women, those with more children, those expecting NZS to be their main income in retirement and those in poor health (Law *et al.*, 2011).[22] However, it is not possible to fully separate the impact of default settings in KiwiSaver from the impact of financial incentives (kickstart and member tax credit).

Taken together, the literature discussed in this section does not provide a clear sense of tax policy direction for policy-makers in a country like New Zealand that wishes to facilitate a higher rate of national saving. On the one hand, New Zealand's TTE taxation of savings may be too discouraging of savings. But it is also clear that many other OECD countries do not have optimal settings either. Studies highlight the fact that encouraging saving through the use of tax incentives is likely to have costs in the form of reduced equity (as tax breaks tend to favour the wealthy), reduced efficiency (by favouring saving in some forms over others) and greater complexity.

One positive feature of New Zealand's policy settings is that in comparison with tax-favoured saving schemes in other countries, the financial incentives offered as part of New Zealand's KiwiSaver scheme generally perform better on most criteria of efficiency. This is because the annual incentive is a capped tax credit (instead of a generous deduction as in most countries), and low- and middle-income savers receive a greater proportionate benefit for their contributions compared to high income savers, so the incentive is more significant for those on lower incomes.

What other aspects of the *structure* of fiscal policy may influence saving? The following section discusses some options on the spending side of the fiscal accounts: in particular it considers

---

[20] E.g., Beshears *et al.* (2010, 2012),

[21] Compared with high-income employees, low-income employees have been found to exhibit a greater degree of bunching at the default rate and a lower rate of opting out of the default even when the default is far from what the typical low-income employee actively chooses. Default portfolio allocations also have a more powerful impact on low-income employees. E.g., Beshears *et al.* (2012).

[22] In New Zealand the KiwiSaver default rate and matching government contribution have changed several times. At the time the scheme was introduced the default contribution rate was set at 4 per cent of earnings, and the government contribution matched this $1 for $1 (via the member tax credit) up to a maximum of $1040/year. Subsequently the default was reduced to 2 per cent, and more recently has increased to 3 per cent, while the government contribution has been reduced to 50c for $1 up to a maximum of $521/year. Analysis of behaviour has revealed a tendency to maximise the government contribution, rather than one's own KiwiSaver accumulation.

some hypothetical changes to the institutional settings around New Zealand Superannuation (NZS) – the universal, non-means-tested pension currently available to all New Zealanders from the age of 65.

5.2 Possible reforms to the settings of New Zealand Superannuation

This section draws on Law (2013) who quantifies the likely impacts of some hypothetical retirement income policy reforms on national saving. The results suggest that some feasible changes to retirement income policies could lead to substantial cumulative changes in national savings over the next few decades.

Briefly, Law's (2013) analysis produces some indicative estimates of national saving effects that may result from the following three retirement income policies:

- Lifting the age of eligibility for New Zealand Super (NZS) from 65 to 67.
- Changing the indexation of NZS from wage growth to the average of wage and CPI growth.
- The introduction of mandatory private pre-funding by making KiwiSaver compulsory and using the accumulations to reduce NZS entitlements (with an abatement rate of 50 per cent).

The choice of these three reform policies is designed to be illustrative of the sort of retirement income policy reforms that could be considered. Obviously any such quantification exercise is fraught with difficulties, as assumptions must be made about behavioural responses.

The third of these options – the introduction of a mandatory 2nd tier saving scheme that would be used to permit abatement of NZS – would constitute a move away from New Zealand's pay-as-you-go (PAYGO) pension scheme towards more of a save-as-you-go (SAYGO) scheme. As such, it can be shown that such a move would have all the efficiency gains of a save-as-you-go (SAYGO) pension system as long as the return to capital investments is larger than the growth rate of the economy (which is normally the case).[23] The basic idea is that by boosting the stock of capital in the economy, a SAYGO pension system will temporarily boost the economic growth rate and permanently boost the level of output in the economy. The disadvantage of such a move, however, is that in the early years existing pensioners continue to be paid their NZS entitlements on a PAYGO basis while working cohorts must at the same time make contributions to the SAYGO fund. So transitional generations effectively pay both for some proportion of their own pensions and for the full cost of the pension entitlements of earlier generations. While this can be considered inequitable for existing generations, Coleman (2012) has shown that under the existing PAYGO-funded SNZ scheme, cohorts born prior to 1980 can expect to pay only half as much as they can expect to get in retirement benefits, because of the relatively small number of pension recipients when they made the bulk of their payments. This makes the transition costs of transitioning to a SAYGO system (either public or private) seem more palatable.

The results of the analysis of the three hypothetical policy reform options do not incorporate the impact of cumulated returns. Thus, the charts below underestimate the potential increase in saving as a result of these policies (both national and household). The extent of the underestimate will not be substantial in the early years of estimates but toward the end of the modelling period saving is likely in each case to be significantly higher than shown here. However, the relative profiles of the three options modelled should be unaffected.

Broadly, the model starts by calculating the impact of each retirement income policy change on an individual's NZS receipts, taking into account their age cohort, income, taxes etc. The model then *assumes* that the greater the reduction in expected NZS receipts, the more people are likely to

---

[23] Diamond (1965, 1997), Feldstein (1974).

respond by cutting back on consumption and increasing saving.[24] Thus, since changing the indexation of NZS (as modelled) implies the greatest loss of NZS entitlements, this hypothetical policy generates the largest saving response, even allowing for a wide range of potential behavioural responses (indicated in Figures 12 and 13 by the dotted lines). By contrast, the smallest saving response comes from raising the age of entitlement from 65 to 67, as this implies a relatively small loss of entitlement, and because years of labour force participation by 65- and 66-year-olds among future cohorts is expected to increase anyway.

In all cases, the annual additions to total household saving eventually slow down as additional saving by working-age people starts to be balanced out by decumulation as retired people start to run down their savings.

The overall impact of any such retirement income reform on national saving would depend not only on the extent to which private saving behaviour would change (Figure 12) but also on the extent to which the government were to use the fiscal savings realised in terms of lower NZS payments to reduce deficits (or increase surpluses). If the full extent of NZS "savings" were to be realised as higher-than-otherwise fiscal saving, the total impact on national saving flows would be as shown in Figure 13. Alternatively, if all of the NZS savings were offset by higher expenditure elsewhere, or lower taxes, the national saving flows would be equivalent to the change in household saving flows only, as shown in Figure 12. The analysis does not take into account any dynamic (second round) effects of fiscal policy.

The estimates shown in Figures 12 and 13 are additional annual saving flows. By cumulating these flows over time, Figure 14 shows that the impact on the stock of national savings (or, assuming unchanged investment, on the Net International Investment Position, NIIP) could be to improve it by around 40 per cent of GDP after 50 years in the case where mandatory saving is introduced and the accumulations used to abate the costs of NZS, or in the case where the age of eligibility for NZS is lifted. This would be equivalent to roughly halving the size of the NIIP as a percentage of GDP over a 50 year period (Figure 14). Note that these estimates would be significantly larger if the impact of cumulated returns was added to the model.

The quantification results above suggest that the types of reforms to retirement income policies modelled have the potential to significantly boost national saving flows by up to 2.5 percentage points of GDP per annum within 40 years, even excluding the impact of cumulative returns. However, this 2.5 percentage point figure results only from reforms that involve very significant cuts in the level of NZS as a percentage of average wages, which would be unlikely to be supported by the majority of New Zealanders. The more politically feasible options (raising the age or introducing compulsory saving with abatement of NZS) suggest that national saving flows might increase by at least ½ to 1 per cent of GDP per annum (it would be higher once cumulative returns are included), assuming that the associated fiscal savings are realised, and not cycled back into lower taxes or higher spending.

While additional flows of ½ to 1 per cent of GDP could be considered to be relatively small, the stock impact analysis above shows that their cumulative impact over a period of decades can be very significant. Also, the total impact once cumulative returns are included would be significantly larger. Finally, a combination of reforms would be expected to result in larger additional annual flows.

---

[24] This assumption seems logical based on a neoclassical utility-maximising lifetime consumption model. Some more recent models have allowed for two types of agents: "active" savers who make their saving decisions as a life-time consumption-smoothing model would predict, and "passive" savers who save more when the saving decisions are done automatically for them than when they had to make the saving decisions themselves (e.g., Chetty *et al.*, 2012). Such models may suggest higher saving responses under a mandatory scheme than under the other policy options.

Figure 12

Annual Increase in Total Household Saving Flows Over and Above Business-as-usual Projections, Under Three Hypothetical Retirement Income Policy Reforms
(percent of GDP)

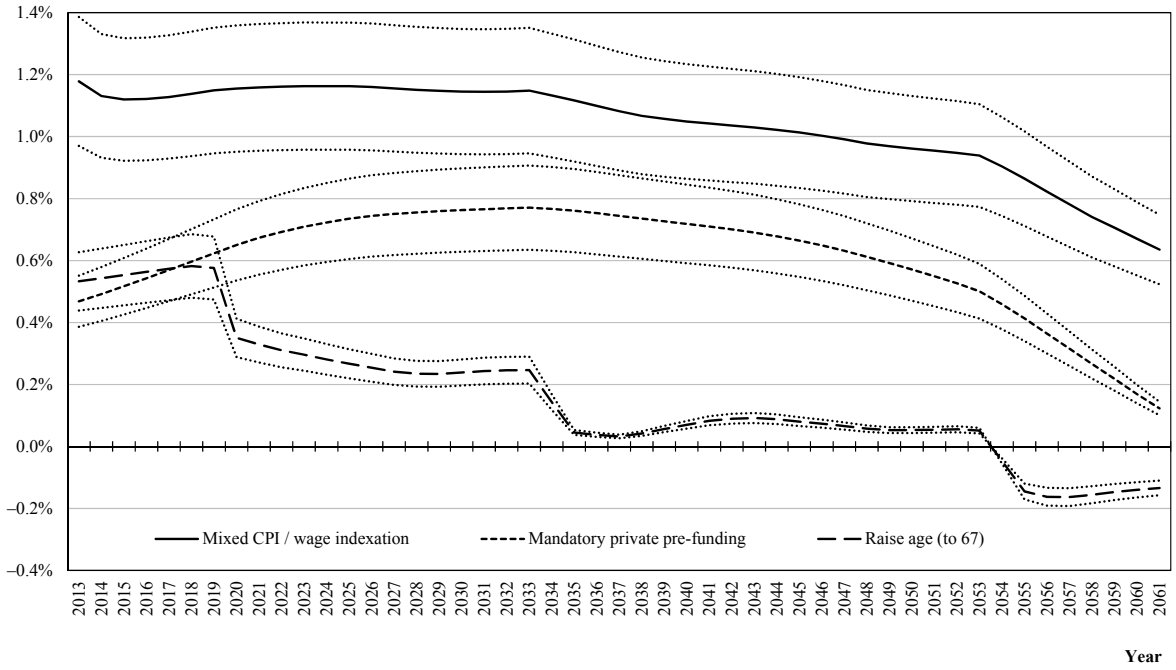


Figure 13

Annual Increase in National Saving Flows, Assuming that Fiscal Savings Are Realised
(percent of GDP)

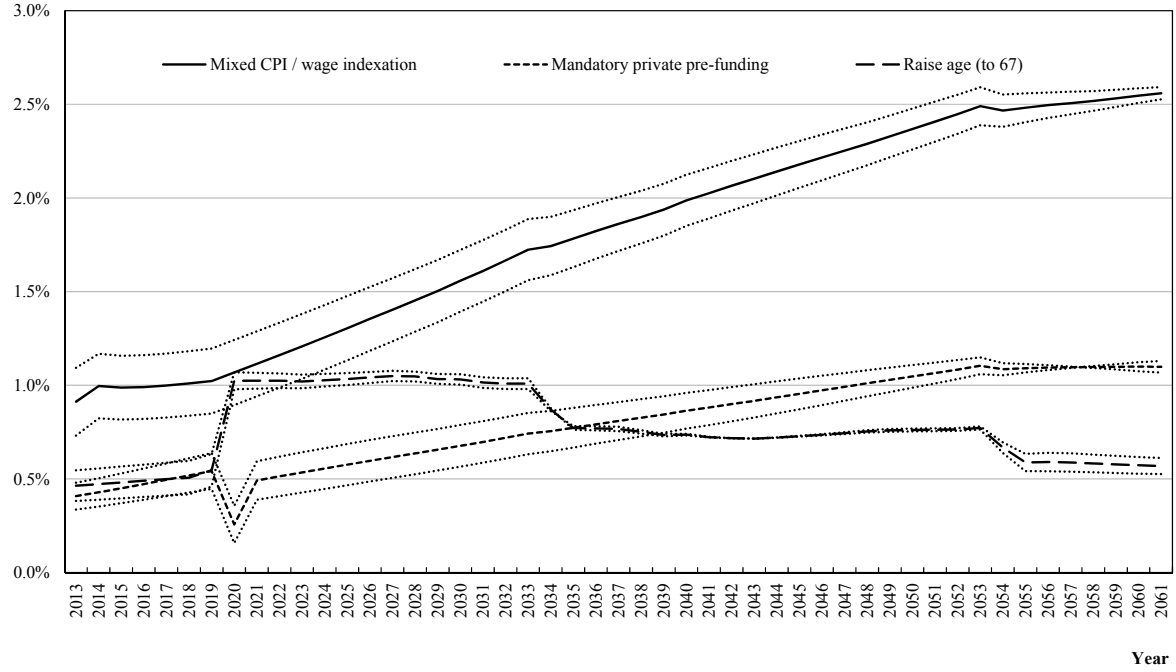
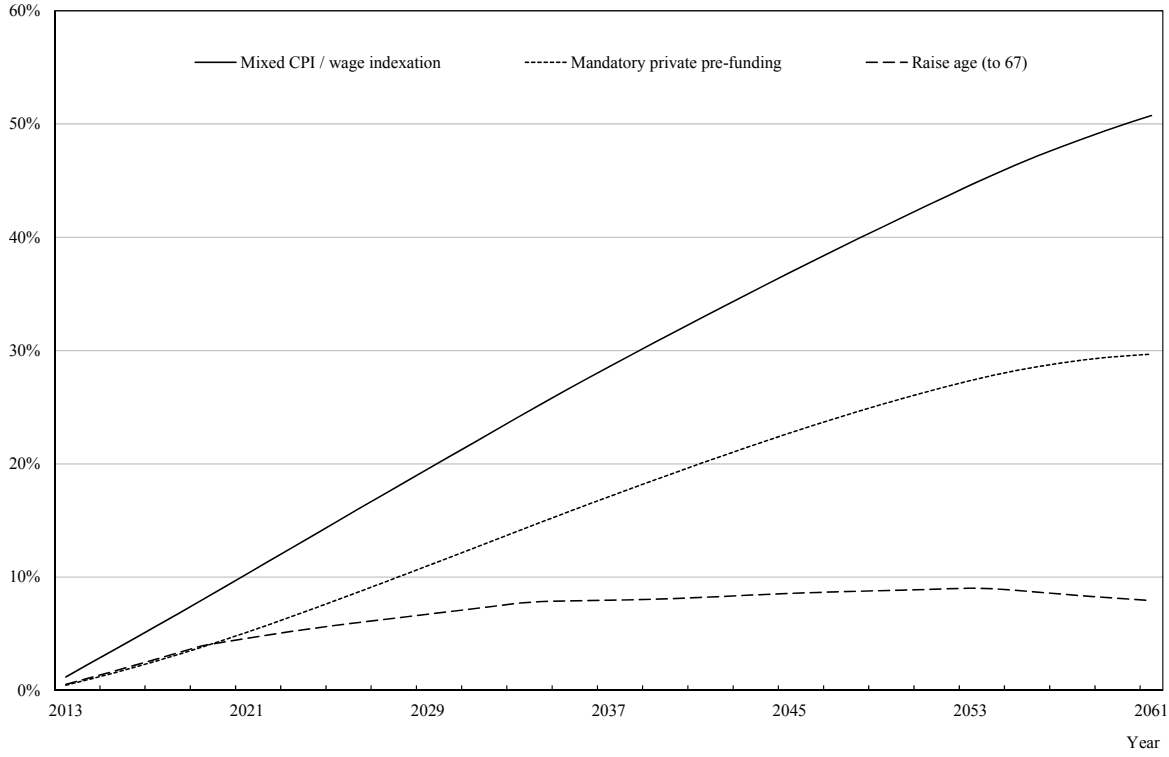


Figure 14

Net International Investment Position, Assuming that Fiscal Savings Are Realised
(percent of GDP)



A more comprehensive analysis of the three hypothetical retirement income policy reform options considered above has been undertaken as part of the Treasury's long term fiscal project (Treasury, 2013b).[25]

As extensions to this quantification exercise it would be useful to compare these estimates with estimates for the likely impact of reforms in other policy areas, such as tax or housing.

6 Conclusion

This paper has considered the role that fiscal policy as viewed through three lenses – fiscal sustainability, structure, and stabilisation – has played in the development of New Zealand's macroeconomic imbalances, and in particular the persistent shortfall of national saving relative to investment.

It has been commonly argued that the best contribution that the government can make to national saving is to increase its own saving – which is part of the *sustainability* role of fiscal

[25] Some of the potential undesirable impacts of the hypothetical reforms to retirement income policies considered would include: health or poverty costs for some people who would find it difficult to work beyond the age of 65; higher old age poverty rates (if NZS re-indexed); transition costs for current working cohorts if a move to more of a SAYGO scheme (compulsory saving); and welfare costs for rational individuals (if saving made compulsory) who may be prevented from saving in their own preferred form, such as paying off their mortgage, or who are forced to save "too much" (*i.e.*, from a consumption-smoothing perspective). These welfare costs would need to be offset by any welfare gains for short-sighted individuals who may be better off under compulsion.

policy. This paper agrees that returning the fiscal balance to surplus and re-building fiscal buffers is important, but argues that efforts to boost private sector saving rates are at least as important.

The paper also considers the *stabilisation* role of fiscal policy. It is noted that fiscal policy probably contributed to the widening of macroeconomic imbalances over the 2005 – 2008 period, when a buoyant economy boosted revenues and permitted strong increases in expenditures, pushing interest rates and the exchange rate up. Changes to the Public Finance Act are expected to put more emphasis on the importance of fiscal policy stabilisation in future economic upturns, although the political economy challenge of ensuring that surpluses are not 'spent' (either on tax cuts or spending increases) during economic upturns is likely to persist. However, in most years fiscal policy has not been pro-cyclical, and there is little reason to think that more stabilising fiscal policy could do much to affect New Zealand's long-standing macroeconomic imbalances.

By contrast, the paper suggests that the *structure* of fiscal policy (*i.e.*, specific tax and spending policies) may have a significantly more important role to play in boosting national saving by influencing incentives for private saving. Internationally, New Zealand stands out as being one of the only OECD countries where individuals do not have access to any significantly-tax-preferred saving vehicles other than property. This suggests that tax reform has potential to both raise the level of saving and improve its composition. One option discussed in the paper would be to reduce the tax rate on capital income, such as by extending the existing PIE regime, although such a reform would need to be packaged together with other changes – such as a capital gains tax – to mitigate the equity and revenue impacts. Another option would be to move toward a private save-as-you-go (SAYGO) pension system, which could involve pairing compulsory savings with means-testing of New Zealand's universal old-age pension (NZS). The quantification exercise discussed in Section 5.2 suggests that this would have significantly beneficial macro-economic impacts: boosting national saving; mitigating external vulnerabilities; and facilitating fiscal sustainability. The micro-economic impacts of compulsion are less clear, as compulsion would likely benefit some individuals but impose costs on others.

