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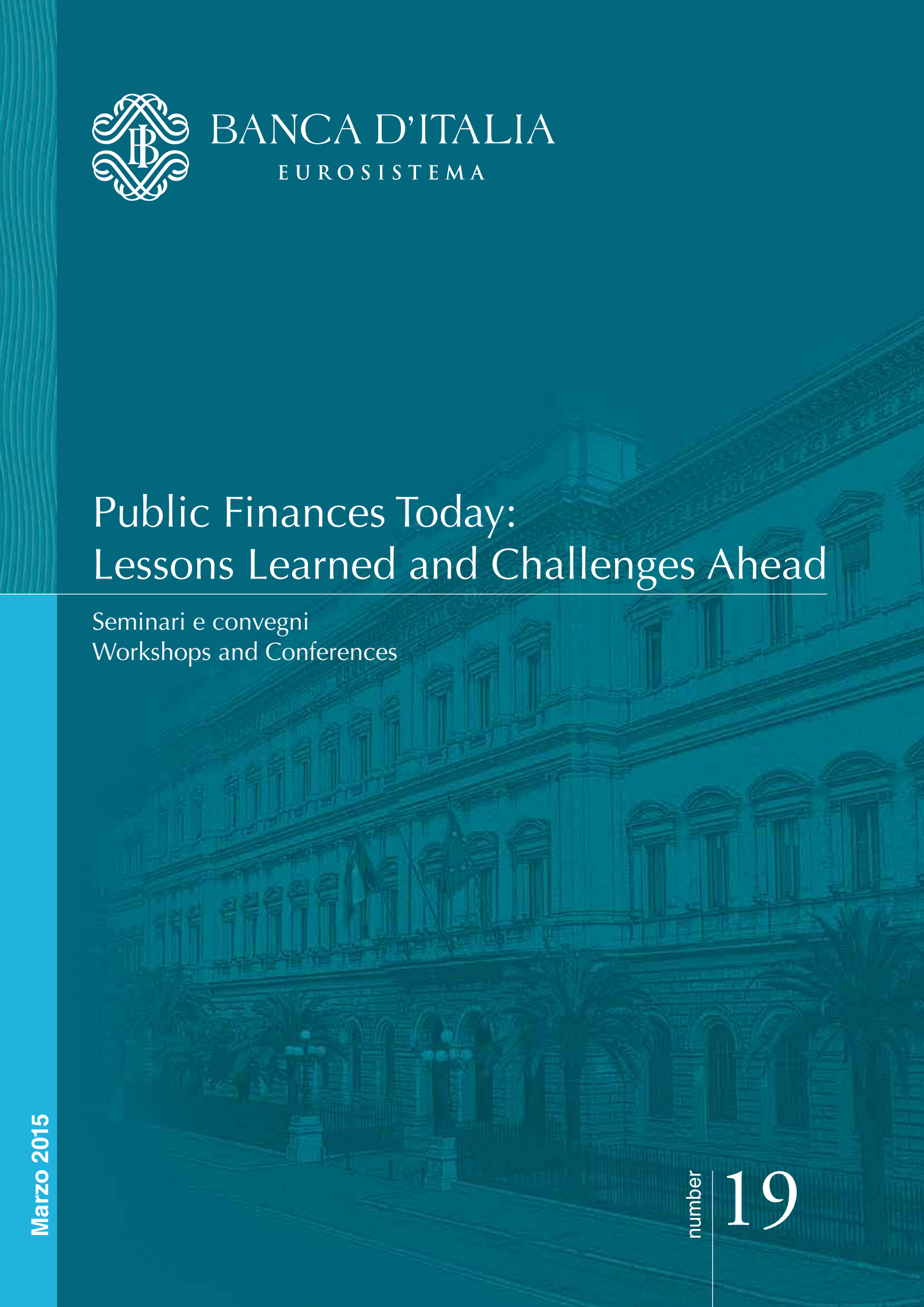

Marzo 2015

number 19

Earlier versions of the papers in this volume were presented at the Banca d'Italia workshop on "Public Finances Today: Lessons Learned and Challenges Ahead" held in Perugia, S.A.Di.Ba., on 3-5 April, 2014. We wish to thank the staff of S.A.Di.Ba. for their assistance in all aspects of the organization of the workshop.

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The proceedings are available at the Banca d'Italia website. A hard copy may be requested from:

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

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

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Printed by the Printing Office of Banca d'Italia, Rome, March 2015.

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FOREWORD

Sandro Momigliano[*]

This volume brings together the papers presented at the Banca d'Italia workshop held in Perugia from 3 to 5 April 2014.

The workshop had two main objectives: to examine the changes that public policies should undertake in the coming years to adapt to a challenging new environment; to assess policy responses to the crisis. In many countries the recent crisis accelerated preexisting trends and made even more urgent a rethinking of the tax and welfare systems. The workshop contributed to this reassessment offering insights on the consequences of specific reforms carried out in and outside Europe. Policy-makers' reaction to the crisis, at the national and supranational level, had a markedly short-term focus, but also aimed, in a longer-term perspective, at guaranteeing the credibility and sustainability of public finances. The reaction to the euro-area sovereign debt crisis included institutional reforms as well as fiscal adjustments. In the workshop, together with discussing the recent reform of EU governance, a number of topics related to the timing, the effectiveness and the composition of fiscal consolidations were examined on the basis of theoretical and empirical works.

The first session focused on the various effects of both tax and expenditure policies. The first two papers tackled the issue of the impact of changes in tax rates and work-related tax expenditures on revenues, taking into account behavioral responses which, in both cases, significantly affect the results. Two works analyzed the effects of fiscal policy on labor markets and on the economy in general in a sample of OECD countries, thus providing guidance for the design of a policy mix which could respectively favor job creation and minimize the impact of consolidation on economic growth. Finally, the remaining two papers discussed actual and potential pension reforms respectively in Eastern Europe and South America. Even though the institutional contexts are quite different, in both cases the authors argue that the reforms were to some extent disappointing: the main issues discussed in the two articles relate respectively to the returns and the allocation of private pensions funds and to the low coverage guaranteed by contributory pension schemes, the latter due to the extent of the informal labor market.