REFERENCES

Allsopp, C. and D. Vines (2005), "The Macroeconomic Role of Fiscal Policy", *Oxford Review of Economic Policy*, Vol. 21, No. 4, pp. 485-508.

André, J.P. (2011), "Economic Imbalances: New Zealand's Structural Challenge", New Zealand Treasury, Working Paper, No. 11/03.

Antolin, P., A. de Serres and C. de la Maisonneuve (2004), "Long-term Budgetary Implications of Tax-favoured Retirement Saving Plans", OECD, *Economic Studies*, No. 39, 2004/2.

Attanasio, O.P., J. Banks and M. Wakefield (2004), "Effectiveness of Tax Incentives to Boost (Retirement) Saving: Theoretical Motivation and Empirical Evidence", OECD, *Economic Studies*, No. 39, 2004/2.

Ayuso, J., J.F. Jimeno-Serrano and E. Villanueva (2007), "The Effects of the Introduction of Tax Incentives on Retirement Savings", Banco de España, Research Paper, No. WP-0724.

Barker, F., R. Buckle and R. St. Clair (2008), "Roles of Fiscal Policy in New Zealand", New Zealand Treasury, Working Paper, No. 08/02, available at: http://www.treasury.govt.nz/publications/research-policy/wp/2008/08-02/

Beetsma, R. and M. Giuliodori (2011), "The Effects of Government Purchases Shocks: Review and Estimates for the EU", *The Economic Journal*, Vol. 121, No. 550, pp. F4-F32.

Benjamin, D.J. (2003), "Does 401(k) Eligibility Increase Saving? Evidence from Propensity Score Subclassification", *Journal of Public Economics*, No. 87, pp. 1259-90.

Bernheim, B.D. (2002), "Taxation and Saving", in A.J. Auerbach and M. Feldstein (eds.), *Handbook of Public Economics*, Vol. 3, Elsevier Publishers, B V Netherlands, pp. 1173-249.

Beshears, J., J.J. Choi, D. Laibson and B.C. Madrian (2010), "The Limitations of Defaults", paper prepared for the *12th Annual Joint Conference of the Retirement Research Consortium*.

——————(2012), "Default Stickiness Among Low-income Individuals", RAND Corporation, Working Paper, No. WR-926-SSA.

Blanchard, O. (2007), "Current Account Deficits in Rich Countries", *IMF Staff Papers*, Vol. 54, No. 2.

Brook, A.M. (2013a), "Making Fiscal Policy More Stabilising in the Next Upturn: Challenges and Policy Options", *New Zealand Economic Papers*, Vol. 47, No. 1.

——————(2013b), "Policy Options to Narrow New Zealand's Saving Investment Imbalance", paper prepared for the *Forum on the New Zealand Exchange Rate*, March 26, Wellington.

Burnside, C. (2013), "New Zealand's Risk Premium", *New Zealand Economic Papers*, forthcoming.

Chetty, R., J.N. Friedman, S. Leth-Peterson, T. Heien-Nielsen and T. Olsen (2012), "Active vs Passive Decisions and Crowd-out in Retirement Savings Accounts", NBER, Working Paper, No. 18565.

Coleman, A. (2012), "Pension Payments and Receipts by New Zealand Birth Cohorts, 1916-1986", Motu Economic and Public Policy Research, Working Paper, No. 12-11, September.

Diamond, P. (1965), "National Debt in a Neoclassical Growth Model", *American Economic Review*, Vol. 55, No. 5, pp. 1126-50.

Diamond, P. (1997), "Macroeconomic Aspects of Social Security Reform", *Brookings Papers on Economic Activity*, No. 1997/2, pp. 1-66.

Disney, R., C. Emmerson and M. Wakefield (2007), "Tax Reform and Retirement Saving Incentives: Evidence from the Introduction of Stakeholder Pensions in the United Kingdom", Institute for Fiscal Studies, Working Paper, No. 19/07, London.

Edwards, S. (2006), "External Imbalances in an Advanced, Commodity-exporting Country: The Case of New Zealand", Reserve Bank of New Zealand, *Bulletin*, Vol. 69, No. 4.

Engelhardt, G.V. (2001), "Have 401(k)s Raised Household Saving? Evidence from the Health and Retirement Study", Syracuse University, mimeo.

Engen, E.M. and W.G. Gale (2000), "The Effects of 401(k) Plans on Household Wealth: Differences Across Earnings Groups", NBER, Working Paper, No. 8032.

Feldstein, M. (1974), "Social Security, Induced Retirement and Aggregate Capital Accumulation", *Journal of Political Economy*, Vol. 82, No. 5, pp. 905-26.

Fielding, D., O. Parkyn and P. Gardiner (2011), "Explaining Some Puzzles in the Estimated Response of New Zealand GDP to Fiscal Shocks", paper presented at the *New Zealand Association of Economists Annual Conference*, Wellington.

Gale, W.G. and J.K. Scholz (1994), "IRAs and Household Saving", *American Economic Review*, Vol. 84, No. 5, pp. 1233-60, December.

Gelber, A.M. (2011), "How Do 401(k)s Affect Saving? Evidence from Changes in 401(k) Eligibility", *American Economic Journal: Economic Policy*, Vol. 3, No. 4, pp. 103-22.

Gruen, D. and L. Soding (2011), "Compulsory Superannuation and National Saving", paper prepared for the *2011 Economic and Social Outlook Conference*, 1 July.

Henry, K., J. Harmer, J. Piggott, H. Ridout and G. Smith (2009), *Australia's Future Tax System: Report to the Treasurer*, Commonwealth of Australia, December.

Ilzetzki, E., E. Mendoza and C. Végh (2011), "How Big (Small?) Are Fiscal Multipliers?", International Monetary Fund, Working Paper, No. WP/11/52.

IMF (2012), *New Zealand Staff Report for the 2012 Article IV Consultation*, IMF, Country Report, No. 12/132.

IMF (2011), "How Well Do Standard Models Explain Australian and New Zealand Saving Behaviour?", New Zealand: Selected Issues Paper, IMF, Country Report, No. 11/103.

Labuschagne, N. and P. Vowles (2010), "Why Are Real Interest Rates in New Zealand So High? Evidence and Drivers", New Zealand Treasury, Working Paper, No. 10/09.

Lane, P. (2010), "Some Lessons for Fiscal Policy from the Financial Crisis", Institute for International Integration Studies, Discussion Paper, No. 334.

Law, D. (2013), "Retirement Income Policy and National Saving", New Zealand Treasury, Working Paper, No. 13/28.

Law, D., L. Meehan and G.M. Scobie (2011), "KiwiSaver: An Initial Evaluation of the Impact on Retirement Saving", New Zealand Treasury, Working Paper, No. 11/04.

López Murphy, P. and A.R. Musalem (2004), "Pension Funds and National Saving", The World Bank, Policy Research, Working Paper, No 3410, Washington (D.C.).

OECD (2011), *OECD Pensions at a Glance 2011: Retirement-income Systems in OECD and G20 Countries*, OECD, Paris.

OECD (2007), "Encouraging Savings Through Tax-preferred Accounts", OECD, Tax Policy Studies, No. 15.

Parkyn, O. and T. Vehbi (2013), "The Effects of Fiscal Policy in New Zealand: Evidence from a VAR Model with Debt Constraints", New Zealand Treasury, Working Paper, No. WP13/02.

Poterba, J.M., S.F. Venti and D.A. Wise (1995), "Do 401(k) Contributions Crowd Out Other Personal Saving?", *Journal of Public Economics*, Vol. 58, pp. 1-32.

——————(1996), "How Retirement Programs Increase Savings", *Journal of Economic Perspectives*, Vol. 10, No. 4, pp. 91-112.

Reddell, M. (2013), "The Long-term Level 'misalignment' of the Exchange Rate: Some Perspectives on Causes and Consequences", paper presented at the *Reserve Bank/Treasury Exchange Rate Forum*, Wellington, 26 March.

Reserve Bank of New Zealand (2012), *Financial Stability Report*, November.

Savings Working Group (2011), "Saving New Zealand: Reducing Vulnerabilities and Barriers to Growth and Prosperity", Final Report to the Minister of Finance, ISBN: 978-0-478-35095-1.

Schule, W. (2010), "The Potential Contribution of Fiscal Policy to Rebalancing and Growth in New Zealand", International Monetary Fund, Washington (D.C.).

Steenkamp, D. (2010), "New Zealand's Imbalances in a Cross-country Context", *Reserve Bank of New Zealand Bulletin*, Vol. 73, No. 4, December.

Treasury (2013a), "Affording Our Future: Statement on New Zealand's Long-term Fiscal Position", available at: http://www.treasury.govt.nz/government/longterm/fiscalposition/2013

——————(2013b), "Future Costs of Retirement Income Policy, and Ways of Addressing Them, background paper for the Long Term Fiscal Statement", available at: http://www.treasury.govt.nz/government/longterm/fiscalposition/2013/pdfs/ltfs-13-bg-fcrip.pdf

——————(2011), "Briefing to the Incoming Minister of Finance: Increasing Economic Growth and Resilience", available at: http://www.treasury.govt.nz/publications/briefings/2011

——————(2009), "Where to From Here for Tax Reform?", Treasury Report T2009/2714, available at: http://www.treasury.govt.nz/publications/informationreleases/budget/2010/pdfs/b10-t2009-2714.pdf

Treasury and IRD (2013), "Taxation of Savings and Investment Income", joint report from Treasury and the Policy Advice Division of the Inland Revenue Department, T2012/2470, PAD 2012/206, available at: http://www.treasury.govt.nz/publications/informationreleases/tax/savingsinvestmentincome

OIL-DEPENDENT REVENUES AND MACROECONOMIC STABILITY UNDER FISCAL AND MONETARY RULES: AN ANALYSIS FOR MEXICO

Ana María Aguilar[*] *and Claudia Ramírez Bulos*[*]

In this paper we develop a small open economy macroeconomic model, and estimate it for Mexico. We incorporate the effect of oil prices on public finances. Assuming monetary policy follows an optimal policy rule, we evaluate the impact of two different fiscal policy rules: a balanced budget rule or a structural-balance rule on macroeconomic stability. We find that when the economy faces inflation or consumption shocks, both rules generate almost the same effect. However, when oil price shocks occur, higher macroeconomic stability is achieved and the monetary authority reacts less aggressively under the structural balance-rule. These results are even more relevant with the recent proposals to flexibilize the energy pricing policy in Mexico.

1 Introduction

Fiscal policy and public debt are important for monetary policy since they can influence the level of aggregate demand and interest rates and they may also affect monetary authorities' ability to control inflation. Standard economic theory suggests that fiscal policy should be countercyclical.[1] A procyclical fiscal policy translates into higher public spending and lower tax rates in good times, and viceversa. However, in practice governments seem to follow pro-cyclical fiscal policies, as some authors have already documented.[2] This feature is even more important in developing economies, particularly for commodity-rich countries, where revenues linked to commodities can be a large portion of government revenues. Hence, when commodity prices are high, sometimes linked to positive global growth perspectives, governments might have more revenues and spend more. Additionally, the fact that commodity prices are generally very volatile, overall revenues become volatile as well.[3]

Mexico, as other commodity exporter countries has faced a number of challenges derived from the management of commodities, particularly oil. In this country, public finances are significantly influenced by the movements on oil prices. In the first place, more than 30 per cent of the public sector's revenues are from oil, in the second place, energy prices are set by a rule determined by the government. This rule is supposed to act as a tax when energy prices abroad are low and as a subsidy when those prices are high. Indeed, before mid-2000s, this rule functioned as a tax, however, during the last decade energy prices have been showing an upward trend and, although they declined temporary during the 2008-09 financial crisis, recently they reached historically high levels and elevated volatility.

In this sense, it is important to reconsider the way public expenditures are determined by such a volatile source of revenues, and to re-think the appropriateness of the energy pricing rule in this new environment. Thus, in this paper we develop a small open economy macroeconomic

---

[*] Banco de México.

E-mail: amaguilar@banxico.org.mx, and claudia.ramirez@banxico.org.mx

The authors thank Daniel Sámano and Carlos Lever for their useful comments. MauricioTorres, José Manuel Rodríguez and Miriam González provided us with excellent research assistance.

The opinions expressed in this article are solely those of the authors and do not necessarily reflect the views of Banco de México.

[1] See Barro (1979).

[2] See Talvi and Vegh (2005), Gavin and Perotti (1997), Stein *et al.* (1999), and Lane (2003).

[3] See Céspedes and Velasco (2011).

model, and estimate it for Mexico, incorporating the effect of oil prices on public finances. Assuming monetary policy follows an optimal policy rule, we evaluate the impact of two different fiscal policy rules: a balanced budget rule or a structural-balance rule. We find that when the economy faces inflation or consumption shocks, both rules generate almost the same effect. However, when oil price shocks occur, the monetary authority reacts less aggressively and higher macroeconomic stability is achieved under the latter rule. These results are even more relevant with the recent proposals to flexibilize the energy pricing policy.[4]

It is important to mention that Mexico, like many other developing economies, has showed some convergence towards greater transparency and accountability, recognizing the benefits of the authority taking decisions under clear and transparent procedures, under a regulatory framework versus a discretionary one. In recent years, Mexico has made some important reforms. Indeed, one of the major actions taken was recognizing in the Constitution, in 1994, the autonomy of the central bank, thus generating greater monetary policy credibility.

In turn, some reforms regarding fiscal policy were put in place as well. In 2006 the Fiscal Responsibility Act was approved in which, among other things, it requires that the economic package is formulated based on medium-term projections, in particular establishing a formula for setting the price of oil to fix the budget for the next fiscal year, and does not allow the tax authorities running deficits. These reforms allowed achieving lower levels of deficit and debt, limiting and eventually eliminating the fiscal dominance situation, which allowed the monetary policy to fulfill its mission of maintaining price stability and generating greater macroeconomic stability. However there are still some vulnerabilities that prevail in the Mexican public finances and that during the recent financial crisis were present, the still high dependence of public revenues on oil revenues, and the fact that energy prices are set by a rule determined by the government, as we have mentioned.

Thus, we consider this a relevant issue for Mexican macroeconomic policies, since all sources of volatility for the macroeconomy that are not managed by the fiscal authorities might be addressed by the monetary ones. Even though the energy pricing rule may be convenient from the inflation stability perspective in the short run, since it absorbs the major part of energy prices volatility, it could imply such high costs in terms of public finances that in the medium term it might become a threat for price stability. In addition to that, the dependence of public finances on oil prices makes it very common for the government to "close" the government budget with adjustments in public prices and rates fixed by the government. This is a very important source of uncertainty for inflation (especially non-core component) and therefore inflation expectations.

The central bank has been very successful in accommodating supply shocks to inflation, specifically exchange rate fluctuations and volatility in agricultural prices. However, the Mexican economy has not yet learned to absorb, in an orderly way, energy price volatility. Therefore, this is an open issue and still a challenge from the monetary policy perspective.

Given the current environment and international conditions in the oil market, the actions undertaken in the recent past can lead to better results if the authority considers additional elements to isolate the effects of cyclical elements in the macroeconomic decisions. Thus, these matters are taken into account in this paper in which we develop a small open economy macroeconomic model for policy analysis, incorporating the effect of oil prices on public finances, in an environment in which monetary policy follows an optimal policy rule, and fiscal policy follows one of two rules: a balanced budget rule or a structural-balance rule. The purpose is to identify the effect of these different fiscal rules on the Mexican economy to various shocks and their effects on macroeconomic stability.

---

[4] The energy pricing policy is described later in the document.

The paper is organized as follows. In Section 2 we describe some common features of the fiscal rules that have been put in place in a number of economies. In Section 3 we present the model. In Section 4 we describe the data we used to estimate and calibrate the model. In Section 6 we analyze the two policy rules showing some exercises and Section 5 concludes.

2 Fiscal rules

During the past two decades monetary policy in many emerging economies was constrained by the high levels of public debt. Nevertheless, mainly during the 1990s many emerging countries implemented some policies that led to reduced debt levels generating a better fiscal position. Indeed many economies implemented formal fiscal rules. Three "waves" can be observed as (Schaechter *et al.*, 2012) mentions. The first one in the early and mid-1990s in part responding to bank and debt crises as well as consolidation needs to qualify for the euro area. The second one was driven largely by emerging economies in the early 2000s when many adopted rules and reformed fiscal frameworks in responses to experience with fiscal excesses, and more recently the third "wave" in response to the recent crisis. In general, the main arguments supporting the use of fiscal rules are to achieve macroeconomic stability, to support other political rules, to obtain sustainable fiscal policies, among others. Notwithstanding, in Latin America, some of the rules implemented prior to the recent crises were more effective in terms of addressing fiscal sustainability as compared to the capacity of responding to shocks, as Berganza (2012) mentions. Thus strong medium-term growth prospects, in many emerging markets' fiscal positions are still exposed to financial and external demand shocks, particularly those commodity exporters.

There have been several empirical studies regarding fiscal rules. One of the main research areas in relation to fiscal rules focuses on determining whether the rules actually restrict the government's ability to use fiscal policy to smooth business cycle fluctuations.

Bayoumi and Eichengreen (1995) use data from 1971-90 for the United States to find that the reduction in fiscal stabilizers can lead to a significant increase in aggregate output variations. In another study, Alesina and Bayoumi (1996) show that even though the tax rules are associated with less variability cyclical fiscal balance, this does not lead to increased output variability. They used data for U.S. states from 1965 to 1992 and found that there is statistically significant relationship between the actual output variability and severity states of fiscal controls. They speculate that this could occur simply because state-level stabilization might not be very important or because stronger controls limit fluctuations in the surplus that could be politically motivated and are potentially destabilizing and limiting countercyclical policies, which could lead to uncertainty in the impact on output variability.

Meanwhile, Levinson (1998) notes that Alesina and Bayoumi (1996) do not control for unobservable characteristics that may be correlated with the business cycle fluctuations and the existence of state fiscal controls. He suggests that the size of the state is correlated with the ability to affect cycle fluctuations through countercyclical fiscal policies and remarks that state tax policy matters more in large states than in small ones, thus the difference between the business cycle fluctuations in states with fiscal controls and strict controls is actually higher among large states than between small states, hence concluded that there is evidence that a strict fiscal rule as the budget balance exacerbates the business cycle fluctuations.

In turn, Galí and Perotti (2003) investigated whether the Maastricht Treaty and the Stability and Growth Pact in Europe weakened the ability of European governments to conduct a stabilizing fiscal policy. This is done by estimating fiscal rules for the discretionary budget deficit in the period 1980-2002, using data from the European countries in the monetary union and control groups of countries that are not part of the monetary union. They find that discretionary fiscal

policy in EMU countries have become more counter-cyclical over time, following a trend that seems to be affecting other industrialized economies as well. In turn, there is some evidence on the pro-cyclicality of fiscal policy in Latin America (see Gavin and Perotti (1997); Kaminsky *et al.*, 2005; Daude *et al.*, 2011) which contributes to macroeconomic volatility.