The works included in the second session were largely concerned with budgetary adjustments. The first paper investigated the factors conducive to a successful exit from IMF official assistance, indicating that, together with determined actions such as fiscal adjustment and decisive financial sector repair, stringent conditionality and supportive external conditions increase the probability of success. The second study assessed the impact of government's payment delays and arrears on the private sector, arguing that increased delays negatively affect the suppliers' liquidity and ultimately economic growth. Two papers investigated, respectively, the influence of fiscal policy uncertainty in the propagation of government spending shocks, and debt dynamics resulting from shocks to the budget, inflation and growth. A fifth research examined the possible effects on public opinion of fiscal policy, contributing to the literature which assign importance to confidence effects when assessing fiscal multipliers. Finally, the last two papers directly estimated, with different techniques and data, fiscal multipliers for a panel of euro-area countries.

The third session dealt with the effects of recent changes in fiscal rules. In particular, the first paper reviewed the innovations to the European fiscal framework introduced by the so-called "Six-pack", the "Two-pack" and the Fiscal Compact, and formulated several recommendations for

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their improvement. The second paper examined instead the impact of national and European fiscal rules on the Polish fiscal policy, pointing out that the former were much more effective than the latter in influencing government behaviour. The authors of the third work built a unique worldwide dataset, showing that the number of fiscal councils surged in recent years and that only well-designed councils are associated with stronger fiscal performance and more accurate forecasts. A final paper – concerned with the Euro area – examined the possible establishment of a supranational fiscal capacity (a fiscal union), in order to buffer country-specific shocks. The authors argued that steps in this direction are desirable, even if they acknowledge that there are significant implementation and political obstacles. They also suggested that one way to create a euro-area fiscal union could be via a euro-wide, notional-defined contribution pension scheme.

The panel discussion, at the end of the conference, examined fiscal rules, focussing on the European context. The three panelists agreed that progress in addressing the shortcomings of the pre-crisis institutional setting has been made, but they also recognized that the current set of rules has become too complex. Intricate rules allow for more than one interpretation, thus increasing the probability of disagreement among member states as well as between member states and the Commission. Furthermore, they reduce the accountability of policy-makers. All panelists recommend that the design of fiscal rules do not discourage structural reforms, and that a proper space be left for market-based fiscal discipline.

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), *Fiscal Policy and Growth* (2012) and *Public Finances Today: Lessons Learned and Challenges Ahead* (2013).

Session 1

TAX AND EXPEDITURE POLICIES

WORK-RELATED TAX EXPENDITURES IN THE EU: IMPLICATIONS FOR TAX REVENUE

Salvador Barrios,[*] *Serena Fatica,*[**] *Diego Martínez López*[***] *and Gilles Mourre*[****]

We examine the impact on tax revenue (and the associated welfare cost) of a reduction in work-related tax reliefs in five European countries. We combine results from a EU-wide micro-simulation model with a theoretical model of labour supply to obtain a measure of the behavioural impacts of the reforms. We find that accounting for behavioural reactions both at the extensive (participation) and at the intensive margin (hours worked) has significant impacts on the revenue gain from the simulated reforms. In particular, our results suggest that at least one-fourth of the extra tax revenues collected through a reduction in work-related tax incentives is washed away after factoring in labour supply responses, especially through lower participation by individuals most at risk of exclusion. For policies strongly targeted at the bottom of the earnings distribution, the reform might even bring about a net revenue loss, depending upon the calibration of the labour supply elasticities to reflect heterogeneity across types of workers. The welfare gain of maintaining these tax reliefs could be far from negligible.

1 Introduction and motivation

The design of national tax systems has increasingly come to the fore of economic policy discussions due to its impacts on both economic efficiency and the sustainability of public finances, particularly in times of lukewarm economic growth and large budgetary consolidation needs. Reforms aimed at broadening the tax bases are a frequent policy recommendation, since they would not only enhance tax collection capacity but also minimise the economic distortions brought about by taxation. Reducing loopholes that facilitate tax avoidance and, more in general, streamlining tax expenditure have been identified as efficient ways to achieve that objective (OECD, 2010). Recurring examples of tax benefits include exemptions, allowances and credits, preferential tax rates for specific groups of taxpayers (e.g., low-income households, pensioners, etc.) or activities (e.g., purchase of cultural goods) or tax deferrals. Overall, the size of tax expenditures in the personal income tax system is significant in the EU (European Commission, 2013).

However, in principle, tax expenditures might also prove efficient from a fiscal standpoint if the immediate adverse impact on tax revenue is more than compensated by the stimulus to economic activity. Ultimately, this would translate into increased revenue in the medium to long run. One particular type of tax expenditure likely to have these features is work-related (or so-called make-work-pay, MWP) policies.[1] Following the example of the Earned Income Tax Credit (EITC) in the US, these schemes have been implemented in a growing number of EU countries over the past two decades in the form of in-work tax benefit, notably tax credit or

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We are particularly indebted to Alberto Tumino and Silvia Avram for comments and suggestions on the microsimulation runs with EUROMOD and to Srvaka András for helpful support and advice on the simulations for Hungary. The version "F6.0++" of EUROMOD was used for this paper. The views expressed in this paper are those of the authors only and do not necessarily reflect those of the European Commission.

[1] In the paper, we use the terms work-related and make-work-pay (MWP) interchangeably.

allowances, granted under the personal income tax system. The primary objective of such types of relief is to stimulate labour market participation by poor individuals or by those most at risk of exclusion. They do so by counteracting the disincentive effect exerted by the reduction/withdrawal of social benefits and, consequently, high marginal tax rates on labour income facing low-wage earners moving into employment. The effectiveness of MWP policies to reduce inequality and to enhance employment depends on several elements that go beyond the mere design of the tax relief, however. Most relevant appear social and economic factors such as the distribution of income, the functioning of the labour market, including its regulatory aspects (e.g., the existence of a minimum wage), the business cycle. In this respect, assessment based on the scheme (and experience) of a single country cannot be easily generalised to other contexts. All in all, a comprehensive cost/benefit analysis of such MWP policies should encompass both the cost per job created and the impact on income distribution (and in-work poverty in particular) as well as on reduced unemployment benefits and increase in work-related tax revenues collected (Immervoll and Pearson, 2009).