In sum, after the economic crisis, some governments that already had some sort of fiscal rules in place might need to adjust them based on the lessons resultant from experiences after the crisis and some other countries will start implementing them. It is also noteworthy that in many countries fiscal rules were violated during the crisis as many governments have adopted stimulative policies. However, combining automatic responses and discretionary stimulative actions has produced some imbalances in many countries. One of the most common ways to evaluate the possible effect of certain policies in a particular economy is through the analysis of economic models that describe the dynamics of the main macroeconomic variables. In the following section, a macroeconomic model is developed in which fiscal and monetary policies interact in the context of a small open economy.

3 Model

In this section we present the model used in this paper to analyze the effect of implementing fiscal rules on macroeconomic stability. We develop a standard semistructural small open economy neokeynesian model. Even though the coefficients of the model have a theoretical background, they are presented in a reduced form.[5] In particular, the aggregate supply is modeled by a New Phillips Curve; the aggregate demand is determined by its main components: private consumption, government spending, investment, exports and imports, these equations are derived from each components' optimization process and are expressed in terms of reduced form parameters.

Additionally, the model incorporates an equation to describe the behavior for the real exchange rate and two policy rules: an optimal monetary policy rule and a fiscal rule. The design of the fiscal policy takes into account two different alternatives: a balanced budget and a structural balance.

This model considers the existence of oil, whose price is determined in international markets (*i.e.*, the price is exogenous to the model) and production of this natural good is owned by the government, as it is the case in Mexico.[6]

3.1 Model specification

3.1.1 Aggregate demand

The aggregate demand is defined as the sum of its different components, private consumption, private investment, government spending and the trade balance (exports and imports).[7]

The different components of aggregate demand are modeled individually with reduced form coefficients, which take into account a number of features. First, the aggregate demand in this model is an extension of the optimizing IS-LM model specification for an small open economy which incorporates an external sector, for this purpose, the model developed by McCallum and

---

5 See Mc Callum and Nelson (1999).

6 The estimation of the model for the Mexican economy is presented in the Appendix.

7 Inventories are considered a residual.

Nelson (1999) is the main reference for this paper. Second, the equations used in this work were developed for three main purposes: i. to capture the persistence of the variables, ii. to incorporate the agents' expectations and allow them to smooth their behavior, and iii. to generate a structural relationship between variables. These main features allow for a simple model to explain the behavior of an small open economy, such as Mexico.[8] The government spending dynamics is described in more detail at the end of the section.

Private consumption

In order to capture an important feature of Mexican consumers, we assume that there is a fraction Φ of consumers who have access to financial markets, so that they can smooth consumption over time by accumulating financial assets.[9] While a fraction $(1-\Phi)$ do not have access to financial markets and consume only their disposable income each period.[10]

To model the behavior of consumers with access to financial markets, we use the specification of McCallum and Nelson (1999), where consumers' optimization process, after some manipulation, leads to the following representation:

$$c_t^{FM} = \alpha_0 + \alpha_1 c_{t-1}^{FM} + \alpha_2 E_t\left[c_{t+1}^{FM}\right] + \alpha_3\left(R_t - E_t\left[\Delta p_{t+1}\right]\right) + \upsilon_{c,t} \tag{1}$$

In equation (1), $\alpha_3<0$, c_t^{FM} is the logarithmic deviation of consumption (Dixit Stiglitz type) of the agents with access to financial markets of the goods that the representative agent consumes in period t, taking into account consumption habits. R_t is the nominal interest rate paid for bonds in the domestic country, $E_t[\Delta p_{t+1}]$ is the expected inflation rate over the next quarter, so $R_t - E_t[\Delta p_{t+1}]$ is the real *ex ante* interest rate, and vc_t is a stochastic shock related to the agents' preference over present and future consumption, with zero mean and constant variance, $\sigma^{2,vc^{FM}}$.

The consumption for agents without access to financial markets, is simply modeled by:

$$c_t^{NFM} = \left(x_t - t_t^{tax}\right) + \upsilon_{c,t} \tag{2}$$

where $x_t - t^{tax,t}$ is the log linearized disposable personal income, and $t^{tax,t}$ is the income tax.

Private investment

In the spirit of the consumption equation, it is assumed that private investment also maintains a hybrid dynamic so the behavior for present investment depends on the projects started in the past, on the expectations for future investment and on the real ex-ante interest rate, resulting in the following equation:

$$in_t = \vartheta_0 + \vartheta_1\, in_{t-1} + \vartheta_2\, E_t\left[in_{t+1}\right] + \vartheta_3\left(R_t - E_t\left[\Delta p_{t+1}\right]\right) + \upsilon_{in,t} \tag{3}$$

---

8 These components are expressed in terms of deviations from their tendency in an effort to identify in a simple fashion the transmission mechanism of the monetary and fiscal policies over the output level.

9 Following Woodruff (2006) in Mexico around 74 per cent of the population has access to financial markets, whereas 26 per cent do not have access.

10 The model equations can be derived from an infinite horizon scheme where agents choose optimal consumption and debt paths and each one of these agents produce a good with a certain level of market power.

In this equation, $\vartheta_3 < 0$, in_t is the logarithmic deviation from private investment with respect to its tendency and $R_t - E_t[\Delta p_{t+1}]$ is the real *ex ante* interest rate. υin_t is a stochastic shock related to the investors preferences over intertemporal investment, with mean zero and constant variance $\sigma^2_{\upsilon in}$.

Exports

Given the context of a small open economy, the domestic economy exports goods to a small fraction of foreign consumers and the level of exports do not affect the price level of the foreign economy. Aggregate exports in this model are positively related to the real exchange rate, $Q_t \equiv S_t P_t^* / P_t^A$, so the equation that describes exports is given by the following expression:

$$ex_t = \delta_0 + \delta_1 ex_{t-1} + \delta_2 E_t\left[ex_{t+1}\right] + \delta_3 q_t + \delta_4 x_t^{US} + \upsilon_{ex,t} \tag{4}$$

In equation (4), ex_t represents the logarithmic deviation of exports with respect to its tendency, q_t represents the real exchange rate, x_t^{US} represents the foreign country' output gap and υex_t represents a stochastic shock related to the preferences from foreign consumers towards domestic goods, with mean zero and constant variance , $\sigma^2_{\upsilon ex}$.

Imports

The domestic economy does not only consume domestic production goods, but also imported goods from abroad that can be used as production inputs. In this case, imports, im_t depend on consumers' habits with respect to consumption of foreign goods and the expectations for future imports. Imports are also affected by the real exchange rate, q_t, and by the domestic output gap as defined bellow:

$$im_t = \gamma_0 + \gamma_1 im_{t-1} + \gamma_2 E_t\left[im_{t+1}\right] + \gamma_3 q_t + \gamma_4 x + \upsilon_{im,t} \tag{5}$$

In this case, the term υim_t represents a stochastic shock related to domestic consumers' preferences towards foreign goods, with mean zero and constant variance, $\sigma^2_{\upsilon im}$.

Inventories

It is assumed that inventories follow an AR(1) process given by:

$$inven_t = \rho_{\upsilon e} inven_{t-1} + \upsilon_{invent,t} \tag{6}$$

where $\rho_{\upsilon e} < 1$ and $\upsilon inven_t$ is a stochastic shock with mean zero and constant variance $\sigma^2_{\upsilon ex}$. This variable is commonly a residual that allows the output level to be adjusted; in this case it is assumed exogenous.[11]

[11] This component is also specified as a residual in the estimations presented in the Appendix.

3.1.2 New Phillips curve

In Neo-Keynesian models, a natural way to describe aggregate supply is through a Phillips Curve, which relates the price level in an economy with its output level. Following McCallum and Nelson (1999), in order to incorporate nominal rigidities, we assume that the economy has gradual price adjustments when firms take production decisions, so the description of price dynamics is fitted properly by a Phillips Curve equation. Many studies have tried to describe inflation dynamics for several countries using backward and forward-looking components,[12] in particular, for Mexico, Ramos-Francia and Torres (2005) find that the New Neo-Keynesian Phillips Curve properly describes inflation dynamics in Mexico.

Following that specification, we use a hybrid Phillips curve to describe the inflation dynamics. Additionally, we use core inflation since it best reflects inflationary pressures as it might be considered "the structural inflation of the economy". The New Phillips curve equation is the following:

$$\pi_t^C = \alpha_1 \pi_{t-1}^C + \alpha_2 E_t\left[\pi_{t+1}^C\right] + \alpha_3 x_t + \alpha_4 \left(\Delta ner_t + \pi_t^{US}\right) + \upsilon_\pi \tag{7}$$

where core inflation π_t^C is affected by past inflation, π_{t-1}^C by the expectations for future inflation, $E_t\left[\pi_{t+1}^C\right]$ by the output gap, x_t, and since it is a small open economy, it is also affected by changes in the nominal exchange rate and foreign inflation, $\Delta ner_t + \pi_t^{US}$.

Additionally, a stochastic shock is included related to changes in inflation dynamics with the traditional features of zero mean and constant variance.

3.1.3 Real exchange rate

The real exchange rate equation used in this model considers the real interest rates parity:

$$rer_t = E_t\left[rer_{t+1}\right] + \left(r_t^{US} - r_t\right) \tag{8}$$

However, one of the main disadvantages for this equation is that the real exchange rate adjusts instantly given any imbalance producing an overshooting of its estimated value. Several proposals have been made in the literature to avoid this abrupt adjustment of the exchange rate (delayed overshooting) as described in Eichenbaum and Evans (1995).

One of the solutions proposed to this problem consists in incorporating an exchange rate lag in the interest rate parity condition. This procedure generally results statistically significant in order to explain the real exchange rate since it replicates the observed persistence in the real exchange rate dynamics generating a gradual adjustment. Under this assumption, it is implicitly supposed that the exchange rate depends on the real exchange rate in the previous period and on the expectations of the exchange rate on the following period, as presented in the following equation.

$$rer_t = c_0 rer_{t-1} + c_1\left(E_t\left[rer_{t+1}\right] + \left(r_t^{US} - r_t\right)\right) \tag{9}$$

3.1.4 Monetary policy rule

In this model, the monetary policy instrument, the short-run nominal interest rate, is obtained through an optimal rule following Söderlind (1999).

---

[12] See Galí and Gertler (1999) among others.

We calculate optimal discretionary monetary policy rules for each fiscal policy rule tested. This methodology does not require us to specify the form of the optimal instrument, since it is a function of all the values of the state-vector of the model.

In order to calculate this optimal policy rule we assume that the monetary authority minimizes a standard loss function. Hence, we define the loss function L as:

$$L = E_t \left\{ \sum_{j=0}^{\infty} \varphi^j \left[\left(\alpha_\pi \left(\pi_{t+j} - \pi^* \right)^2 + \alpha_x x_{t+j}^2 + \alpha_i \left(i_{t+j} - i_{t+j-1} \right)^2 \right) \right] \right\} \tag{10}$$

s.t. the structure of the economy (*inflation*, *aggregate demand*, *real exchange rate*)

In this loss functions, α_π, α_x and α_i represent the relative importance of output and inflation gaps as well as interest rate smoothing, and we assume that the authority assigns the same weight to the three of them.[13]

3.1.5 Fiscal policy rule

In this model, government spending not only is considered part of the aggregate demand, but it is also subject to fiscal rules that determine how fiscal adjustments should be done by the authority given exogenous shocks.

We assume that the budget constraint for the government is the following:

$$B_t = G_t - T_t + \left(R_{t-1} + \Psi \left(\exp\left(B_{t-1} - b \right) - 1 \right) \right) B_{t-1} \tag{11}$$

where B_t is the real level of government indebtedness, b represents the debt level in the stationary state, G_t represents real government spending, T_t represents public revenues, R_{t-1} is one plus real interest rate $(1+r_t)$ and $(R_{t-1} + \Psi \exp(B_{t-1} - b) - 1)$ is the cost of debt.[14] In this expression, $\Psi>0$, is the interest rate elasticity given changes in debt levels, the cost is defined this way because the price of debt is sensitive to the level of outstanding debt.

Additionally it is supposed the existence of a commodity, oil, sold abroad with production rights owned by the government, so the revenues from this sale are entirely for the government.

Therefore, public revenue has two main components tax revenues on the one hand, and oil revenues on the other.

Total revenues are described as:

$$T_t = \varphi_1 \, \tau \, Y_t + \left(1 - \varphi_1 \right) P_t^{oil} Y_t^{oil} \tag{12}$$

where φ_1 is the share of tax revenues, τ is the tax rate, $(1 - \varphi_1)$ is the share of oil revenues, P_t^{oil} is the price of oil in period t and Y_t^{oil} is oil production in period t.

Government spending may follow two different behaviors depending on the fiscal rule in turn.

---

[13] See Appendix for more details about the optimal policy rule.

[14] This expression incorporates an adjustment cost following Schmitt-Grohe and Uribe (2001), so the debt is not undetermined, given the fact that R_t is greater than one so debt is not stationary. Assuming such adjustment cost, we can ensure stationarity by supposing that $(R_{t-1}+\Psi\exp(B_{t-1}-b)-1)$ is less than one.

Balanced Budget Rule:

In this case, the government meets the balanced budget restriction but there exists the possibility of issuing debt, so government spending adjusts in the following way:[15]

$$G_t = T_t - \left(R_{t-1} + \Psi\left(\exp\left(B_{t-1} - b\right) - 1\right)\right) B_{t-1} \tag{13}$$

With the balanced-budget rule (BB), the government can spend only what it receives from tax and oil revenues minus the debt service, constant over time. However, after an increase in output, tax revenues increase allowing for a higher spending level while meeting the rule. In the same way, after a decrease in output, government spending must be reduced in order to meet the rule. The same behavior for government spending is observed after changes in oil revenues. Therefore this rule is pro-cyclical.

Structural Balance Rule:

In the same spirit as in Galí and Perotti (2003) the structural fiscal deficit or structural balance (SB), attempts to factor out cyclical components from the actual budget balance. In general, the actual balance reflects both cyclical and structural factors that might over- or underadjust budget developments by the government but separating cyclical from structural factors might help diminish these overadjustments.[16]

Assume that the balance is represented as follows:

$$BA_t = T_t - G_t - \left(R_{t-1} + \Psi\left(\exp\left(B_{t-1} - b\right) - 1\right)\right) B_{t-1} \tag{14}$$

$$B_{st} = BA_t - \tilde{T}_t = T_t - \tilde{T}_t - G_t - \left(R_{t-1} + \Psi\left(\exp\left(B_{t-1} - b\right) - 1\right)\right) B_{t-1} \tag{15}$$

being $\tilde{T}_t = \varphi_1 \tau \left[Y_t - Y_{ref} \right] + \left(1 - \varphi_1\right) \left[P_t^{oil} - P_{ref}^{oil} \right] Y_t^{oil}$. In this case Y_{ref} is defined as potential output level and P_{ref}^{oil} as a price reference for oil.[17]

The structural balance rule used in this paper is based on the rule currently followed by Chile and takes into account the model described by Medina and Soto (2007) for this Latin American economy when defining the structural balance rule.[18]

While following this type of rule, a shift in oil price causes an increase in the level of cyclical revenues since the gap for oil price with respect to its reference level increases, and so the structural deficit level diminishes. In order to maintain the structural deficit level unchanged, government spending should decrease to compensate for this effect. The same is true when output level deviates from its potential level, after an increase in output, cyclical revenues increase with the same effect on the structural deficit. In this way, fiscal policy does not overadjust over the cycle.

---

15 Under the balanced budget rule it is possible to isolate the effect of monetary policy on fiscal behavior; while for a positive level of debt, monetary policy actions through interest rate affect the cost of debt.

16 See Fiess (2004).

17 The oil reference price for Mexico is determined as a weighted average of observed prices and futures, as described in the Fiscal Responsibility Act.

18 Given the log-linearized structure of the model, the structural balance level as a fiscal policy rule becomes irrelevant. Constant levels in this type of models do not affect the result since variables are expressed in terms of deviations from the steady state.

Equations (11) to (15) are expressed in levels, however, in order to be incorporated in the model and maintain the same structure as the rest of the equations in the model it is necessary to log-linearize them. In this case, the equations are expressed in the following way:

Budget constraint: $$b_t = s_1 g_t + s_2 b_{t-1} + s_3 r_{t-1} - s_4 t_t \quad (16)$$

Public revenues: $$t_t = q_1 x_t + q_2 \left(p_t^{oil} + x_t^{oil} \right) \quad (17)$$

Balanced Budget Rule: $$g_t = n_1 x_t + n_2 p_t^{oil} + n_3 x_t^{oil} - n_4 b_{t-1} - n_5 r_{t-1} \quad (18)$$

Structural Balance Rule: $$g_t = j_1 x_t^{ref} + j_2 p_{ref}^{oil} + j_3 x_t^{oil} - j_4 b_{t-1} - j_5 r_{t-1} - j_6 \left(bas_t + x_t \right) \quad (19)$$

Variables b_t , g_t , t_t , p_t^{oil} , p_{ref}^{oil} , x_t^{oil} and x_t , x_t^{ref} are logarithmic deviations of real debt, government spending, oil price, oil production and output level, respectively; r_t is the short-run real interest rate.[19]

We assumed that non-core inflation, oil price gap, oil production gap and inventories follow an AR(1) process.

The output gap is computed as the weighted sum of its components' gaps, and the foreign variables follows an autoregressive vector.

Foreign Variables:

$$\pi_t^{US} = \phi_0 + \phi_1 \pi_{t-1}^{US} + \phi_2 \pi_{t-2}^{US} + \phi_3 x_{t-1}^{US} + \phi_4 x_{t-2}^{US} + \phi_5 i_{t-1}^{US} + \phi_6 i_{t-2}^{US} + \nu_t^{\pi US} \quad (20)$$

$$x_t^{US} = k_0 + k_1 \pi_{t-1}^{US} + k_2 \pi_{t-2}^{US} + k_3 x_{t-1}^{US} + k_4 x_{t-2}^{US} + k_5 i_{t-1}^{US} + k_6 i_{t-2}^{US} + \nu_t^{\pi US} \quad (21)$$

$$i_t^{US} = \chi_0 + \chi_1 \pi_{t-1}^{US} + \chi_2 \pi_{t-2}^{US} + \chi_3 x_{t-1}^{US} + \chi_4 x_{t-2}^{US} + \chi_5 i_{t-1}^{US} + \chi_6 i_{t-2}^{US} + \nu_t^{\pi US} \quad (22)$$

4 Data

In this section we describe the data used for the analysis. The relevant variables regarding the Mexican economy are: private consumption, government spending, investment, exports, imports, real debt, nominal and real exchange rates. For Mexico and the U.S., the variables of interest are inflation, nominal and real interest rates, output gap and the crude oil price. Our sample ranges from the first quarter of 2002 to the third quarter of 2012. We decided to use this sample since variables such as inflation started to be stationary in Mexico since then (Capistran *et al.*, 2008). For Mexico, quarterly data of GDP components: private consumption, government spending, investment, trade balance, was used to estimate gaps for each of these variables. Each gap is defined as the percentage deviation (logarithmic difference) between the level of each variable and its trend, calculated using the Hodrick-Prescott filter. Monthly core and non-core inflation were transformed into quarterly data. The source of all data is INEGI. Inflation target, prior to 2004, was calculated by a quarterly lineal interpolation of inflation targets established by Banco de México in its Annual Inflation Reports. Since 2004 it corresponds to the current 3 per cent target established by Banco de México. Nominal exchange rate refers to FIX exchange rate in pesos per dollar and real exchange rate corresponds to an index (base 1990=100). The periodicity of these series is daily so we calculated the quarterly average and expressed them in

[19] The parameters *s*,*q*,*n* and *j* are define after log-linearizing the model, and are presented in Appendix 1.

logarithms. Regarding nominal interest rate, it corresponds to 91-days CETES yield. Real interest rate was estimated from the nominal interest rate and 12 months inflation expectation. The source of this data is Banco de México.