In this paper we aim at quantifying the fiscal impacts of reforms to MWP policies taking account also of the effects on the labour market equilibrium via adjustments on the supply side. We show that short-run budgetary gains from reducing those tax reliefs have indeed an economic and fiscal cost in the medium to long run when labour supply has reacted to the new policy environment. Further, we compute the marginal cost of public funds as a synthetic measure of the relative welfare effects of the simulated reforms. Our analysis rests on three building blocks: a theoretical framework for labour supply, derived from Saez *et al.* (2002), Kleven and Kreiner (2006) and Immervoll, Kleven, Kreiner and Saez (henceforth, IKKS, 2007); empirical estimates of participation and hours-of-work elasticities; simulation results obtained from a EU-wide micro-simulation model (EUROMOD). Combined together, those three ingredients allow us to model the effects that behavioural reactions along the extensive and the intensive margin have on tax revenue through changes in labour market outcomes. Consistent with the theoretical framework, we explicitly allow for heterogeneous individual responses by appropriately calibrating the labour supply elasticities across countries and types of workers. We perform our exercise on five European economies, namely France, Spain, the United Kingdom, Hungary and Slovakia, since the work-related policy is well identified for these countries. Moreover, the country sample gives rise to a very diverse set of policy configurations, not only in terms of type (credit vs. allowance) and design (e.g., conditionality on family characteristics) of the work-related tax relief, but also when it comes to the distinctive features of the whole tax-benefit system. In this respect, the use of a EU-wide micro-simulation model is essential, as the model can capture the full range of institutional features of tax and benefit systems with regards to personal income tax (PIT) and social security contribution (SSC), including pensions and other social benefits.

We believe our approach has a number of merits. First, by considering a marginal reduction in existing tax expenditures, instead of ad hoc reforms like the introduction of hypothetical harmonised policies, we make our exercise concretely based on real-life institutions, which have likely been shaped by national preferences. Moreover the choice of a marginal reform follows the political economy result that even radical tax reforms are likely to be introduced gradually. The flipside is that the marginal shocks we work with are not fully comparable across countries, since they depend on the size of the existing tax expenditures, as well as on the design of the broader tax-benefit systems they are embedded in. Secondly, by considering work-related tax reliefs as the relevant policy instrument we strengthen the case for including behavioural reactions of labour supply into the analysis. This is consistent with the empirical evidence for the US reported for instance by Eissa and Hoynes (2006), who document a strong reaction of labour supply to reforms to the EITC. When it comes to the choice of the policy instrument, our approach finds support also in the burgeoning literature on tax salience, and particularly in the experimental evidence on the EITC provided by Chetty and Saez (2009). In this respect, a simple salience argument would

indeed point to the fact that individuals adjust their labour supply more promptly in response to changes in specific and well identifiable instruments (like work-related tax benefits) than to general reforms to the personal income tax schedule, which ultimate impact on the take-home pay might be more opaque to figure out *ex ante*. Third, the theoretical framework underlying our analysis allows us to highlight the significant role played by labour supply responses along the extensive margin. It is a stylised fact that low annual or weekly hours of work occur with very low frequency in the data (Eissa *et al.*, 2008). Therefore, entry is also likely to take place at non-infinitesimal hours of work (that is, at part-time or full-time hours). Hence, policies affecting participation decisions entail first-order effects on government revenue via behavioural reactions affecting discrete choices.

The paper is organised as follows. Section 2 frames our analysis by illustrating relevant dimensions of worked-related tax expenditures, including their fiscal impact. Section 3 sets out the theoretical framework, while its empirical complement – the micro-simulation model results and the calibration of labour elasticities – is put forward in Section 4. Section 5 presents the results, including sensitivity analyses. Concluding remarks and policy implications are offered in Section 6.

2 Work-related tax expenditures: rationale, design and fiscal cost

Work-related tax reliefs are increasingly being used in Europe as an instrument to foster employment. Although their specific design differs across countries, reflecting also significant differences in the broader tax-benefit systems at the national level, they tend to have common features that go beyond the pure employment-conditionality. To frame our analysis, we briefly discuss these by focusing on the specific policies implemented in the countries we consider in our analysis, leaving a more detailed description of the different instruments, as they stood in 2010, to Appendix 2.

A work-related tax relief is normally granted as a direct reduction of the individual tax liability derived from earned income, that is, as a tax credit. Specifically, for France, the instrument is designed as a tax credit for the working poor (so-called *Prime pour l´emploi, PPE*), while the corresponding policy in the UK is the working tax credit (WTC). In both cases, the tax credit, income-tested and refundable, is granted conditional on a number of personal and family characteristics other than earned income levels.[2] Similarly, in Hungary and in Slovakia the tax relief takes the form of a proportional reduction of the tax liability, gradually phased out at higher income levels. As opposed to the previous cases, though, the amount of the relief does not depend on characteristics other than the level of individual earnings. Lastly, in Spain the tax benefit is designed as an allowance (*Deducciones por renta del trabajo*), *i.e.*, a reduction in the relevant tax base (employment income), varying in amount depending on the level of individual earnings, on the tax unit (single taxpayer or household), and on other characteristics such as the place of employment.

Detailed quantitative information on the tax relief, both at the aggregate level and along the income distribution, has been retrieved through the micro-simulation model.[3] The summary statics,

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[2] "Refundable" means that all qualifying taxpayers receive the full credit amount to which they are entitled, regardless of their tax liabilities. Otherwise said, if the credit is not fully exhausted by the tax liability, the exceeding amount is still granted to the taxpayer as a transfer.

[3] The joint consideration of taxes and benefits entitlements is all the more necessary in the simulation of the policy reforms in order to analyse the potential changes in disposable income and incentives to take-up a job as a result of changes in tax policies. These interactions can be a defining feature of MWP policies. For instance, in the UK working tax credits are determined jointly with family benefits. Also, for the other countries considered here the interaction between taxes and tax credits (or allowances) and social benefits also play a very important role, albeit in a more indirect way. We follow Avram *et al.* (2012) who propose a simple approach to capture the interactions between taxes and benefit entitlement modelled in EUROMOD. In a first step the gross taxes are simulated before allowances and credit. In a second step the tax allowances are set to zero and the gross tax rate is calculated

(continues)

reported in Table 1, shed light on the differences in the design of the tax policy instruments considered by quantifying their impacts across income deciles. For consistency with the theoretical framework employed in our main analysis, we exclude workers not employed for the year, who might thus be in transition between jobs. Likewise, public sector employees and self-employed are not included. As a consequence, the figures presented are for full-year employees in the private sector. A first remarkable result is that the scope of the policies varies considerably across countries. While the tax expenditures in Spain and Hungary benefit around 95 per cent of the working population, the tax credit schemes in the remaining countries appear targeted at the lower end of the income distribution. The French PPE affects around 20 per cent of the working population, and, expectedly, its coverage is monotonically decreasing with income. While two out of three workers in the first income decile are entitled to the tax relief, only 5 per cent of those in the seventh decile receive it. The WTC in the UK affects roughly 14 per cent of the total working population, mostly concentrated in the lower half of the income distribution. Targeting is even more specific in Slovakia, where the tax credit de facto benefits almost all and only workers in the first income decile, roughly 9 per cent of the total working population. Substantial heterogeneity emerges also when looking at the money amounts involved. Averaged across recipients, the monthly tax credit ranges from around € 9 in Slovakia to € 177 in the UK. In Spain, the tax allowance translates into a decrease of the average individual tax liability of nearly € 42 per month.[4] Those differences naturally carry over to the aggregate value of the tax relief. The tax credits cost the budget foregone revenues ranging from roughly € 19 million in Slovakia to € 1.822 billion in the UK. To put those numbers in perspective, they equal, respectively, 5 per cent and nearly 18 per cent of the aggregate tax liability from PIT and SSC in the sample.[5]

3 Theoretical framework

3.1 The revenue impact of reforming work-related tax expenditures

To account for changes in behaviour following reforms to the in-work tax relief we need a model of labour supply with participation and in-work decisions. We derive the theoretical predictions from the framework proposed by IKKS (2007) building on Saez (2002), illustrated more in detail in Appendix 1. The economy is made of individuals endowed with exogenous productivity and heterogeneous preferences, and faced with a non-linear income tax schedule, who decide on their labour supply. In particular, individuals take decisions about whether to work or not, which reflects the presence of fixed costs related to working (*i.e.*, the extensive margin). Conditional on being in work, the number of hours worked is chosen (*i.e.*, the intensive margin). Individuals thus face a nonlinear tax schedule from zero to positive income tax rate depending on their decision to work and on the number of hours worked. Changes in the tax system – including reforms on tax expenditures – alter the net-of-tax wage rate and, consequently, the opportunity cost of not working (through the labour/leisure decision). Under the assumption that entry does not take place at an infinitesimal level of working hours, which finds empirical support in the literature,

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before the tax credits are begin computed. The fiscal cost of tax allowances is then calculated as the difference between the taxes calculated in the first step and in the second step. Importantly, setting allowances to zero also modifies the benefit entitlements reflecting the interaction between tax and benefits necessary to consider the full range of the impact of tax reforms. The fiscal cost of the tax credit is then determined subsequently by calculating the difference between the gross taxes paid in the second step and the final net taxes paid (*i.e.*, net of allowances and credits).

[4] The fiscal cost of the tax allowance is obtained as the difference between the gross tax liability without and with the allowance (see footnote 3). Given the nature of the relief (*i.e.*, a deduction against earned income), its value to the individual taxpayer increases with the marginal tax rate on personal income.

[5] We have also cross-checked the results obtained from EUROMOD, both at the aggregate level and by income deciles, with comparable information available from national sources. We find that EUROMOD reproduces the income profiles of the tax reliefs and their aggregate value in a very precise way. The comparison tables are available upon request.

Table 1

MWP Tax Expenditures in Selected EU Countries: Summary Statistics

Decile	Fraction of Recipients	Total MWP Tax Expenditure	Average Monthly MWP Tax Expenditure	Total Taxes (*)	Total Benefits	Total Net Taxes
France						
1	65.18%	638.4	35.7	1058	620	438
2	34.6%	178.8	18.7	1782	433	1349
3	26.1%	124.8	18.3	2232	330	1902
4	18.9%	169.2	34.8	2475	296	2179
5	21.7%	178.8	36.8	2701	331	2370
6	13.0%	124.8	43.6	2865	301	2564
7	5.5%	49.8	41.5	3365	246	3119
8	1.7%	13.3	38.2	3529	251	3278
9	0.3%	3.0	48.1	4477	200	4277
10	0.2%	1.0	31.9	6120	303	5817
All deciles	20.8%	1481.9	30.6	30605	3311	27294
Spain						
1	66.8%	2806.0	211.5	308	92	216
2	96.9%	3427.2	242.0	509	38	471
3	98.4%	3227.0	218.3	694	33	661
4	99.2%	3135.1	219.6	770	19	751
5	99.9%	3239.2	221.0	907	31	876
6	100.0%	3426.3	221.6	1121	33	1088
7	100.0%	3300.2	221.7	1278	21	1257
8	100.0%	3488.3	221.3	1653	31	1622
9	100.0%	3191.0	221.5	1922	21	1901
10	100.0%	3234.1	221.4	2929	27	2902
All deciles	96.3%	32474.2	231.4	12091	345	11746