With respect to U.S variables, CPI was extracted from the Bureau of Labor Statistics. Nominal interest rate corresponds to 3-month Treasury bills secondary market rate, which was provided by the Federal Reserve. Real interest rate was calculated using the nominal interest rate and 12 months inflation expectation, published by Michigan University (Survey Research Center). As in the case of Mexican variables, we transformed them into quarterly data. The source of output gap data is Haver Analytics and the crude oil price was provided by Bloomberg.

In order to analyze the dynamics of the Mexican business cycle, we estimated the volatility of GDP and its components, measured as the standard deviation, and the cross correlation between GDP and the rest of the variables. First we analyze the performance of these variables across the entire sample and then we divide it into two subsamples: the first one ranges from the first quarter of 2002 to the last quarter of 2007, just before the international financial crisis started; and the second one goes from the first quarter of 2008 to the third quarter of 2012.

In Table 1 we report the results for the entire sample. As we can observe from column seven, all the components of GDP, except public consumption are highly pro-cyclical, being private consumption and imports the components with higher correlation with the GDP gap. Regarding private consumption, we can also see from the second column that in contrast with what the consumption theory would suggest, consumption is more volatile than output. Nevertheless, this result is consistent with previous studies of business cycles in emerging economies, such as Mexico, Torres (2000) and Cuadra (2008). The volatility in private consumption suggests that consumption smoothing across the cycle is very limited, which can be due to the existence of credit constrains or to the cyclical component of the cost of external credit, as mentioned in Cuadra (2008). In Table 1 we reported the results for the entire sample.

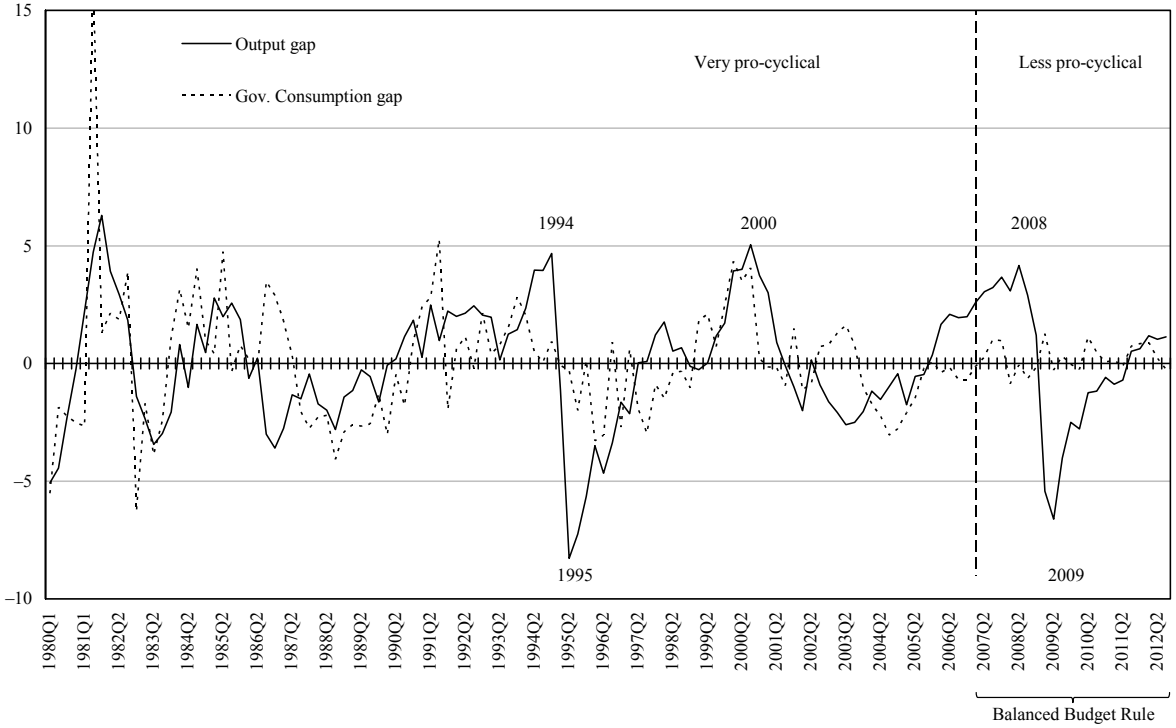
Cyclical components of investment, exports and imports exhibit great volatility across the cycle. Looking to the relative volatility, which is defined as the ratio of the standard deviation of each variable to the standard deviation of GDP, we can see that these variables are twice as volatile as the output. If we compare our results with similar analysis using different samples, we can see that the volatility reported for investment and imports in our data is lower than the one reported using a bigger sample. Cuadra (2008) found that from 1980 to 2006 investment was four times more volatile than the output and imports were six times more volatile. Our results are consistent with empirical data showing important decreases in volatility of investment and imports through time.

Regarding the cyclical component of public consumption, we can see in Table 1 and Figure 1 that it shows low absolute and relative volatility. One possible explanation to this fact is the prevailing fiscal rule in Mexico. As we mentioned before, in order to increase the transparency and reduce the discretionary component in public spending, in 2006 was approved the Federal Budget and Fiscal Responsibility Law which forces the government to have an equilibrium in public finances at all time. This is also consistent with the low correlation of public spending with GDP.

With respect to the real interest rate, we observed that during the period of our study it exhibited low volatility. Moreover, as we can see from column four to twelve, cross correlation of this variable with GDP suggest that real interest rate reacts with some lag to fluctuations in output, although when we looked into the subsamples it exhibited different dynamics before and after the crisis.

Figure 1

GDP and Government Consumption
(cycle components)



Comparing our two subsamples (Table 2 and Table 3), we can observe that after the financial crisis volatility in all the variables increased. Nevertheless the dynamics of the relative volatility were different across variables. In the case of consumption, even though it showed a considerable increase in volatility, relative volatility remains almost unchanged, and since the crisis consumption became more correlated with GDP. For investment, we observed that in the second period absolutevariance increased but its relative volatility decreased. As we mentioned before, this performance is consistent with an important reduction of the volatility of the cyclical component of investment. The same consideration applies to the component of exports.

Regarding the relation between real interest rate and output cycles we can observe that it changes significantly between our two subsamples. This difference is mainly due to the fact that the central bank maintained interest rates unchanged for several years after the crisis and inflation was stable as well.

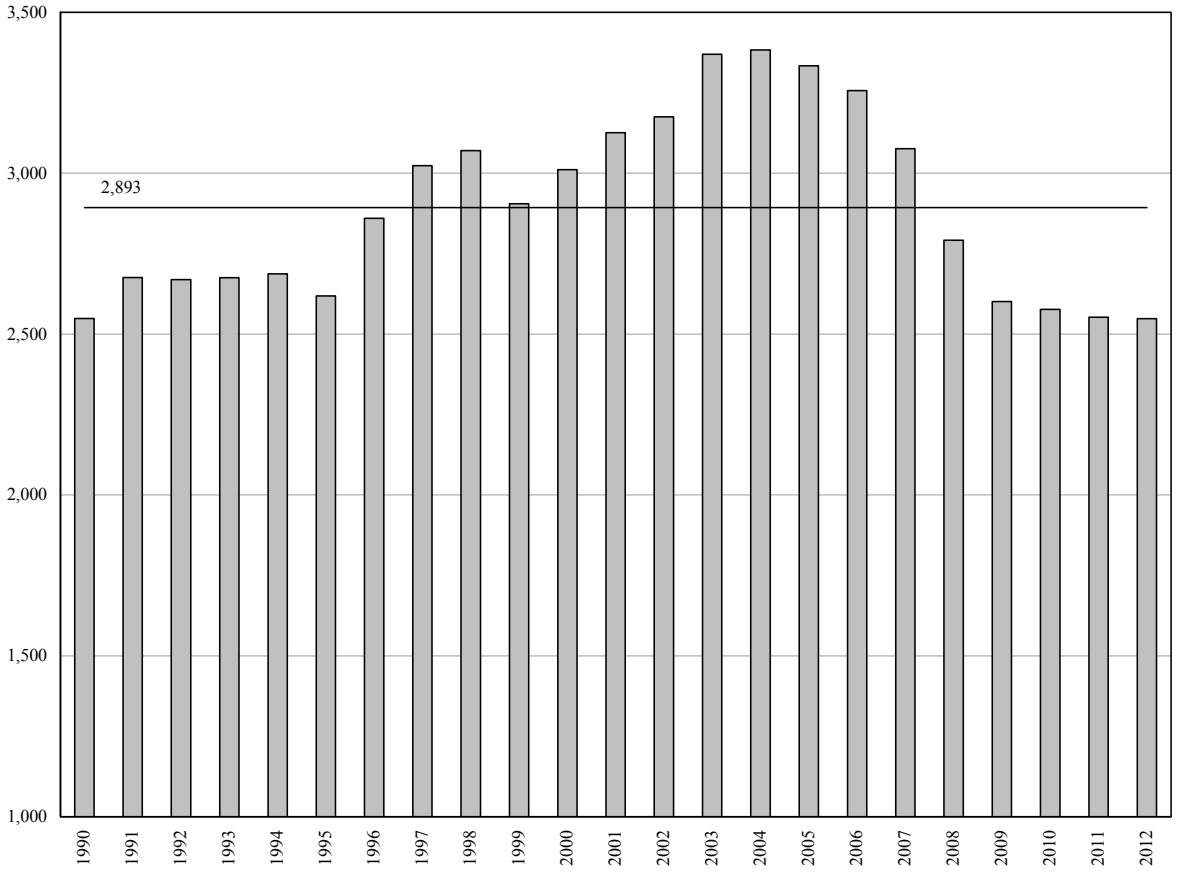
4.1 Oil

For several decades, the Mexican economy has been characterized for the high dependence of public revenues to oil revenues. This situation has been considered one of the major issues of public finances in Mexico.[20] Evenmore, in recent years the production of oil in Mexico has been beneath the average of 1990-2012, as we can see in Figure 2, the barrels of crude oil extracted per

[20] Some credit rating agencies have explicitly mentioned this factor as one of the most important obstacles to upgrade the Mexican debt.

Figure 2

Mexican Crude Oil Production
(barrels per day)



day reached its maximum level in 2004 and since then total production has been decreasing. At the same time, we have observed an increasing volatility of international oil prices (Figure 3). In particular, the price of the Mexican crude oil has grown more than 260 per cent since 2000, with higher volatility through 2007 and 2008 due to the international financial crisis, where we observed a sudden decrease.

The combined effect of changes in these two variables has been reflected in particular in public finances. In Mexico, more than a third of total public revenues come from oil (Figure 2), making revenues quite vulnerable to the dynamics of the situation in international markets.

Since the early seventies, the development of oil prices has been driven mainly by the interaction between supply and demand. Changes in oil supply by OPEP were very relevant factors behind the significant changes in oil prices in the seventies.

However, the sharp increase in oil demand, especially from emerging countries in recent years has been a crucial factor behind the dynamics of international oil prices, of course together with supply policies applied by some producing countries. Looking ahead, it is likely that imbalances between oil supply and demand will continue to be relevant as oil supply could be limited by physical factors and by reducing investments, while demand, especially from emerging economies could continue to grow, as mentioned by ECB (2010).

Table 1

Summary Statistics
(period: 2002Q1-2012Q3)

Variable x	Sigma (x)	Sigma (x)/ Sigma (GDP)	Correlation of GDP with								
			x(*t*–4)	x(*t*–3)	x(*t*–2)	x(*t*–1)	x(*t*)	x(*t*+1)	x(*t*+2)	x(*t*+3)	x(*t*+4)
Output	2.39	1.00	0.19	0.36	0.58	0.82	1.00	0.82	0.58	0.36	0.19
Private Consumption	2.73	1.15	0.16	0.34	0.59	0.83	0.97	0.81	0.62	0.40	0.24
Public Consumption	1.08	0.45	–0.03	0.01	0.02	–0.06	–0.01	0.06	0.09	0.16	0.15
Investment	5.19	2.18	0.00	0.15	0.38	0.63	0.85	0.85	0.80	0.70	0.56
Exports	6.29	2.64	0.31	0.44	0.63	0.83	0.89	0.67	0.37	0.10	–0.07
Imports	7.13	2.99	0.15	0.31	0.56	0.81	0.92	0.76	0.51	0.27	0.10
Real Interest Rate	1.65	0.69	0.11	0.13	0.16	0.24	0.32	0.44	0.45	0.40	0.26

* It corresponds to the gap of each variable, except for real interest rate.

Table 2

Summary Statistics*
(period: 2002Q1-2012Q4)

Variable x	Sigma (x)	Sigma (x)/ Sigma (GDP)	Correlation of GDP with								
			x(*t*–4)	x(*t*–3)	x(*t*–2)	x(*t*–1)	x(*t*)	x(*t*+1)	x(*t*+2)	x(*t*+3)	x(*t*+4)
Output	2.00	1.00	0.46	0.60	0.72	0.82	1.00	0.82	0.72	0.60	0.46
Private consumption	2.26	1.13	0.47	0.61	0.74	0.83	0.96	0.80	0.76	0.58	0.45
Public consumption	1.30	0.65	–0.16	–0.09	–0.01	0.06	0.19	0.25	0.27	0.36	0.43
Investment	4.58	2.28	0.48	0.65	0.76	0.82	0.97	0.80	0.73	0.62	0.45
Exports	5.46	2.72	0.57	0.64	0.73	0.82	0.95	0.76	0.63	0.47	0.34
Imports	5.97	2.98	0.48	0.59	0.73	0.84	0.99	0.83	0.73	0.58	0.46
Real interest rate	1.10	0.55	0.51	0.42	0.34	0.27	0.25	0.26	0.21	0.15	0.00

Table 3

Summary Statistics*
(period: 2008Q1-2012Q3)

Variable x	Sigma (x)	Sigma (x)/ Sigma (GDP)	Correlation of GDP with								
			x(*t*–4)	x(*t*–3)	x(*t*–2)	x(*t*–1)	x(*t*)	x(*t*+1)	x(*t*+2)	x(*t*+3)	x(*t*+4)
Output	2.82	1.00	–0.30	–0.09	0.27	0.72	1.00	0.72	0.27	–0.09	–0.30
Private consumption	3.22	1.14	–0.38	–0.12	0.28	0.73	0.98	0.69	0.27	–0.05	–0.24
Public consumption	0.58	0.21	0.29	0.18	0.07	–0.27	–0.30	–0.08	–0.07	0.07	–0.11
Investment	6.00	2.12	–0.56	–0.41	–0.04	0.42	0.79	0.80	0.59	0.37	0.16
Exports	7.21	2.55	–0.18	–0.01	0.33	0.73	0.85	0.52	–0.01	–0.44	–0.60
Imports	8.46	3.00	–0.34	–0.15	0.24	0.70	0.87	0.59	0.11	–0.30	–0.48
Real interest rate	1.44	0.51	–0.67	–0.52	–0.29	0.05	0.39	0.60	0.62	0.48	0.26

* It corresponds to the gap of each variable, except for real interest rate.

Figure 3

International Market Price
(US $)

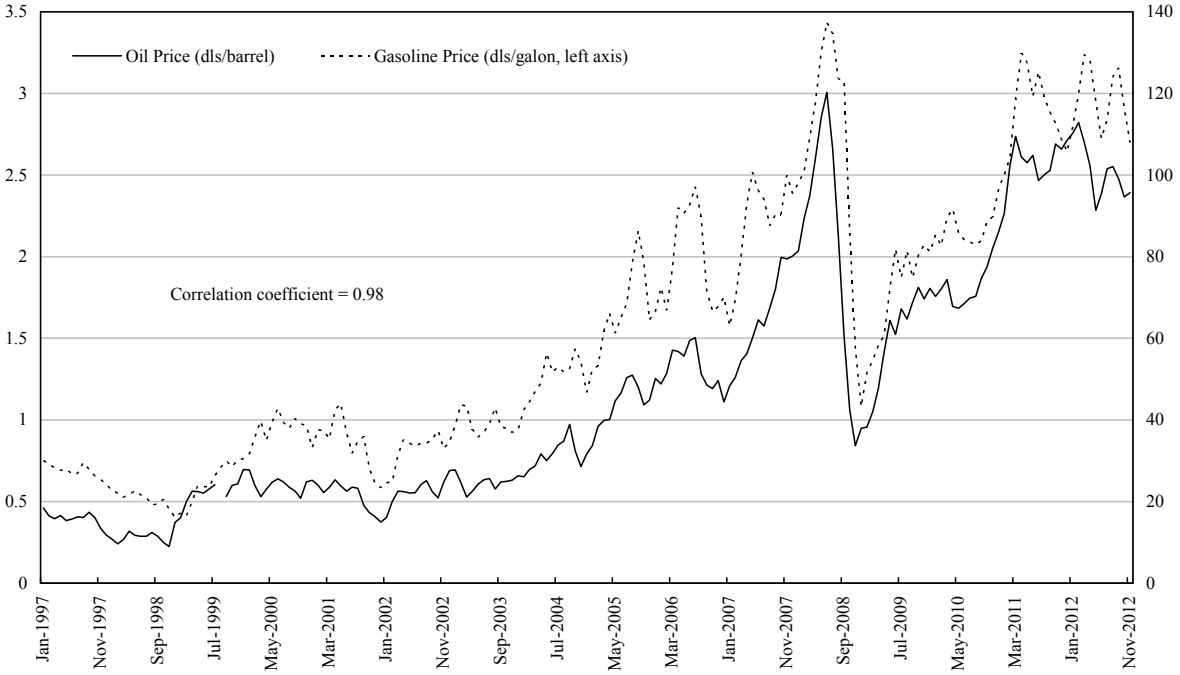
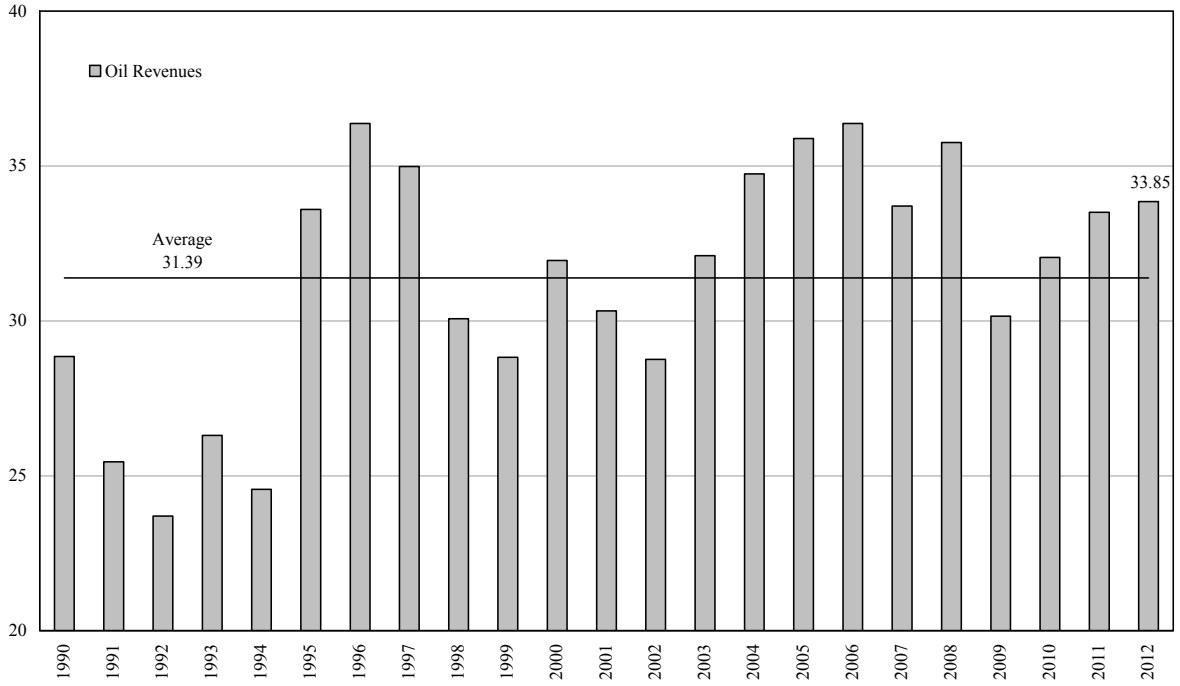


Figure 4

Oil Revenues
(percent of total revenues)



Under these circumstances it is harder for the government to plan future public spending. Moreover, even though in Mexico public finances have been sound and macroeconomic stability has improved, there is still room for reducing the dependence of public revenues to oil revenues. The prevailing fiscal rule has allowed the government expenditure to reduce its volatility, however the balanced budget rule currently in place is still a procyclical fiscal policy rule.