Table 1 *(continued)*

MWP Tax Expenditures in Selected EU Countries: Summary Statistics

Decile	Fraction of Recipients	Total MWP Tax Expenditure	Average Monthly MWP Tax Expenditure	Total Taxes (*)	Total Benefits	Total Net Taxes
UK						
1	23.8%	369.9	197.2	168	168	0
2	36.5%	740.7	290.9	341	104	236
3	42.5%	401.4	145.5	455	94	361
4	28.1%	216.0	115.2	559	71	488
5	15.2%	76.5	71.4	703	68	635
6	1.7%	15.0	126.1	845	62	783
7	0.4%	2.9	105.1	1048	62	987
8	0.0%	0.0	0.0	1257	63	1194
9	0.0%	0.0	0.0	1618	65	1553
10	0.0%	0.0	0.0	3346	77	3270
All deciles	13.8%	1822.5	177.4	10340	832	9508
Hungary						
1	99.9%	12.2	51.4	23	8	15
2	100.0%	12.9	55.6	26	7	19
3	99.7%	12.6	56.6	33	5	28
4	100.0%	13.0	56.9	40	5	35
5	100.0%	13.2	57.3	47	7	40
6	99.8%	13.1	57.5	55	7	49
7	100.0%	13.8	58.4	69	8	60
8	99.5%	12.8	57.6	79	7	71
9	99.3%	11.9	50.1	110	9	101
10	49.4%	2.6	11.8	211	11	200
All deciles	94.6%	118.2	51.4	693	75	617
Slovakia						
1	97.1%	18.7	8.8	30	10	20
2	0.7%	0.1	3.7	59	7	52
3	0.0%	0.0	0.0	26	3	23
4	0.0%	0.0	0.0	53	5	48
5	0.0%	0.0	0.0	60	6	54
6	0.0%	0.0	0.0	66	5	61
7	0.0%	0.0	0.0	81	6	75
8	0.0%	0.0	0.0	81	4	77
9	0.0%	0.0	0.0	104	5	99
10	0.0%	0.0	0.0	160	6	154
All deciles	9.4%	18.7	8.8	720	58	662

Notes: All figures in Mio euros, except for average monthly MWP tax expenditure (in euros). Average monthly MWP tax expenditure for recipient households. (*)Total taxes includes PIT and SSC. For France, total taxes includes PIT, SSC, CSG and CRDS.
Source: authors' calculations, based on Euromod F6.0++ simulations.

responses at the extensive margin will thus exert first-order effects on government revenue. Our aim is indeed to gauge not only the overall size of such revenue impacts, but also the relative magnitude of the behavioural vs. the mechanical effect of a given change in tax expenditures. Therefore, naturally, we depart from IKKS by not assuming revenue neutral reforms. Secondly, in line with the theoretical model we consider marginal changes in existing policies rather than the introduction of new hypothetical policies.

Following IKKS and Saez (2002), we stick to the assumption of ruling out income effects on labour supply, which simplifies considerably the theoretical analysis, and in particular welfare aggregation. In practice, after working through the model (see Appendix 1), it is possible to express in compact way the overall change in tax revenue following a generic marginal tax reform (∂z) affecting disposable income. Formally, this can be written as:

$$dR = dM + dB = \sum_{i=1}^{I} \left[\underbrace{\frac{\partial T_i}{\partial z} E_i + \frac{\partial T_0}{\partial z}(N_i - E_i)}_{\text{mechanical}} - \underbrace{\left(\underbrace{\frac{\tau_i}{1-\tau_i} \frac{\partial \tau_i}{\partial z} E_i w_i l_i \varepsilon_i}_{\text{intensive margin}} + \underbrace{\frac{a_i}{1-a_i} \frac{\partial (T_i - T_0)}{\partial z} \eta_i E_i}_{\text{extensive margin}} \right)}_{\text{behavioural}} \right]. \quad (1)$$

In equation 1, the overall revenue effects from the tax reform – obtained as an aggregation over the groups of individuals in the income decile i – can be decomposed into two separate parts, the mechanical and the behavioural components. The former gauges the impacts of the policy reform absent any behavioural reactions, whereas the latter quantifies the revenue effect brought about precisely by individuals reacting to the new policy environment. In particular, the first term of the mechanical element captures the direct change in tax revenues collected from those in employment (E_i), while the second term is the effect of the tax reform on the benefits received by non-working individuals $(N_i - E_i)$. The terms $T_i \equiv T(w_i l_i, z)$ and $T_0 \equiv T(0, z)$ are the tax liabilities for those working and for those unemployed, respectively, given the current policy z. Similarly, the behavioural component of the change in tax revenues can be further decomposed into two separate effects, corresponding to the changes to hours worked and participation decisions. In particular, the first term captures the adjustment along the intensive margin, with τ_i the marginal effective tax rate, wl labour income (w is the wage rate and l hours worked), and ε_i the intensive labour supply elasticity for individuals in group i. The second term in the behavioural component represents the adjustment along the extensive margin. As it is apparent, this depends on the change in the tax liability in the transition from unemployment into work $\partial(T_i - T_0)$ and on the extensive elasticity η_i, defined as the percentage change in the number of workers in group i following a one percent change in income net of taxes (which is equivalent to consumption) between working and not working. Importantly, the magnitude of effect along the extensive margin depends also on the participation tax rate, $a_i = [T_i(w_i l_i) - T(0)]/(w_i l_i)$.

3.2 A measure of the welfare cost: the marginal cost of public funds

The amount of tax revenues foregone due to the tax breaks is influenced by both the number of workers targeted by MWP policies and by the generosity of the relief. The potential cost of reforming MWP policies should thus be gauged in terms of a trade-off between equity and efficiency related to the revenue outcomes of the schemes. Isolating the behavioural component of the overall effects of a tax reform allows one to directly assess the non-monetary cost of the policy intervention. The theoretical framework sketched above naturally lends itself to the application of a synthetic measure of such cost, namely the marginal cost of public funds (MCF), which has

emerged as one of the most important concepts in modern public finance. The MCF can be expressed as the ratio, taken with negative sign, between the change in welfare and the change in revenue brought about by a marginal arbitrary tax rate increase. As such, it indeed quantifies the welfare loss incurred by society in raising an extra euro of revenue to finance public spending. An analytical expression for the MCF from taxing labour income in the presence of fixed costs and endogenous labour force participation is derived by Kleven and Kreiner (2006). In particular, they show that, in this framework, the aggregate welfare effect is simply the sum of what we call the mechanical increase in the tax liabilities for each group of individuals. This is a direct consequence of the fact that in this type of model, at equilibrium, optimized hours of work are not affected by marginal tax reforms. The change in government revenue is derived in a straightforward way by factoring in the behavioural responses along the intensive and the extensive margin of labour supply. All in all, equation 1 provides already all the ingredients needed to compute the MCF, which can be expressed compactly as:

$$\mathrm{MCF} = -\frac{\mathrm{dWelfare}}{\mathrm{dRevenue}} = \frac{\mathrm{dM}}{\mathrm{dR}} = 1 + \frac{|\mathrm{dB}|}{\mathrm{dR}} \tag{2}$$

Recalling notation from equation 1, dM indicates the mechanical change in revenue, which is equal, as explained above, to minus the welfare effect, and dR is the total, or net, revenue impact of the reform. The last term in equation 2 stems from the equivalence result linking the MCF and the marginal excess burden from taxation, *i.e.*, the excess distortion generated in raising an additional euro of tax revenue (Dahlby, 2008).[6] In our framework, the marginal excess burden can be immediately singled out through the behavioural component, and is therefore captured by the ratio |dB|/dR, where again, dB quantifies the change in revenue following labour supply adjustments.

Kleven and Kreiner (2006) also define the broader concept of social marginal cost of public funds (SMCF), which takes distributional preferences into account in the quantification of the aggregate cost. In this case, the group-specific welfare changes are aggregated using ad hoc weights that reflect the average social marginal utility of income among the working population in each group. Although this might be a natural approach to adopt in our framework, nonetheless we prefer not to impose assumptions on the distributional preferences of the countries we analyse. Hence, we stick to an unweighted welfare aggregation. Appropriately substituting the expressions for the different components of MCF demonstrates that, even ignoring distributional concerns, observed heterogeneity in earnings, behavioural parameters, and taxes and benefits do matter for the welfare cost of raising additional government revenue. Insofar as the policies we are analysing are targeted at the low end of the earnings distribution, which is mostly the case for the countries we're looking at, the MCF formula will arguably provide us with a lower bound for the SMCF. Given the inclusion of discrete responses along the extensive margin in the underlying theoretical model, our estimates turn out to be already larger than the results commonly found in the traditional MCF literature focusing only on infinitesimal adjustments in hours worked.

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[6] As pedagogically presented by Dahlby and Ferede (2011), if a government raises a tax rate by 10 per cent and the private sector responds by reducing the amount of the taxed activity by 2 per cent, the government's tax revenue will increase by 8 per cent, not 10 per cent. The efficiency loss from the reallocation of resources in the economy due to a tax is reflected in this shrinkage of the tax base. To illustrate how this phenomenon affects the calculation of the marginal cost of public funds, because the 10 per cent tax rate increase generates only an 8 per cent increase in tax revenue, the cost of raising that last, or marginal, dollar of tax revenue is 10/8=1+2/8, or 1.25. Of course, this reasoning is illustrative, since it should be considered strictly speaking only valid in marginal terms. In other words, at the existing tax rate, raising an additional euro of tax revenue costs society 1.25 euro.

4 Estimating the impact of reforming tax expenditures: implementation

Implementing the theoretical framework above requires a realistic calibration of a number of parameters. Firstly, we need to gauge the level and the changes in the tax burden on the workers under the current policy regime and the simulated scenarios. Secondly, participation and in-work labour supply elasticities must also be obtained. We discuss our methodological choices on these two issues in turn.

4.1 Simulation of the tax parameters

The baseline scenario of our exercise assumes the marginal reform as a 1 per cent decrease in the size of the tax expenditure at the individual level. As a sensitivity check, we simulate a lump-sum change in the tax expenditure equal to € 1 (per month) again at the taxpayer level. The change in the policy instrument, represented by z in equation 1, ultimately results in an increase of the tax liability, and thus of the effective tax rate, for the workers. These parameters are clearly worker-specific, and, importantly, depend on the features of the national tax and benefit systems. To account for such complex interactions, we derive them using the EUROMOD microsimulation tool.

Starting with the components of the mechanical effect, $\partial T_i / \partial z$ captures the change in the net tax liability of the workers from the actual to the reformed policy setting. In our framework, the term $(\partial T_i / \partial z)E$ exhausts the mechanical effect of a change in tax expenditure because non-working individuals are not affected by the simulated policy change. Since we do not adopt a balanced budget rule, the second term comprising the mechanical effect in equation 1 – the potential compensatory changes in the transfers received by the unemployed – will be equal to zero. The aggregate measure of the mechanical revenue impacts is obtained from the individual effects by applying employment rates (the term E_i) taken from the Labour Force Surveys.

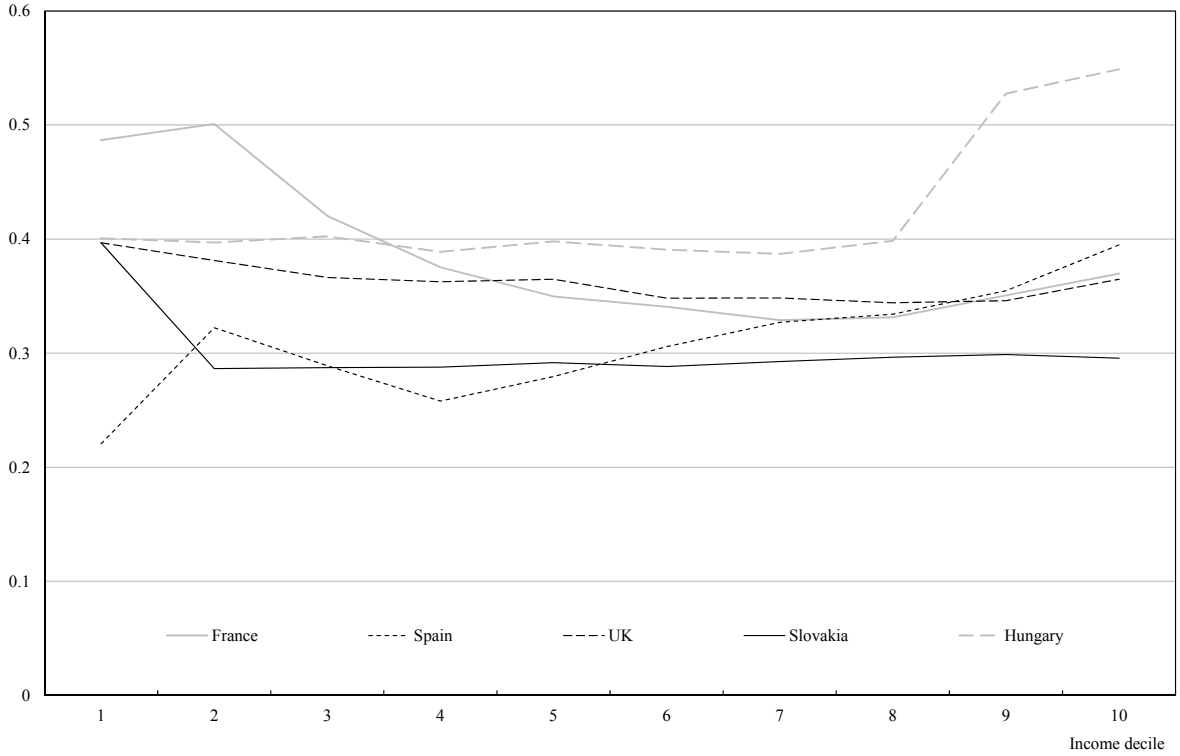
When moving to the behavioural component of the revenue effect, one needs to measure the level of the individual effective marginal tax rates (EMTR) τ_i and their marginal changes ($\partial \tau_i$) following the tax expenditure reform. In order to calculate the EMTRs we follow the approach of Jara and Tumino (2013) which explicitly accounts for all elements affecting household current cash disposable income. Thus, the EMTRs for each individual are evaluated on the basis of taxes paid by (and benefits paid to) all members of a household. Formally, individual level EMTRs are calculated as:

$$EMTR = 1 - \frac{Y_{HH}^1 - Y_{HH}^0}{G_k^1 - G_k^0} \tag{3}$$

where Y_{HH} is the household disposable income and G represents the earnings of the individual household member. Operationally, the household disposable income is calculated first. Then, the income of each earner in the household is increased sequentially by a given amount, while accounting for all simultaneous changes induced on the tax liability and benefit entitlement for all other household members. In computing the EMTR we have chosen to increase marginally only the largest component of the individual total income – that is, gross labour income ($w_i l_i$, using the notation in equation 1). This warrants further consistency with the underlying theoretical framework of labour supply responses. We applied a marginal increase of 3 per cent of the gross wage, which corresponds approximately to the additional earnings from a one hour increase in working hours (assuming a full-time employee working 40 hours per week).

Figure 1

Effective Marginal Tax Rates by Income Decile



Source: authors' calculations, based on Euromod F6.0++ simulations.

Figure 1 plots the simulated EMTRs across income deciles for the five countries.[7] In the cross-country comparison, low income earners tend to face relatively high marginal tax rates in France and relatively low rates in Spain. As from the fourth income decile Hungary displays the highest marginal rates, with a peak above 50 per cent at the top of the income distribution.[8] The three "old" EU Member States also show a rather similar pattern for EMTRs at the highest earnings deciles. Marginal rates do not always increase monotonously, as it appears for France and the UK. There are several reasons for this. For instance, the joint tax system in France can result in very high marginal income tax rates for low-wage spouses of high-income earners. Moreover, in general, the withdrawal of income-related benefits can increase marginal tax rates at the lower end of the income distribution. Also, discontinuities in the SSC schedules (such as earnings thresholds) can give rise to very high marginal rates (as well as participation tax rates) for some low wage earners. By contrast, at the same time, ceilings on the contribution base can result in relatively low marginal SSC rates for the highest deciles.

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[7] Overall, the simulated values are in line with those in Jara and Tumino (2013). Some differences emerge for the average values. For instance, we obtain average EMTRs (non-reported) of 38.7, 30.9 and 37.1 per cent for France, Spain and the UK, respectively, while their calculations give 36.5, 25.9 and 39.4 per cent for the same countries. These discrepancies are likely caused by our sample selection rule.

[8] It is worth noting that, since our simulations are based on 2010 policies, the results for Hungary reflect the progressive personal income tax schedule in place then, with a top marginal rate of 32 per cent. In addition, in 2010 a so-called "super gross-up" regime was introduced, whereby the tax base (aggregate taxable income) was grossed-up of social security contributions.

The second term in the behavioural impact in equation 1 represents the change in net tax revenues related to the extensive margin of labour supply. To compute that, we derive from EUROMOD a measure of the change in the tax liability, that is the term $\partial(T_i - T_0)$, which represents the difference between the net taxes (*i.e.*, net of social benefits) paid by the individual when working and the net taxes paid by when not working (*i.e.*, when wage income is zero). We also need to retrieve the participation tax rates (the term a_i), that is the difference between the net taxes paid by worker i when working and the net taxes paid by the same individual when not working, relative to labour income. Figure 2 plots the participation tax rates. The UK appears to have the lowest participation tax rate across all earning deciles. In all countries, except Slovakia, the participation tax rate tends to increase across income deciles. By contrast, the profile is relatively flat for Slovakia, which shows the largest participation tax rates, ranging between 73 per cent and 79 per cent.

Lastly, two additional parameters are crucial to translate the static microsimulations into the dynamic effects behind the behavioural contribution to the revenue change. The term ε_i represents the (uncompensated) in-work elasticity of labour supply, *i.e.*, the variation in the number of hours worked as a result of a change in the gross labour income. Likewise, η_i represents the participation elasticity, which affects the impacts along the extensive margin. The calibration of these parameters is illustrated in the next section.