4.1.1 Oil prices and inflation

One important feature of the Mexican price structure is that fuel prices are set by the government, hence volatility in oil prices has not been transmitted to CPI inflation in any direction. Until the second half of 2000s, gasoline prices in Mexico were higher than international gasoline prices, however, given the abrupt increase in oil prices in the last years this situation has changed. As a response, in the last years the government has been announcing gradual increases in gasoline prices in order to close the gap between domestic and international prices. In this context, it has been discussed the possibility of flexibilizing gasoline prices, or at least adjust them to be consistent with international gasoline prices. We have discussed the potential vulnerabilities of public finances to oil prices volatility, however, if this adjustment in inflation occurs the effects of volatility in oil prices will not only affect public finances but inflation as well.[21] Under these circumstances, the monetary policy might need to respond more aggressively.

5 Exercises

In this section we perform a macroeconomic evaluation of both fiscal rules allowing the monetary policy to optimally adjust its policy under both fiscal scenarios. Next we present some impulse-response functions in order to illustrate the functioning of the model.

5.1 Evaluation of policy rules

In this subsection we use the model presented in the previous section and the loss function described above to evaluate the two fiscal alternatives presented before. We set the "loss function" in order to compare the two different policy rules. In particular, we are interested in evaluating whether the optimal monetary policy instrument in combination with a SB rule achieve a better outcome than an optimal monetary policy rule in combination with a traditional BB rule.

To assess the performance of the different rules we simulated stochastic shocks for 1000 periods allowing the optimal monetary policy rule for each case to adjust endogenously. We repeat this 3000 times obtaining the average standard deviations across repetitions. The results from the simulations are reported in Table 4. As we can observe, under the SB rule, standard deviations of the main macroeconomic variables in the model are lower than under the BB rule. In particular, the output gap and headline inflation show lower volatility under the former one. Under the BB rule headline inflation is around 2.2 per cent more volatile than under the SB rule. In turn, the output gap is 6.4 per cent more volatile. This is in line with a more stable government spending, which is 75 per cent less volatile under the SB rule as compared to the BB rule. Regarding the monetary policy instrument, it is 2.4 per cent less volatile under the SB rule, generating less aggressive responses from the monetary authority under the SB rule.

---

[21] Gasoline prices' weight on inflation is around 4.2.

Table 4

Evaluation of Standard Deviations and Loss Functions Under Different Fiscal Rules

	Structural Balance Rule	Balanced Budget
Loss function	239.16	270.4
Headline inflation	1.655	1.693
Output gap	14.48	15.47
Consumption	4.16	4.18
Government spending	3.99	16.31
Investment	19.16	19.33
Real exchange rate	1.72	1.75
Nominal interest rate	5.18	5.31
Real interest rate	4.62	4.75

5.2 Impulse-response functions

In this section we present the functioning of the model under the two different fiscal policy alternatives presented in the previous sections, using impulse-response functions. In order to see the main channels through which the model functions we present 3 shocks. The first one is a traditional "cost-push" shock, the second one is an aggregate demand shock. Finally we analyze an oil price shock.

First of all we show how the economy responds to a typical "cost-push" shock (inflation shock). A one standard deviation increase in the non-core inflation leads to an increase in headline inflation (Figure 5), which forces the central bank to raise interest rates to counteract the effect. This increase in the interest rate leads to a fall in private consumption of agents who have access to the financial markets, investment, and indirectly, in exports due to the appreciation of the exchange rate. By reducing economic activity when the interest rate increases, consumers who do not have access to financial markets are affected since their disposable income reduces and therefore their level of consumption. At the same time tax revenues fall and spending under the various rules also decreases, although in different magnitudes. As expected, government consumption fluctuates more with the balanced budget rule than with the structural balance rule. For the former case, since the shock generates lower tax revenues, the government reduces its spending as the output gap decreases. Additionally, spending has to fall more because the government must meet its debt payment duties still complying with a zero deficit rule. Finally, under a structural balance rule, since government spending reacts to changes in the level of the "reference output" and not to current changes in the output level, the fall in spending is much lower.

Next, we present a scenario where consumption is subject to a positive shock. When the economy faces this type of shock, as seen in Figure 6, it generates demand pressures that drive the gap to a level above its equilibrium, which in turn generates inflationary pressures that are transmitted through the Phillips curve, making the monetary authority to increase the nominal interest rate so that the real interest rate rises enough to counteract the effect. By increasing the

Figure 5

IRF.s Non-core Inflation Shock

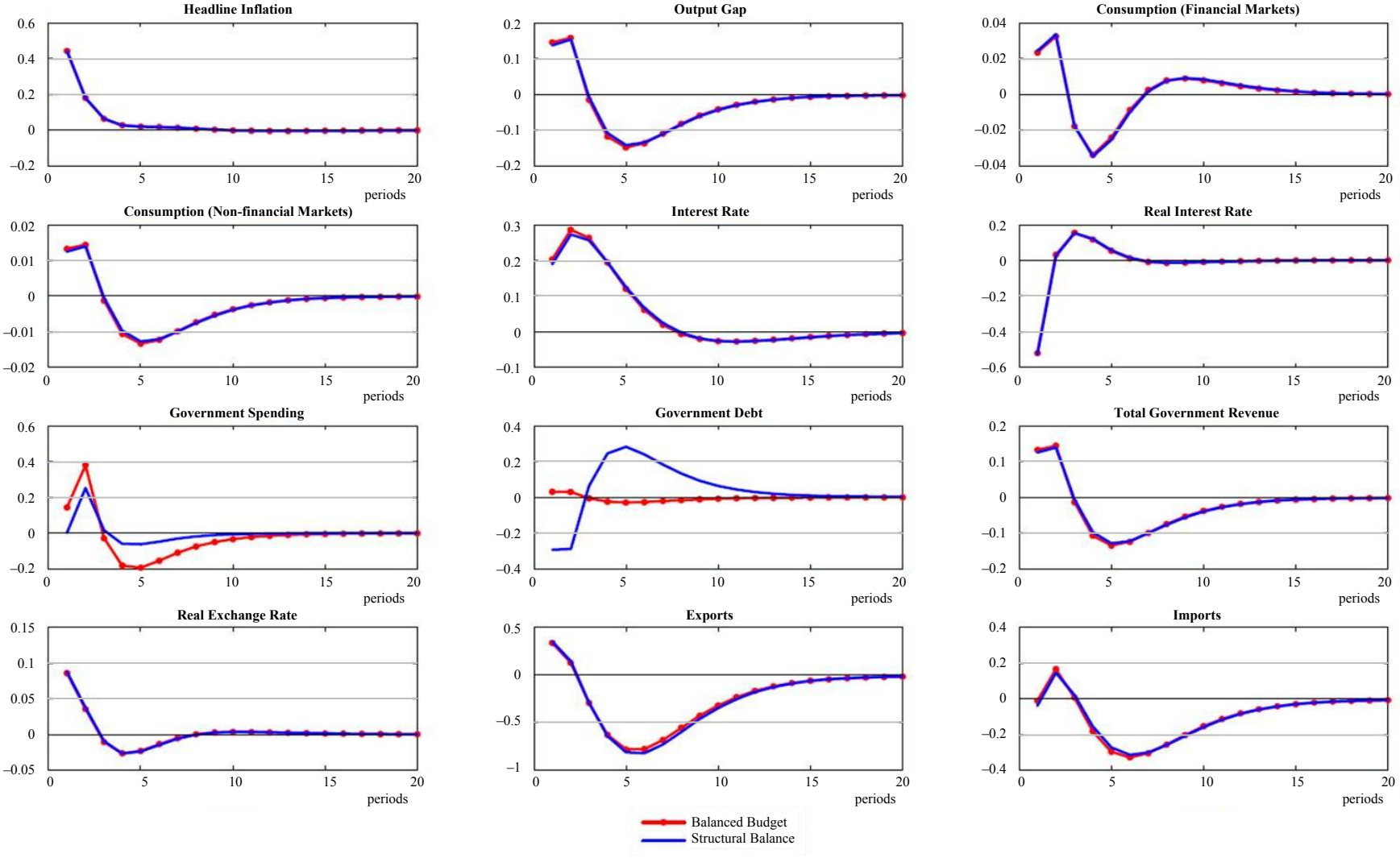


Figure 6

IRF.s Consumption Shock

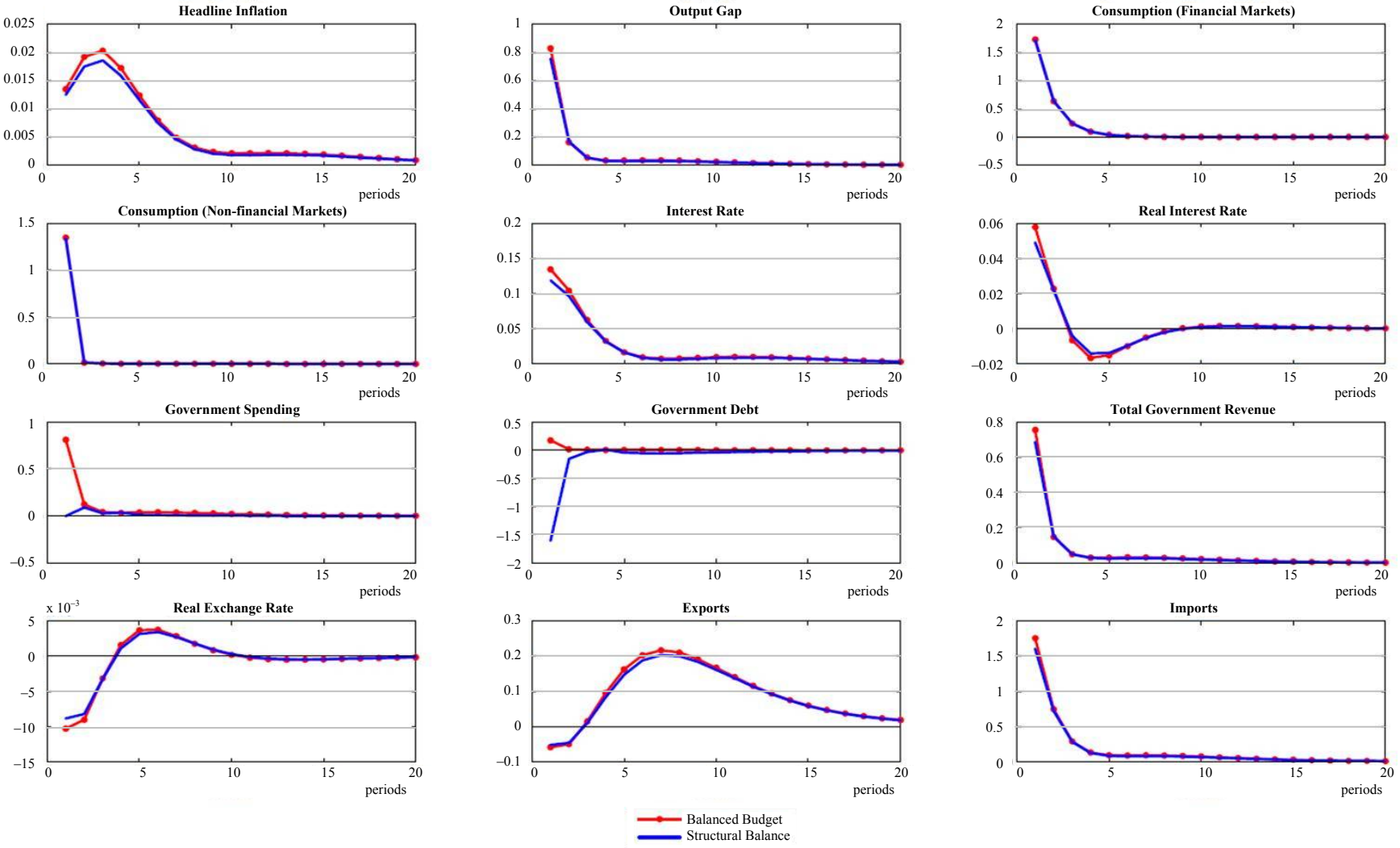


Figure 7

IRF.s Oil Price Shock

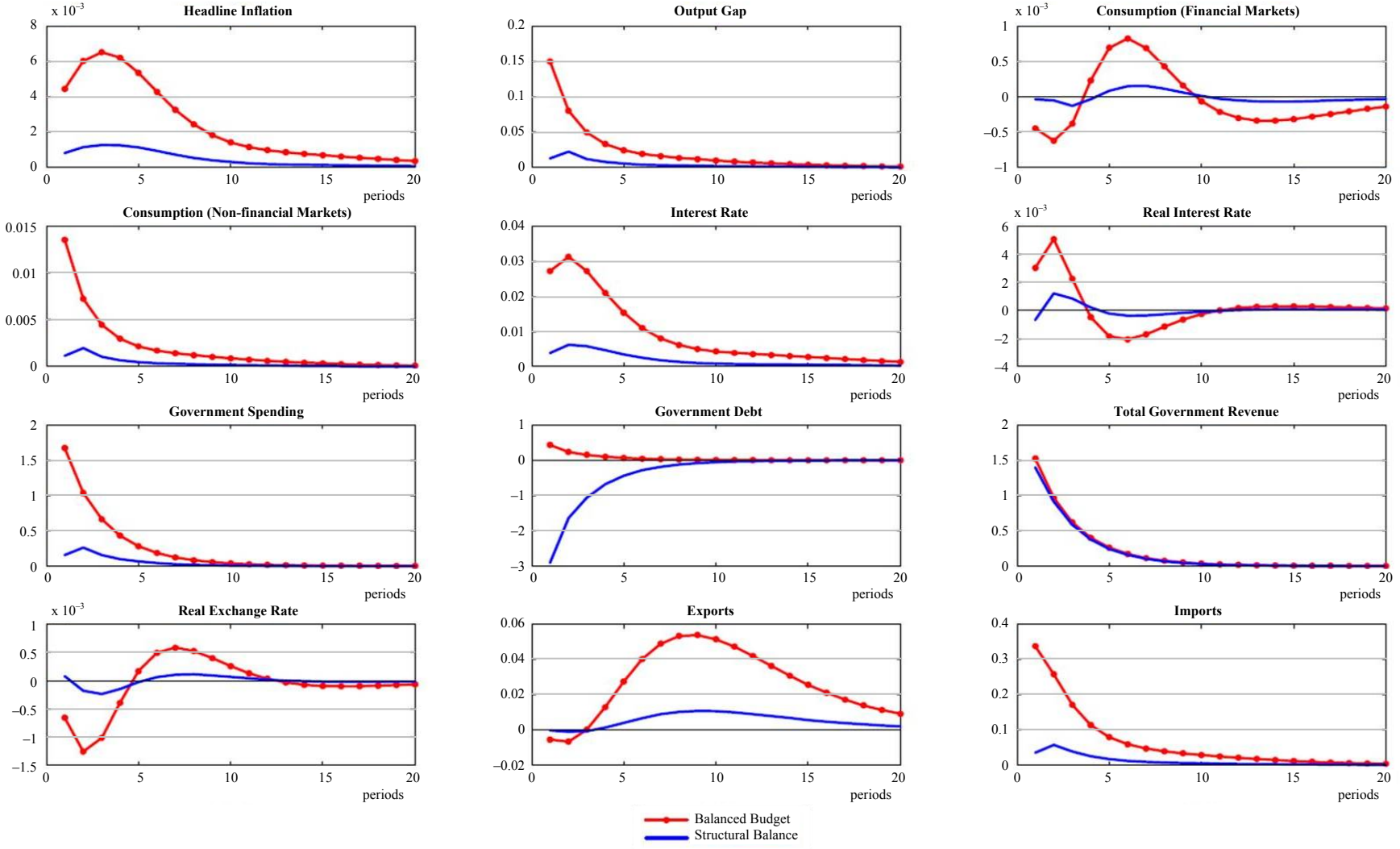
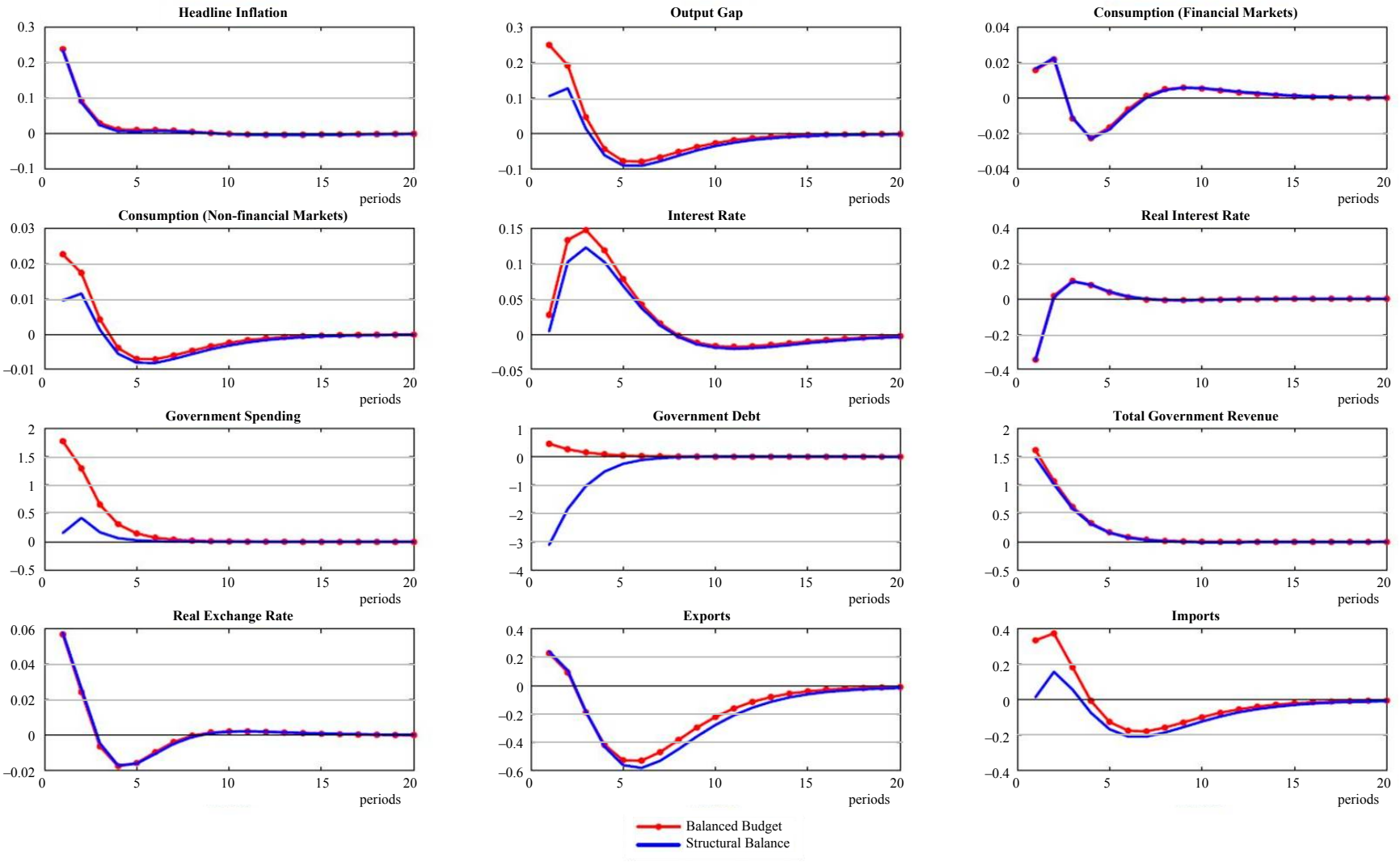


Figure 8

Increase of Gasoline Prices and Inflation



output gap, tax revenues increase as well, so the government can spend more, but spending behavior will also depend on the type of rule followed by the tax authority. In the case of a zero deficit, as revenues increase, the government can spend more and still meet the rule. In addition, the increase in interest rates by the central bank to reduce inflation, generates an increase in the financial cost of the government and a fall in investment, consumption and, therefore, the output gap that feeds back the effect on spending through tax revenues. Additionally it generates an appreciation of the exchange rate, causing an increase in imports and a decline in exports. Finally, the effect on spending under a structural balance rule maintains the same spirit as the former rule but generating much smoother movements in government spending because it only reacts to changes in the "reference output", and a change in consumption today affects it minimally.

Finally, Figure 7 shows the response of the different variables of the model to an increase in oil prices, but not in inflation since movements in oil prices are not transmitted to movements in fuel prices under the rule determined by the government.[22] This shock´s immediate effect is reflected in the increased government revenue due to higher oil revenues, however the reaction of government spending depends on the type of rule that is being followed.[23] In general, due to the increase in government revenue, demand pressures are generated. The central bank has to act to contain these pressures and increases the interest rate on the short-term, which affects both inflation and the exchange rate so that inflation begins to decline and the increase in the real interest rate generates an appreciation of the real exchange rate, increasing imports and decreasing exports. Consumers and investors, meanwhile, know that given the increase in oil prices the government will have more money to spend, hence the output gap will increase, but also know that the monetary authority will react to these pressures by tightening the interest rate to offset this effect on inflation. For this reason, consumption, is affected at the time of the shock and gradually adjusts during the following periods after the shock. Considering the balanced budget rule, given an increase of oil revenues, the government can increase its spending and still comply the fiscal rule. This in turn generates a fiscal policy that exacerbates the effect of the increase in the price of oil with high volatility. In the case of the structural balance rule, government spending only reacts to changes in the "reference price" of oil, so an increase in oil prices generate minor effects on the output gap and therefore on inflation, which leads monetary policy to increase the interest rate in a lower magnitude compared to the balanced budget rule and therefore the effects on the exchange rate, consumption and investment, are lower as well.

5.3 Oil prices shocks

In Mexico, as already mentioned, movements in oil prices are not transmitted to movements in fuel prices since the government fix these prices every year resulting in a very limited impact on inflation. However, one of the main purposes of the government in recent years has been to close the gap between domestic and international fuel prices. This modification will imply that oil price volatility will not only affect government revenues volatility but also inflation volatility.

It is important to mention that the current rule followed by the government to fix fuel prices is a very regressive subsidy that distorts the relative prices of inputs and therefore generates inefficient allocation of resources. Even though from the inflation stability perspective, the energy prices rule may be convenient in the short run since it absorbs the major part of energy prices volatility, it could imply such high costs in terms of public finances that in the medium term it

---

22 Note that this assumption will be modified in the following excercise.

23 In Mexico, the increase in oil prices affects government revenues by extracting more surplus to the rest of world, since the sale of crude oil to other countries does not directly affect domestic consumers.

might be a threat for price stability. Considering the situation described above we compare the two fiscal policy rules considered in this analysis allowing oil price shocks to affect not only government revenues but also inflation.

In order to calibrate the effect of the oil price shock over inflation, we calculate how an increase in oil prices can affect inflation. We consider the price that the public pays for gasoline, and compare it with the price at which the oil company buys gasoline abroad adding other costs such as transportation costs, taxes, fees, etc. Which under perfect competition should be the price that consumers should be paying.[24] Once we obtain the price that consumers should be paying instead of the fixed price set by the government we calculate the average increase that inflation should have had if the adjustment takes place, considering the weight of gasoline prices on the CPI.[25]

In order to see the potential effect of an increase of oil prices not only in oil revenues, but also in inflation, we run impulse-response functions with both shocks, calibrated as abovementioned. As we can observe in Figure 8, the dynamics of the variables is very much the same as in the previous shocks, but we can see that the monetary policy authorities have to react increasing the interest rate more under the BB rule than under the SB rule. This situation has some costs in terms of the output gap, which is more volatile under the BB rule. It is important to mention that this shock is not considering indirect effects of increasing gasoline prices, but only the direct effect on inflation. If we consider that gasoline prices have impact on other goods and services, then the effect might be higher over inflation, hence the reaction of the monetary authority should be higher as well.

6 Conclusions

In Mexico, more than 30 per cent of the public sector's revenues are from oil revenues. Moreover, energy prices are set by a rule determined by the government. This rule is supposed to act as a tax when energy prices abroad are low and as a subsidy when those prices are high. Indeed, before mid-2000s, this rule functioned as a tax, however, during the last decade energy prices have been showing an upward trend and, although they decline temporary during the 2008-09 financial crisis, recently they reached historical high levels and elevated volatility.

In this sense, it is important to reconsider the way public expenditures are determined by such a volatile source of revenues, and also to re-think how appropriate the energy prices' rule in this new environment is. In this paper we examine this fiscal situation and its interaction with the monetary policy. Mexico, as other commodity exporter countries have faced a number of challenges derived from the management of commodities. In this context, Mexico has showed some convergence towards greater transparency and accountability, recognizing the benefits of the authority taking decisions under clear and transparent procedures, *i.e.* under a regulatory framework versus a discretionary one, in recent years, the country has made some important reforms.

These reforms allowed achieving lower levels of deficit and debt, limiting and eventually eliminating the fiscal dominance situation, which allowed the monetary policy to fulfill its mission of maintaining price stability and generating greater macroeconomic stability. However there are still some vulnerabilities that prevail in the Mexican public finances and that during the recent

---

[24] We consider the retail gasoline price published by the national oil company (PEMEX), transportation and other costs from the figures published by Ministry of Finance, and producer costs are obtained from the Gulf Coast Gasoline Midgrade Wholesale prices.

[25] The average increase that gasoline prices should have reflected with respect to international gasoline prices is 43 per cent. Considering this increment in gasoline prices, the incidence of this increase would be 156 percentage points.

financial crisis were present, the still high dependence of public revenues on oil revenues, and secondly, the fact that energy prices are set by a rule determined by the government, as we have mentioned.

Thus, we consider this a relevant issue for Mexican macroeconomic policies since all sources of volatility for the macro economy that are not managed by the fiscal authorities might be addressed by the monetary ones. Even though from the inflation stability perspective, the energy prices rule may be convenient in the short run since it absorbs the major part of energy prices volatility, in the medium term it could imply such high costs in terms of public finances, income distribution, since the tax is regressive and it might be a threat for price stability. In addition to that, the dependence of public finances on oil prices makes it very common for the government to "close" the government budget with adjustments in public prices and rates fixed by the government. This is a very important source of uncertainty for inflation (especially non-core component) and therefore inflation expectations. Even though in this paper we only focus on the short term costs over inflation, future work should take into account the trade-offs of these policy changes in terms of social welfare, income distribution, among other topics since this are extremely relevant for the Mexican public policies.

The central bank has been very successful in accommodating supply shocks to inflation, specifically exchange rate fluctuations and volatility in agricultural prices. However, the Mexican economy has not yet learned to absorb, in an orderly way, energy prices volatility. Therefore, this is an open issue and still a challenge from the monetary policy perspective.

Given the current environment and international conditions in the oil market, the actions undertaken in the recent past can lead to better results if the authority considers additional elements to isolate the effects of cyclical elements in the macroeconomic decisions. Thus, these matters are taken into account in this paper in which we develop a macroeconomic model for policy analysis, incorporating the effect of oil prices on public finances of a small open economy, in an environment in which monetary policy follows an optimal policy rule, and fiscal policy follows one of two rules: a balanced budget rule or a structural balance budget rule. We found that in general, when the economy faces domestic and external shocks, higher macroeconomic stability is achieved under the Structural Balance Budget Rule than under the Balanced Budget rule, currently in place. Furthermore, when the economy faces an oil price shock, the structural balance rule generates the monetary authority to react less aggressively than under a balanced budget rule. The resulting higher stability under structural balance rule is even more important under the potential scenario where government stops fixing fuel prices, which in the medium term will generate less distortions and better resource allocations, even though in the short term might generate inflation volatility thus a more aggresive fiscal rule might be necessary.

APPENDIX 1
VARIABLES AND ESTIMATIONS

In this section we present the estimation outputs for the different equations described in the document. We estimated most equations from 2002Q1to 2012Q2 using GMM; however, variables following AR processes were estimated using OLS. Each component of the Aggregate demand was estimated in terms of gaps. The results are the following.

New Phillips Curve

The specification of core inflation is a hybrid Phillips curve. Note that in order to fulfill the dynamic homogeneity property, *i.e.* nominal variables do not affect real variables in the long term, it is necessary that the sum of the coefficients of the nominal variables equal one, therefore $a_1+a_2+a_4=1$. The resulting estimation is:

$$\pi_t^C = 0.520\,\pi_{t-1}^C + 0.475\,E_t\left[\pi_{t+1}^s\right] + 0.009\,x_t + 0.005\left(\Delta e_t + \pi_t^*\right)$$

(0.066) (0.004) (0.003)

*Generalized Method of Moments. Instrument specification: π_{t-2}^C to π_{t-4}^C, π_t to π_{t-1}, Δe_t to Δe_{t-3} and π_t^* to π_{t-4}^*.
Standard deviation in parenthesis. *p*-value of *J* is 0.964.

In this case, the signs on the regression coefficients make sense with those suggested by the economic theory.

Real exchange rate equation

Real exchange rate is defined according to Interest Rate Parity condition plus one lag of the exchange rate in order to smooth the performance of this variable. The resulting estimation is:

$$rert_t = 0.487\,rert_{t-1} + 0.513\,E_t\left[\left[rert_{t+1}\right] - 0.453\,r_{t-1} + \frac{1}{400}\left(r_t^* - r_t\right)\right]$$

(0.055)

*Generalized Method of Moments. Instrument specification: rer_{t-1}, r_{t-1} and r_{t-3}^*.
Standard deviation in parenthesis. *p*-value of *J* is 0.412.

Private consumption

The private consumption with access to the financial market specification is the following:

$$C_t^{FM} = 0.272\,C_{t-1}^{FM} + 0.811\,E_t\left[C_{t+1}^{FM}\right] - 0.075\,r_{t-1}$$

(0.127) (0.128) (0.040)

*Generalized Method of Moments. Instrument specification: C_{t-1}^{FM} to C_{t-3}^{FM}, i_{t-3} to i_{t-4} and π_{t-1}^{ε} to π_{t-2}^{ε}.
Standard deviation in parenthesis. *p*-value of *J* is 0.857.

Investment

The specification of the investment, as well as the other components of aggregate demand, is in terms of gaps.

$$in_t = 1.744 + 0.552\ in_{t-1} + 0.473\ E_t\,[in_{t+1}] - 0.453\ r_{t-1} + 0.228\ x^*$$
$$(0.964)\quad (0.071)\qquad (0.078)\qquad\qquad (0.259)\qquad (0.122)$$

*Generalized Method of Moments. Instrument specification: in_{t-1} to in_{t-4}, i_{t-3} to i_{t-4}, π^e_{t-1} to π^e_{t-3} and x^*_{t-2} to x^*_{t-4}.
Standard deviation in parenthesis. *p*-value of *J* is 0.722.

Exports

$$ex_t = 0.492\ ex_{t-1} + 0.513\ E_t\,[ex_{t+1}] + 6.34\ rer_t - 0.056\ x^*_{t-1}$$
$$(0.025)\qquad (0.028)\qquad\qquad (3.737)\qquad (0.028)$$

*Generalized Method of Moments. Instrument specification: ex_{t-1} to ex_{t-4}, rer_t to rer_{t-4}, x^*_{t-2} to x^*_{t-4} and $dlic_t$ to $dlic_{t-4}$.
Standard deviation in parenthesis. *p*-value of *J* is 0.853.

Imports

$$im_t = 33.479 + 0.198\ im_{t-1} + 0.207\ E_t\,[im_{t+1}] - 7.481\ q_t + 1.881\ x_t$$
$$(0.037)\quad (0.037)\qquad (0.033)\qquad\qquad (2.705)\qquad (0.148)$$

*Generalized Method of Moments. Instrument specification: im_{t-4}, x_t to x_{t-4}, rer_t to rer_{t-3}, x^*_{t-3} to x^*_{t-4} and π^{imp}_{t-2} to π^{imp}_{t-4}.
Standard deviation in parenthesis. *p*-value of *J* is 0.764.

The model assumes that changes in inventories, non-core inflation, oil prices and oil production are exogenous variables that follow a first order autoregressive process. Furthermore it is assumed that foreign variables, real interest rate, inflation and output gap for the foreign country, r^*, π^* and x^* respectively are generated from a second order autoregressive vector.

Estimates for these variables are the following.

Changes in inventories

The specification of changes in inventories is modeled as a residual. It is calculated estimating the output gap as the dependent variable and the weighted sum of the gaps of the components of GDP as independent variables. The weights used for this sum are the Historical Great Ratios of GDP components to total GDP. The resulting residuals from this estimate are divided by the average weight of inventory changes and then the following autoregressive process is estimated:

$$inven_t = 0.286\ inven_{t-1} + \mu_{ex}$$
$$(0.138)$$

* Least Squares Method. R^2=0.082.
Standard deviation in parenthesis.

Non-core inflation

Non-core inflation is modeled by an autoregressive process of order one and the resulting estimation is:

$$\pi_t^{NC} = 0.524\ \pi_{t-1}^{NC} + \mu_{\pi_t}^{NS}$$

(0.138)

*Least Squares Method. R^2=0-0.762
Standard deviation in parenthesis.

Oil price gap

The oil price gap is modeled as an autoregressive process of order 1:

$$P\ oil_t = 0.643\ P\ oil_{t-1} + \mu_{ppet_t}$$

(0.156)

*Least Squares Method. R^2=0.428.
Standard deviation in parenthesis.

Oil production

In the case of oil production gap, it is modeled as an autoregressive process of order 1 as well:

$$Y\ oil_t = 0.814\ Y\ oil_{t-1} + \mu_{xpet_t}$$

(0.073)

*Least Squares Method. R^2=0.66.
Standard deviation in parenthesis.

The parameters that were not estimated, were calibrated from historical averages for Mexico, as in the case of the weights of the output gap, where each weigh represents the historical ratio of the component as a proportion of GDP and of the parameters describing fiscal variables, as summarized in Appendix 2.

APPENDIX 2
HISTORICAL AVERAGES AND CALIBRATED VALUES

After log-linearizing the model, the parameters *s*, *q*, *n* and *j* are defined as follows:

s_1	$\frac{\bar{G}}{\bar{B}}$	s_3	$\bar{R}$
s_2	$R+2\Psi\exp(B-b)-\Psi$	s_4	$\frac{\bar{T}}{\bar{B}}$
q_1	$\frac{\varphi_1 \tau \bar{Y}}{\bar{T}}$		
q_2	$\frac{(1-\varphi_1)\overline{Y\ oil\ P\ oil}}{\bar{T}}$		
h_1	$\frac{\bar{T}}{\bar{G}}$		
n_1	$\frac{\varphi_1 \tau \bar{Y}}{\bar{G}}$	n_4	
n_2	$\frac{(1-\varphi_1) Y\ oil\ P\ poil}{\bar{G}}$	n_5	$\frac{\bar{R}\bar{B}}{\bar{G}}$
n_3	$\frac{(1-\varphi_1)\overline{Y\ oil\ P\ oil}}{\bar{G}}$		
j_1	$\frac{2\varphi_1 \tau \bar{Y} - \bar{B}\bar{A}\bar{S}}{\bar{G}}$	j_4	
j_2	$\frac{2(1-\varphi_1)\overline{Y\ oil\ P\ oil}}{\bar{G}}$	j_5	$\frac{\bar{R}\bar{B}}{\bar{G}}$
j_3	$\frac{(1-\varphi_1)\frac{\bar{G}}{Y\ oil\ P\ oil}}{\bar{G}}$	j_6	$\frac{\bar{B}\bar{A}\bar{S}}{\bar{T}}$

Table 5

Historical Averages and Calibrated Values

$\frac{\overline{G}}{\overline{\overline{B}}}$	2.389	$\frac{\overline{T}}{\overline{\overline{G}}}$	0.98
$R+2\Psi\exp(B-b)-\Psi$	0.041	$\frac{\overline{R}\overline{B}}{\overline{G}}$	0.435
$\overline{R}$	1.04	τ	0.14
φ_1	0.7	$\frac{\overline{B}\overline{A}\overline{S}}{\overline{T}}$	0.002
$\frac{\overline{Y_{perPpet}}}{\overline{G}}$	0.33	$\frac{\overline{Y}}{\overline{\overline{G}}}$	10
$\frac{\overline{T}}{\overline{\overline{B}}}$	2.339		

Table 6

Historical Ratios

$\frac{\overline{C}}{\overline{\overline{Y}}}$	ω_c	67
$\frac{\overline{IN}}{\overline{Y}}$	ω_{in}	20
$\frac{\overline{G}}{\overline{\overline{Y}}}$	ω_g	13
$\frac{\overline{Ex}}{\overline{Y}}$	ω_{ex}	19
$\frac{\overline{Im}}{\overline{Y}}$	ω_{im}	20
$\frac{\overline{Vex}}{\overline{Y}}$	ω_{vex}	1

APPENDIX 3
OPTIMAL POLICY RULES

The monetary policy rules were calculated following Söderlind (1999). The policy maker loss function is 10 and it reflects its interest in the target economic variables as well as a preference for a stable interest rate. The instrument of the monetary policy authority is the nominal interest rate. The policy maker picks the interest rate such that it optimizes its loss function under discretion. This means that the policy maker optimizes every period considering the process by which the agents form their expectations as given. Something worth noting is that the optimal monetary rule is different between the BB model and SB model.

REFERENCES

Alesina, A. and T. Bayoumi (1996), "The Costs and Benefits of Fiscal Rules: Evidence from U.S. States", NBER, Working Paper, No. 5614.

Barro, R. (1979), "On the Determination of Public Debt", *Journal of Political Economy*, Vol. 87, Issue 5, Part 1, pp. 940-71.

Bayoumi, T. and B. Eichengreen (1995), "Restraining Yourself: The Implications of Fiscal Rules for Economic Stabilization", IMF, Staff Papers, Vol. 42, No. 1, pp. 32-48.

Blinder, A.S.S. (1998), *Central Banking in Theory and Practice*, The MIT Press.

Carranza, L., C. Daude and Á. Melguizo (2011), "Public Infrastructure Investment and Fiscal Sustainability in Latin America: Incompatible Goals?", OECD, Development Centre, Working Paper, No. 301, OECD Publishing.

Céspedes, L. and A. Velasco, (2011), "Was This Time Different?: Fiscal Policy in Commodity Republics", BIS, Working Paper, No. 365, Bank for International Settlements.

Cuadra, G. (2008), "Hechos estilizados del Ciclo Económico en México", Documento de investigación, 2008-14, Banco de México.

ECB (2010), "Oil Prices – Their Determinants and Impact on Euro Area Inflation and the Macroeconomy", *Monthly Bulletin*, August.

Eichenbaum, M. and C. Evans, (1995), "Some Empirical Evidence on the Effects of Shocks to Monetary Policy on Exchange Rates", *The Quarterly Journal of Economics*, MIT Press, Vol. 110, No. 4, pp. 975-1009, November.

Fiess, N. (2004), "Chile's Fiscal Rule", *Econometric Society 2004 Latin American Meetings*, No. 348, Econometric Society.

Galí, J. and R. Perotti (2003), "Fiscal Policy and Monetary Integration in Europe", NBER, Working Paper, No. 9773, National Bureau of Economic Research.

Galí, J. and M. Gertler (1999), "Inflation Dynamics: A Structural Econometric Analysis", *Journal of Monetary Economics*, Vol. 44, No. 2, pp. 195-222.

Gavin, M. and R. Perotti (1997), "Fiscal Policy in Latin America", NBER, Macroeconomics Annual.

Kaminsky, G., C. Reinhart and C. Végh, (2005), "When It Rains, It Pours: Pro-cyclical Capital Flows and Macroeconomic Policies", NBER Chapters, in *NBER Macroeconomics Annual 2004*, Vol. 19, pp. 11-82, National Bureau of Economic Research.

Kennedy, S. and J. Robbins (2001), "The Role of Fiscal Rules in Determining Fiscal Performance", Department of Finance, Working Paper, No. 2001-16, Ottawa.

Lane, P. (2003), "The Cyclical Behavior of Fiscal Policy: Evidence from the OECD", *Journal of Public Economics*, Vol. 87, pp. 2661-75.

Levinson, A. (1998), "Balanced Budgets and Business Cycles: Evidence from the States", *National Tax Journal*, Vol. 51, No. 4, pp. 715-32.

McCallum, B.T. and E. Nelson (1999), "An Optimizing IS-LM Specification for Monetary Policy and Business Cycle Analysis", *Journal of Money, Credit and Banking*, Blackwell Publishing, Vol. 31, No. 3, pp. 296-316, August.

Medina, J.P. and C. Soto (2007), "Copper Price, Fiscal Policy and Business Cycle in Chile", Central Bank of Chile, Working Paper, No. 458.

Ramos-Francia, M. and A. Torres (2005), "Reducing Inflation Through Inflation Targeting: The Mexican Experience", Documento de Investigación, No. 2005-01, Dirección General de Investigación Económica, Banco de México.

————— (2006), "Inflation Dynamics in Mexico: A Characterization Using the New Phillips Curve", Documento de Investigación, No. 2006-15, Dirección General de Investigación Económica, Banco de México.

Schaechter, A., T. Kinda, N. Budina and A. Weber (2012), "Fiscal Rules in Response to the Crisis – Toward the 'Next-Generation' Rules. A New Dataset", IMF, Working Paper, No. 12/187.

Schmitt-Grohe, S. and M. Uribe (2001), "Closing Small Open Economy Models", Departmental Working Paper, No. 200115, Rutgers University, Department of Economics.

Soderlind, P. (1999), "Solution and Estimation of Rational Expectations Macromodels with Optimal Policy", *European Economic Review*, Vol. 43, pp. 813-23.

Stein, E., A. Grisanti and E. Talvi (1998), "Institutional Arrangements and Fiscal Performance: The Latin American Experience", NBER, Working Paper, No. 6358. Also Inter-American Development Bank, Working Paper, No. 367.

Talvi, E. and C.A. Végh (2005), "Tax Base Variability and Procyclical Fiscal Policy in Developing Countries", *Journal of Development Economics*, Vol. 78, No. 1, pp. 156-90.

Torres, A. (2000), "Estabilidad en Variables Nominales y el Ciclo Económico: El Caso de México", Documento de Investigación, No. 2000-03, Banco de México.

————— (2003), "Monetary Policy and Interest Rates: Evidence from Mexico", *North American Journal of Economics and Finance*, Vol. 14, No. 3, pp. 357-79.

Woodruff, C. (2006), "Characteristics of the Unbanked and Banked in the Popular Financial Sector in Mexico: An Analysis of the BANSEFI Household Panel Survey", report prepared for BANSEFI, Mexico City.

COMMENTS ON SESSION 4
FISCAL TOOLS TO CONTROL MACROECONOMIC RISKS AND IMBALANCES: EXPERIENCES AND PRESCRIPTIONS

David Heald[*]

May I thank Daniele Franco and Banca d'Italia staff for a fantastic conference, as is always the case in Perugia. By way of context for my discussion, Scotland is going to have a referendum in 2014 on becoming an independent country and the UK Government tell us that, if we vote "Yes", we will be thrown out of the European Union. In contrast, the United Kingdom will have a referendum in 2017, with the intention – in certain parts of the Government – of leaving the European Union. So discussions about the nature of the European Union and the relationship between the European Union and the Eurozone are obviously of great interest in my country.

I have two papers to discuss. Of the first, by Kastrop, Scheubeand and Hauptmeier (2013), I have only seen the PowerPoint slides; he expanded on them slightly, particularly at the end of his presentation. The other is a fully-fledged paper by Stracca, Buetzer and Jordan on the cultural underpinning of macroeconomic imbalances. What is striking is that the two papers are vastly different in style but they do have links which I will identify. Kastrop promises a formal paper and I look forward to receiving that. There is obviously a limit to what one can say about PowerPoint slides, particularly when one is not sure in advance what will be said in addition. However, the presentation was quite close to the slides.

One of the graphics that people have delighted in showing at this conference is the spread of bond yields across countries in the 2000s, particularly the way in which they were very close together and then diverged dramatically. There is therefore a question about whether the markets did not believe the Eurozone "no bail-out" clause and hence were correct, or whether the markets had misunderstood the relative positions of Eurozone members. Given that Kastrop emphasised the contrast between centralisation of policy functions and a more market-based approach, whether the market got it right or the market got it wrong in that period is an important aspect of the policy background. In his presentation, Kastrop contended that hybrid structures of market-based controls over fiscal policy together with reliance on central authority controls are vulnerable; not necessarily that they would not work but that they are potentially vulnerable.

From a United Kingdom perspective – and potentially from a Scottish perspective – an obvious question is the relationship between the Eurozone countries and the countries that are not in the Euro, either like the United Kingdom (because successive Governments have not wanted to be in) or in the cases of Denmark and Sweden (because their populations cannot be persuaded to go into the Euro). When there is more centralised political authority in the Eurozone, this leaves uncertain the positions of countries which are in the European Union but not in the Eurozone.

There was much emphasis on analogies to existing federations but there is the question of how valid these analogies are. Each of the federal examples has democratic governance, as opposed to technocratic governance or elite-dominated processes. I might be over-influenced by the United Kingdom experience, but one of the things that strikes me as very important is that political elites and business leaders have tended to be in favour of European Union membership yet have been unwilling to make that case forcibly in public. Europe seems to be blamed for everything that goes wrong in the United Kingdom; partly that is driven by xenophobia at the tabloid end of the media. Nevertheless, there is the serious question as to what extent one needs public consent in a

[*] University of Aberdeen.

democracy or whether democracy is a nuisance and one really wants technocrats to run policy insulated from political constraints.

I do not understand what certain terms are now taken to mean, including "fiscal union". If one considers existing federations, there are those such as Australia (which have heavily resourced territorial equalisation systems) at one end of the spectrum and the more competitive federalisms such as the United States at the other. However, people underestimate the sheer size of fiscal transfers in the United States via Medicare, Social Security, the defence budget and various forms of pork-barrel politics in Congress. One of the US fiscal problems is that, although there is a much harder budget constraint at the level of the states, this produces a pro-cyclical bias in fiscal policy which means the Federal Government, though heavily constrained, has to do more fiscal lifting. This further raises the question of the balance between fiscal and monetary policy.

Where Kastrop's presentation differed from the text was on the final slide about the potential role of independent fiscal institutions, arguing that these could be transparency-generating. On this aspect, I am extremely sympathetic (Heald, 2012, 2013), but beyond that you come up against the counter-posing of technocracy against democracy. So independent fiscal institutions that put information into the public domain have my whole-hearted support, but if fiscal policy decisions are to be distanced from democratic politics, there are potentially very serious problems in terms of democratic consent. One of the problems of having technocrats run policy is that questions then arise about accountability mechanisms when technocrats and economists get it wrong (Barber, 2011).

Turning to Stracca *et al.*'s paper, his presentation was immaculate and I really enjoyed listening. He concentrated on the most important aspects of the paper. The written paper is very thorough but that makes it more difficult to focus on the major points. However, I have some concerns.

First, the paper talks about "civic capital" but I do not fully understand the difference between civic capital and the broader notion of social capital. The relationship between these concepts has to be further explored; there is a comment in the paper that they are similar but the relationship is not developed.

Second, the first half of the paper uses values survey data for 65 advanced and emerging countries; I presume that data limitations are affecting which countries are included. The later part of the paper focuses on the Eurozone countries and I will come back to that. The basic argument is that interpersonal trust is beneficial in terms of avoiding macroeconomic imbalances, particularly with respect to the government budget balance and the inflation rate. Though the composite index that the authors use, and do sensitivity tests on, includes the current account balance, that balance itself is less significant. They obtain their data from the World Values Survey and the European Values Survey, and obviously one has to use the data that are available. Some of the questions in those surveys do make me cringe, but there is a plausible argument that, for example, high interpersonal trust reduces transactions cost in the economy. However, empirical work based on these values surveys often ignores intra-country cultural differences. Italy is a good example; even the rest of the world knows that Italy in the North is not the same as Italy in the South. So what does an average value for Italy mean? Italy is perhaps an extreme example, at least in terms of Europe, of having such a well-identified geographical divide; nevertheless this is an important generic issue.

Third, on a more technical level, although Stracca made some reference to this in his presentation, I did not really understand why he was using decade averages. In the presentation he made the point that there is not much year-on-year variation but why should one think that the 1980s, 1990s and 2000s are necessarily an economically significant partitioning of time?

Fourth, I am a Professor of Accountancy and, in the accounting and management research literature, there are persistent references to work done in the 1970s and 1980s by Geert Hofstede, a Dutch management consultant. Now when one goes back to this work, and particularly if one heard Hofstede lecture in the 2000s, some of these characterisations almost feed national caricatures. Yet it remains interesting how his contribution has survived.[1] The economics literature on trust is separate from the Hofstede literature. One of the points that Stracca *et al.* make is that, on some indicators of values, it is not at all obvious what to expect; for example, would one expect obedience to be beneficial to macroeconomic balances or expect religiosity to be positive or negative? Though constraints on available values data are inevitable, there are reasons to exercise caution.

Fifth, the R^2s are not high, at 0.14, but the paper contains a very interesting sentence which Stracca did not use in his presentation. One standard deviation increase in trust corresponds to roughly one half of a standard deviation reduction in macroeconomic imbalances, which is a large effect.

Sixth, Stracca and his colleagues use "quality of institutions" and "confidence in institutions" as control variables. However, if I wanted to explain why Sweden had good economic performance, I would think that the quality of institutions and confidence in them were closely linked to this idea of interpersonal trust. So I would emphasise the sources of interpersonal trust and the channels through which it might work to improve economic performance.

The paper then moves to consider the Eurozone and that is where it becomes denser and rather more difficult to read. One of the conclusions is that cultural heterogeneity within the Eurozone is not particularly large. I wish that the paper had gone from the 65 countries to the European Union before it had moved on to the Eurozone. Given that two of the authors work for the European Central Bank, I can well see why that was done, but it would be very interesting to see the results for the European Union as a whole.

My final question is that, if policy-makers and decision-makers disregard democracy and treat politics as a nuisance, what is likely to be the effect on trust over the long-term? What I would expect is the growth of anti-politics and a flight to extremist political parties. I made the point earlier about the dangers of elite actors being seen to ignore public opinion, without arguing their case. Certainly in the United Kingdom, the trust indicators have gone down sharply. Electoral turnout, which is often regarded as a trust indicator, has fallen, and there is considerable alienation from the mainstream political process. I look forward to receiving Kastrop's paper and I very much enjoyed reading Stracca's paper on culture, though it does not give any easy answers. What I find surprising is the finding that cultural heterogeneity within the Eurozone is not particularly large: this contrasts markedly with much political and media comment since the Eurozone went into crisis after 2008.

---

1 For a critique of Hofstede (1980) on culture, see Baskerville (2003).

REFERENCES

Baskerville, R. (2003), "Hofstede Never Studied Culture", *Accounting, Organizations and Society*, Vol. 28, No. 1, pp. 1-14.

Buetzer, S., C. Jordan and L. Stracca (2013), "Macroeconomic Imbalances in the Euro Area and Beyond: A Question of Civic Capital?", conference version of the paper in this volume.

Heald, D. (2012), "Why is Transparency About Public Expenditure So Elusive?", *International Review of Administrative Sciences*, Vol. 78, No. 1, pp. 30-49.

———— (2013), "Strengthening Fiscal Transparency", in R. Allen, R. Hemming and B. Potter (eds.), *The International Handbook of Public Financial Management*, Basingstoke, Palgrave Macmillan, pp. 711-41.

Hofstede, G.H. (1980), *Culture's Consequences: International Differences in Work-related Values*, Beverly Hills CA, Sage Publications.

Kastrop, C. (2013), "The Role of Fiscal Design in Federal Systems: Indications for an Incentive-based Europe?", conference slides of the paper in this volume.

COMMENTS ON SESSION 4
FISCAL TOOLS TO CONTROL MACROECONOMIC RISKS AND IMBALANCES: EXPERIENCES AND PRESCRIPTIONS

Geert Langenus[*]

Obviously, I would first like to thank the Banca d'Italia colleagues for organising this excellent workshop and having me again. My comments will focus on two very different papers. The first one, by Lendvai *et al.*, tackles the question how the measurement of the structural (or cyclically-adjusted) budget balance can be improved. The second one, by Herrero García *et al.*, focuses on Spain and analyses the complex relationships between fiscal and macroeconomic imbalances. Both papers provide a lot of food for thought and are well written and I congratulate the authors.

Let me start with Lendvai *et al.* Actually, this paper is a trip down memory lane for me. I vaguely remember from the mists of time that the first Banca d'Italia fiscal workshop in 1999 was primarily devoted to cyclical adjustment of budget balances. This provided the impetus to develop our own method with a number of ESCB colleagues. On the one hand, it is nice to see that this issue is still relevant today, fourteen years later. On the other hand, pessimists may argue that fiscal experts are not working very quickly or, at least, it takes quite long for them to agree on certain issues and cyclical adjustment appears to be a case in point.

Cyclical adjustment methods essentially *simplify* reality by presupposing stable links between broad tax categories and (easily available) macroeconomic variables. In my view the limitations of this approach are most evident for corporate (profit) taxes. In this particular case one typically tries to capture a relationship that is essentially non-linear (as there are no negative taxes, or subsidies, for losses in year *t*) with a constant elasticity. In addition, tax rules are usually so arcane that the real-world concept of "taxable corporate profits" is far removed from anything that can be found in the national accounts. Finally, corporate tax systems typically include rules to carry forward losses, which implies an unknown lag structure for the relationship between macroeconomic aggregates, such as GDP, and corporate tax proceeds.

Most cyclical adjustment methods (e.g., the ones used by the EC, the OECD and the IMF) follow a two-step approach. First, a broad tax category (or unemployment spending) is linked to a macroeconomic aggregate, which is thought to determine its growth, e.g., VAT and other indirect taxes are related to private consumption. Second, this macroeconomic "tax base" is linked to GDP. In both steps, standard elasticities are econometrically estimated or obtained from tax rules. The aggregate budget sensitivity to the cycle can then simply be derived from the set of elasticities for the budget items considered. The Lendvai *et al.* paper is essentially addressing the issue of large "volatility" in this second type of elasticity, between the tax base and GDP. The authors propose to do so by linking part of the budget to another macro variable, *i.e.*, domestic absorption instead of GDP. Please note that the ESCB method is more radical in this respect: (almost) nothing is linked to GDP.

I want to start my specific comments on the paper by focusing on a country example, Belgium. As you can see from table 1, the correction proposed by the authors significantly modifies the levels of the cyclically adjusted balance: for the 2005-07 period the new CAAB – based upon domestic absorption – is about 0.5 per cent of GDP better than the estimate on the basis of the "official" EC method. At the same time, it is clear from the table that the ESCB method

---

[*] Research Department, National Bank of Belgium, E-mail: geert.langenus@nbb.be

These comments reflect the views of the author and not necessarily those of the National Bank of Belgium.

Table 1

An Example: Cyclically-adjusted Balances for Belgium
(percent of GDP)

	2005	**2006**	**2007**	**2008**	**2009**
CAB – EC	–2.8	–0.4	–1.5	–2.1	–4.4
CAAB – Lendvai *et al.*	–2.4	0.0	–1.0	–2.0	–4.4
ESCB – Bouthevillain *et al.* (2001)	–2.1	0.4	–0.5	–1.5	–5.3

(Bouthevillain *et al.*, 2001) that is essentially aimed at a better matching between budget categories and macro variables leads to a larger correction: cyclically-adjusted balances are about 0.7 to 1 per cent of GDP higher than estimated by the EC. So, I agree with the authors: the correction implied by the CAAB is "not just peanuts". It is definitely a step in the right direction but does it go far enough?

Let me now zoom in on 2009. Here I was struck by the fact that the change in the CAB is roughly equal to the change in the CAAB. Yet, 2009 is a textbook case of "unbalanced" growth in my view. The impact of the Great Recession on the major tax bases was much more benign than on GDP. While the latter dropped by close to 3 per cent in real terms, real private consumption declined by less than 0.5 per cent while earned income, due to the specific features of the notorious Belgian indexation system, even increased somewhat in real terms. So, wouldn't you want a (significantly) smaller cyclical impact – and, hence, a more important cyclically-adjusted worsening – than that based on a standard output gap method such as the EC's cyclical adjustment method? In my view, the new CAAB does not seem to fully address the issue of unbalanced growth episodes.

I now turn to a number of technical and other specific issues. First, I wonder if the authors could elaborate on the rationale for using deviations with respect to norms rather than deviations from trends for the absorption component. The norms in themselves are period- and country-specific but they are determined in a panel regression and, hence, time-varying and country-specific impacts of explanatory variables are ruled out. I am not sure if such an approach really captures actual *cycles* in absorption. If the correction does not have a zero mean in the longer term, it is a somewhat different type of animal than the cyclical adjustment methods that we are used to and that we use to evaluate fiscal policy in a medium-term perspective. More generally, it is worthwhile to place the paper in the context of the literature on CAB measurement errors and revenue windfalls and shortfalls. One strand of this literature stresses the role of asset prices. An operational method to augment CABs with a correction for asset price cycles is proposed, for instance, by Price and Dang (2011). The results that they present are not fully in line (and sometimes at odds) with the CAAB correction and I would argue that both corrections are not complementary as asset price cycles should, in principle, be related to absorption cycles. Another strand of the literature tries to explain actual revenue windfalls and shortfalls. In this connection, Morris *et al.* (2009) show that unexplained residuals can be large – even if one uses the ESCB approach that is supposed to provide a better matching! – and are found primarily in profit taxes and, to a much lesser extent, in consumption taxes. It seems to me that the CAAB correction mainly targets the latter and would not necessarily deal with unexplained cyclicality in corporate taxes.

Table 2

Trend Uncertainty when Measuring CABs
(percent of GDP)

	CAAB	CAB	CAB – Spring 2008
Spain (2007)	0.2	0.9	2.4

This brings me to the more general issue: what should be the role of cyclical adjustment in fiscal governance systems, and, more specifically, how should CAB measurement uncertainty be reconciled with the need to consider the business cycle when assessing fiscal outcomes? Let me first reiterate the point made by previous speakers: in my view the biggest problem, by far, is the trend uncertainty, as shown for instance by different vintages for the 2007 CAB for Spain (see Table 2). I was also intrigued by the recent Borio *et al.* (2013) paper that manages to proxy "final" output gaps in real time by just looking at a number of simple financial indicators and the work shown by Christophe Kamps earlier in the conference goes in the same direction even though the methodology is different. In addition, the method that is now used by the EC should in principle be less prone to trend revision. However, I am not sure whether trend uncertainty can and should be completely sanitised away. In the end, our view on the cycle is and should be determined by our expectations for the future. As we do not have perfect foresight, trend revisions will remain part of life and CAB estimates will continue to come with some degree of uncertainty. So, how should we use these uncertain CABs in fiscal rules? My take on this consists of three elements. First, be prudent. Make sure that there are sufficiently large safety margins. This implies, for the EU countries, that one should err on the side of caution, e.g. when setting medium-term objectives or defining the appropriate size of fiscal consolidation. Second, one should always try to not just estimate but also *explain* developments in CABs, in particular by reconciling them with a bottom-up approach starting off from actual fiscal measures. An operational method is proposed, for instance, by Kremer *et al.* (2006). Finally, fiscal rules based on CABs should be complemented by other types of rules: limits on nominal deficits, public debt ceilings and, as other people have already argued in this workshop, expenditure rules.

If you allow me one final comment on the Lendvai *et al.* paper: it comes at a time when the new EU fiscal governance framework will be put to the test and e.g. the European Commission, the authors' employer, is currently considering imposing fines for certain fiscal sinners on the basis of a CAB methodology, which, according to the authors, is not fully sound from a methodological point of view. This makes the paper not only very interesting but also very courageous. I obviously assume here that the upper echelons of the European Commission still intend to take the new governance framework seriously.

I turn to Spain now. Herrero *et al.* provide a very rich paper combining descriptive analysis ("What went wrong?") with policy-relevant empirical research on the links between fiscal and other imbalances. Let me skip the summary. I guess you've all been awake during the presentation. I go to the comments immediately. The paper uses different models to analyse different questions so discussants have to do some cherry-picking and I will focus on two specific issues. However, let me first say that I really enjoyed also the descriptive part of the paper. We all know something about what went wrong in Spain but it is very nice to have all elements together in one paper. I take from the paper that all the failures of our monitoring and governance system somehow came together in Spain. If only the paper could have been written six years ago!

OK, issue number 1: non-Keynesian effects. I guess it is fair to say that the debate on fiscal multipliers is raging. It seems to me that the claim about the presence of non-Keynesian effects is somewhat at odds with the current majority view (or, at least, the concern) that we may underestimate the demand-reducing impact of fiscal consolidation. Basically, the authors are up against a Grand Coalition of various fiscal experts, ranging from the IMF, household names such as professors Krugman and De Grauwe to the research staff of the Syriza party in Greece, not to mention the thousands of people that are demonstrating in the streets of Madrid from time to time. So I guess the issue deserves a closer look. Even though I am actually sympathetic to the claim, I am not fully convinced that it can be derived from the empirical results presented in the paper. The argument is essentially based upon responses of private investment (+) and unemployment (–) to a "fiscal balance" shock but the VAR that is used does not contain GDP or private consumption. In addition, it was unclear to me if the fiscal balance shock is orthogonal to the business cycle (the authors do not seem to use cyclically-adjusted budget balances in the paper that I read). Moreover, the alternative VAR identification scheme that is proposed in the paper would seem to be at odds with the conventional wisdom and Section 2 of the paper. Finally and most importantly, the observed positive link between fiscal consolidation and investment may just point to "crowding-in" of private investment but not to non-Keynesian multipliers. In this connection, the Cardoso and Domenech (2010) paper that is referred to is very interesting. These authors use a rational expectations model with liquidity constraints and find a similar crowding-in impact of fiscal contraction on investment. However, their empirical results still point to Keynesian multipliers overall as the beneficial impact on private investment is more than offset by the negative impact on private consumption.

Another point is that, if I learned anything from the literature, it is that circumstances matter for the size and the sign of the multipliers: liquidity constraints, fiscal stress, openness, degree of monetary accommodation, you name it. In this respect, I was wondering if one single model can describe both pre-crisis and post-crisis Spain. I would argue that, today, there is for instance a higher degree of fiscal stress but, presumably, the share of liquidity-constrained consumers has also risen.

Finally, the authors argue that the composition of fiscal policy matters. I couldn't agree more. However, they can not really substantiate it because the empirical approach does not go beyond the budget balance. As the workshop is hosted by the Banca d'Italia, I felt that it was appropriate to refer to a number of papers by Banca d'Italia colleagues – e.g., Giordano *et al.* (2008) and Caprioli and Momigliano (2011) – that use VARs to look at the budget in a more disaggregated manner. I think that the authors will find some support for their claim on the importance of the composition of fiscal adjustment there.

Let me now turn to the second issue: how to rebalance the current account and what is the role for the government budget? Here the authors use an ECM linking the current account to 5 variables. Now, I personally wouldn't know the first thing about how one should model the current account but then I remembered that this is actually done in the other paper that was allocated to me. So why not use the know-how of the European Commission to criticise our Spanish colleagues, so to speak? When looking at the differences with the panel approach used in the Lendvai *et al.* paper, it struck me that in the regressions there is no role for GDP (growth) so one may miss out on differences related to catching-up effects. Also the International Investment Position and the oil balance are not included. In my experience, trying to explain current account movements without taking into account the latter, in particular, is quite an uphill task for many countries.

Then there is the issue of the positive long-run relationship and the negative short-run dynamics for some variables such as the budget balance and the investment variable. I am not fully convinced by the explanation of diminishing returns. In my view it may also point to identification

or multicollinearity problems. The long-run and short-run coefficients of almost equal magnitude for the budget balance are particularly difficult to interpret in my view.

In addition, the paper finds a (clear) positive link between the fiscal balance and the current account, which suggests that fiscal consolidation weighs on domestic absorption. How does that square with authors' view on non-Keynesian effects? Several papers, including for instance Nickel and Vansteenkiste (2008), specifically look at the fiscal-current account relationship to evaluate the presence of Ricardian equivalence.

Let me wrap up by getting back to the broader picture and the policy messages: the authors suggest that the scope for addressing external imbalances with a fiscal contraction alone is likely to be limited. This lends support to the policy line that fiscal consolidation needs to be accompanied by structural reforms, in particular aimed at enhancing competitiveness and increasing the employment rate. Against that background, an even greater focus on cost developments, including but not limited to unit labour costs, in the paper would have been warranted.

REFERENCES

Borio, C., P. Disyatat and M. Juselius (2013), "Rethinking Potential Output: Embedding Information About the Financial Cycle", BIS, Working Paper, No. 404.

Bouthevillain, C., P. Cour-Thimann, G. van den Dool, P. Hernández de Cos, G. Langenus, M. Mohr, S. Momigliano and M. Tujula (2001), "Cyclically-adjusted Budget Balances: An Alternative Approach", ECB, Working Paper, No. 77.

Caprioli, F. and S. Momigliano (2011), "The Effects of Fiscal Shocks with Debt-stabilizing Budgetary Policies in Italy", Banca d'Italia, Working Paper (Temi di discussione), No. 839.

Cardoso, M. and R. Doménech (2010), "On Ricardian Equivalence and Twin Divergence: The Spanish Experience in the 2009 Crisis", in European Commission (ed.), *External Imbalances and Public Finances in the EU*, European Economy, Occasional Paper, No. 66.

Giordano, R., S. Momigliano, S. Neri and R. Perotti (2008), "The Effects of Fiscal Policy in Italy: Evidence from a VAR Model", Banca d'Italia, Working Paper (Temi di discussione), No. 656.

Kremer, J., C. Rodrigues Braz, T. Brosens, G. Langenus, S. Momigliano and M. Spolander (2006), "A Disaggregated Framework for the Analysis of Structural Developments in Public Finances", ECB, Working Paper, No. 579.

Morris, R., F. de Castro Fernández, S. Jonk, J. Kremer, S. Linehan, M.R. Marino, C. Schalck and O. Tkacevs (2009), "Explaining Government Revenue Windfalls and Shortfalls: An Analysis for Selected EU Countries", ECB, Working Paper, No. 1114.

Nickel, C. and I. Vansteenkiste (2008), "Fiscal Policies, the Current Account and Ricardian Equivalence", ECB, Working Paper, No. 935.

Price, R. and T.T. Dang (2011) "Adjusting Fiscal Balances for Asset Price Cycles", OECD, Economics Department, Working Paper, No. 868.

COMMENTS ON SESSION 4
FISCAL TOOLS TO CONTROL MACROECONOMIC RISKS AND IMBALANCES: EXPERIENCES AND PRESCRIPTIONS

Ranjana Madhusudhan[*]

I would like to thank Daniele Franco and Banca d'Italia for inviting me to participate at another great Public Finance Research Workshop in Perugia. My comments today are going to be primarily directed to the two papers that were assigned to me, with the usual disclaimer that the views expressed are my own. Both papers are well written and I thoroughly enjoyed reading them. The authors also provide a very good literature review along with their insightful discussions.

It is interesting to note the similarities – the papers cover small economies with floating exchange rates and focus on macroeconomic policy imbalances. Both these papers point to a good record of fiscal management due to transparency-based framework for encouraging responsible fiscal policy management, as set in the Public Finance Act (New Zealand) and the Fiscal Responsibility Act (Mexico). On the other hand, the dissimilarities are that the Mexico paper deals with the issue of oil price setting while the New Zealand paper focuses on increasing the county's private savings rate. I will briefly comment on the first paper by Brook and then move on to the second paper by Aguilar and Ramírez.

Comments on "Macroeconomic Imbalances and Fiscal Policy in New Zealand" by Anne-Marie Brook

The paper by Brook discusses the role that fiscal policy in New Zealand may have played in contributing to its macro-economic imbalances, including a very negative net international investment position, with large current account deficits, a significant build-up of household debt linked to strong house price increases, a persistently over valued exchange rate and a productivity level lower than average reported for wealthier economies. As mentioned in the paper, the above trends are somewhat puzzling given New Zealand's generally sound fiscal framework and attractive business environment.

The paper examines the role of fiscal policy that may have contributed to persisting these imbalances and the persistent shortfall of national savings relative to investment. The author's view is that the existing macroeconomic imbalances pre-date the episode of pro-cyclical fiscal policy identified and discussed in Sections 1 through 5 in the paper, as such the stabilization role of fiscal policy is not likely to play a major role as part of solutions in dealing with the country's macroeconomic imbalances. Changes to the Public Finance Act currently underway are expected to put more emphasis on the importance of fiscal policy stabilization in future economic upturns, although political challenges to ensuring that surpluses are not "spent" (either on "tax cuts" or spending increases) is likely to persist, as reflected by the author. Brook is somewhat skeptical that more stabilizing will do much more to affect New Zealand's macroeconomic imbalances.

Interestingly, Brook suggests that the more microeconomic aspects of fiscal policy, particularly, the *structure role* of fiscal policy, such as tax policy and retirement income policy may be playing a more important role and not fiscal sustainability, as is generally the case with many OECD countries, in putting undue pressure on macroeconomic imbalances.

---

[*] National Tax Association, USA.

The views expressed are those of the discussant and does not necessarily reflect the views of the New Jersey Department of Treasury, New Jersey State or the National Tax Association.

The paper employs the three dimensions of good fiscal policy, which include sustainability, stabilization, and structure as key components. In particular, the paper focuses on the low private savings rate and examines the extent to which changes in fiscal policy structure may have potential to boost private saving, and thus alleviate macroeconomic imbalances.

The paper discusses how the tax system influences savings, including: (i) inter-temporal distribution, and (ii) distribution of savings across different savings instruments. There is a good discussion on how the choices of a comprehensive tax base has important implications on the impact on savings, even though, the empirical evidence on the impact of tax incentives on savings is mixed. New Zealand's experience with non-neutrality among different saving instruments was noted and some have argued that the tax-favored nature of the ownership of housing has led to too much of the country's savings being diverted into housing and the resulting problems.

Different measures to potentially raise savings rate and improve the composition of savings is laid out in Sections 5.1 and 5.2 along with a discussion of the quantification results and underlying trade-offs. Under one of the options suggested, the tax rate on capital income would be reduced by extending the existing PIE regime, along with other changes such as a capital gains tax so as to mitigate the equity and revenue impacts. Another measure suggested by Brook would be to move toward a private save-as-you-go (SAYGO) pension system, which would involve pairing compulsory savings with means-testing of New Zealand's universal old-age pension (NZS).

I would like to conclude with the following open questions and some thoughts on extending the analysis on New Zealand: What happens when the underlying income distribution is taken into account? How would differences in degrees of propensity to save across different income/population cohort affect the outcomes under proposed solution options? In this context, a much detailed evaluation of underlying distributive implications of different tax favored savings schemes would be insightful for the policy maker. It would be useful to examine the dynamics of the fiscal policy structure component under alternative scenarios such as different inflationary environments.

The role of Rainy Day Fund and enforcement issues are additional potential areas for future research. The leveraging process of households and agricultural sectors probably should be looked at and the importance of cultural variables and institutions (such as faith and thriftiness factors) in enhancing private savings rate may merit due consideration as well. I also concur with Brook's observation that the paper would benefit by extending its focus on other policy areas that may have impacted macroeconomic imbalances such as economic regulation and competition policy.

Overall, the thrust on the more microeconomic aspects of fiscal policy (the *structure role* of fiscal policy) in supporting external balance by encouraging a higher rate of private saving is interesting. However, till we have a clear track history, it will be difficult to know the actual impact of the proposed changes and policy options suggested in this paper. The final results would also be a function of when and how the Parliament acts on the pending measures under the Public Finance (Fiscal Responsibility) Amendment Bill – so stay tuned.

Comments on "Oil-dependent Revenues and Macroeconomic Stability Under Fiscal and Monetary Rules: An Analysis of Mexico" by Ana María Aguilar and Claudia Ramírez Bulos

The paper by Aguilar and Ramírez discusses challenges of the highly oil-dependent public finances in Mexico, the setting of oil prices by a set of government rules and issues with macroeconomic stability. They examine this fiscal situation and its interaction with the monetary policy to assess the appropriateness of Mexico's energy pricing rule in the new oil price environment.

The authors develop a small open economy macroeconomic model to analyze the effect of oil prices on Mexican public finances. Assuming monetary policy follows an optimal rule, the paper evaluates the impact of two different fiscal policy rules: a balanced budget rule or a structural balance rule and finds that when the economy faces inflation or consumption shocks, both rules generate almost the same effect. However, the authors note that when oil price shocks occur, higher macroeconomic stability is achieved and the monetary authority reacts less aggressively under the structural balance-budget rule.

The paper assumes that non-core inflation, oil price gap, etc. follow an AR (1) process. Here the question that comes to mind is what happens if this assumption is changed? That is, if the AR (1) process is not followed by the variables under consideration?

Several positive developments are mentioned to have taken place, such as greater transparency and accountability and policy decisions being made under a *regulatory* framework rather than a *discretionary* one. These reforms have helped but as the authors correctly note that Mexican public finances still remain vulnerable.

It appears that the central bank has been very successful in addressing supply shocks to inflation on account of exchange rate fluctuations and volatility in agricultural prices. However, the Mexican economy appears to not have learned to absorb energy price volatility in an orderly manner, leaving it as an open issue.

The discussion of the history of oil price development was quite informative. However, the modeling framework needs to be enhanced by making the mechanics of oil price change more explicit, indicating whether it is supply-driven or demand-driven. The effect on oil prices from the risk of future supply constraints or the expectation of future economic growth should also be included. In a recent analysis using a partial least squares (PLS) technique,[1] the 1990s were identified as a period of excess supply in the oil market, and the 2000-09 period as one in which demand factors were dominant. The oil price volatility during the Great Recession was attributed to the rapidly changing expectations about demand. More recently, according to this analysis, supply pressures have appeared again as major oil-price determinant.

I would like to conclude my discussion of the paper on Mexico with a few questions to the authors and suggestions for possible extensions of their study. For instance, what are the implications of alternative model specifications to deal with an abrupt adjustment of exchange rates? What happens when the assumption of equal weights is changed in the case of interest rate smoothing process? It would be useful to discuss the underlying adjustment process in greater detail to reflect on lags and other secondary effects, including a discussion of underlying regressivity implications.

An analysis of the disbursement side indicating how the oil revenues are allocated among different tiers of government, what programs are covered, whether or not the spending components are earmarked with oil revenues or funded as part of general fund oil revenues, could make a difference to final policy outcomes depending on whether there is budgetary flexibility or rigidity. Finally, the policy trade-offs and distributional implications under proposed changes need to be highlighted and discussed fully.

---

[1] For details about the Federal Reserve Bank of New York analysis see the blog on "A New Approach for Identifying Demand and Supply Shocks in the Oil Market" posted at: http://libertystreeteconomics.newyorkfed.org/2013/03/a-new-approach-for-identifying-demand-and-supply-shocks-in-the-oil-market.html