4.2 Calibration of labour supply elasticities

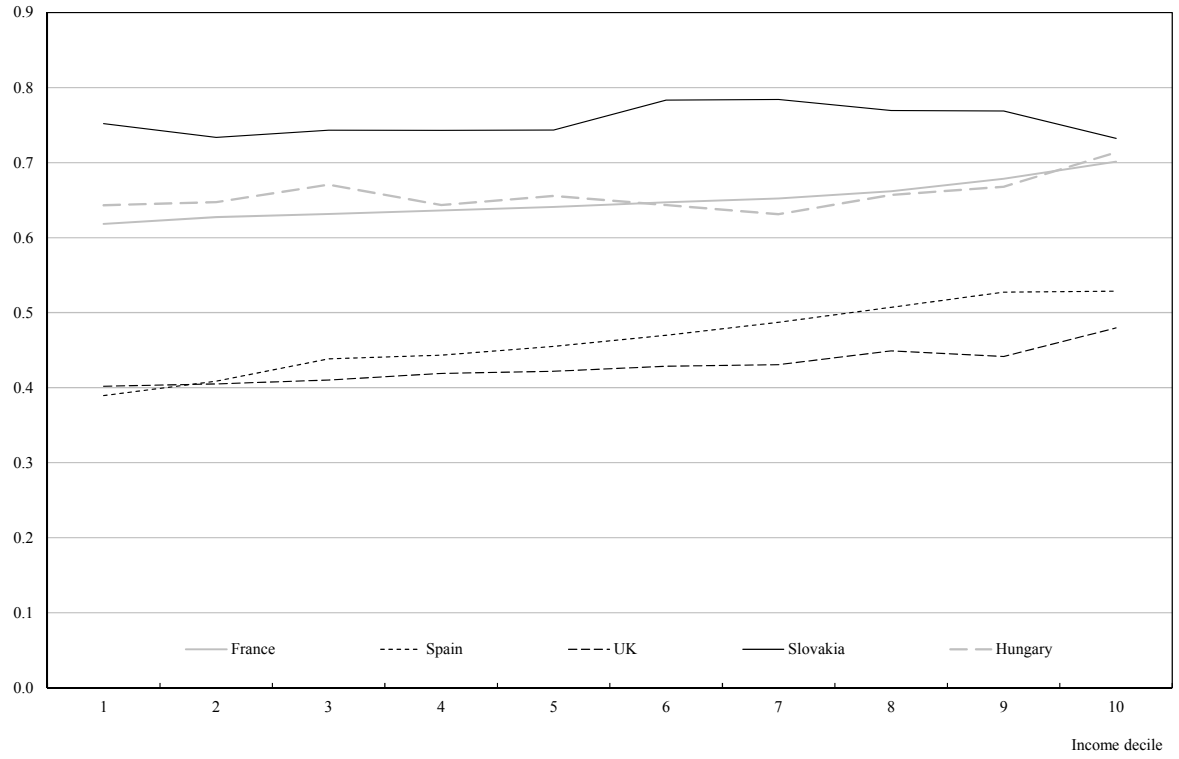
The calibration of the labour supply elasticities – both the intensive and the extensive margin – is crucial to gauge the behavioural impacts of the tax reforms. Our choices regarding these elasticities were guided by two main considerations. Firstly, the high degree of heterogeneity observed in the labour market, documented for instance in Blundell *et al.* (2011), need be accounted for. This would also allow us to have the heterogeneity uncovered by the microsimulation model reflected into the dynamic impacts. Thus, ideally the elasticities should be differentiated by type of individuals. Secondly, from a purely methodological standpoint, cross-country comparability of the elasticities is a potential source of concern. Country-specific studies have often obtained different labour supply elasticities depending on the specific period considered, the focus on specific categories of workers or the estimation method. To avoid this uncertainty, we narrow down the number of sources we rely upon to two. Thus, we take our baseline elasticities from Bargain et al. (2012) who provide both intensive (*i.e.*, number of hours worked) and extensive (*i.e.*, participation) labour supply elasticities for a range of European countries, including the five countries considered in our analysis. They are reported in Table 2. In addition, we use other estimates on the elasticities at the extensive margin, as reported in IKKS. Importantly, these are specific to type of individual and decreasing across income deciles. By doing so, we can capture, at the finest possible level of granularity, the effect of heterogeneity, which, according to recent results from empirical studies, are significant for participation decisions but relatively small adjustments in hours worked. All in all, we differentiate two baseline cases depending on the degree of heterogeneity in labour supply elasticities, as follows:

Case 1: baseline participation and hours-of-work elasticities – country-specific and aggregate value across income distribution[9] – from Bargain *et al.* (2012). For *lone parents* only, participation

[9] The elasticities by decile shown by Bargain *et al.* (2012) do not parse the extensive and the intensive margin. Moreover, they are computed over a more limited sample. Moreover, the distribution of the elasticities across income deciles is U-shaped. This result, although interesting, is not fully convincing, and deserves further investigation.

Figure 2

Participation Tax Rates by Income Decile



Source: authors' calculations, based on Euromod F6.0++ simulations.

elasticities - decreasing across deciles but not varying across countries – are taken from IKKS.[10]

Case 2: baseline participation and hours-of-work elasticities – country-specific and aggregate value across income distribution – from Bargain *et al.* (2012). For *lone parents and married women*, participation elasticities – decreasing across deciles but not varying across countries – are taken from IKKS.

The two sets of elasticities are applied to the proportional (marginal) reform (scenarios 1 and 2), whereas elasticities as in case 1 applied to the lump sum reform (scenario 1.a). Moreover, as an additional sensitivity analysis, in the latter policy intervention, we also show the result obtained by averaging the elasticities under case 1 across countries, so as to single out the effect of the different policies (combined with that of dissimilar income distributions). We label this as scenario 3.

We are aware that the current situation in the labour market would call for considering young people as one of the groups deserving a differential analysis. Although youth unemployment is an important issue, we remain sceptical about the existence of sound estimates of labour supply elasticities for the younger cohorts that could be used in our analysis.

[10] The values of the participation elasticities for lone parents are 0.9 for deciles 1 and 2, 0.6 in deciles 3 and 4, 0.4 in deciles 5 and 6, 0.2 in deciles 7 and 8 and 0 in deciles 9 and 10.

Table 2

Labour Supply Elasticities
(simulation: 1 percent tax policy change)

	France		Spain		UK		Hungary		Slovakia	
Scenario 1	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**
Married women	0.02	0.1	0.08	0.43	0.02	0.07	0.01	0.13	0.01	0.13
Married men	0.02	0.04	0.07	0.07	0	0.06	0	0.07	0	0.07
Single women	0.02	0.09	0.04	0.19	0.04	0.24	0.01	0.07	0.01	0.07
Single men	0.02	0.12	0.09	0.47	0.01	0.22	0.01	0.15	0.01	0.15
Lone parents	*as single*	*as single*	*as single*	*as single*	*as single*	*as single*	*as single*	*as single*	*as single*	*as single*
Scenario 2	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**
Married women	0.02	0.1	0.08	0.43	0.02	0.07	0.01	0.13	0.01	0.13
Married men	0.02	0.04	0.07	0.07	0	0.06	0	0.07	0	0.07
Single women	0.02	0.09	0.04	0.19	0.04	0.24	0.01	0.07	0.01	0.07
Single men	0.02	0.12	0.09	0.47	0.01	0.22	0.01	0.15	0.01	0.15
Lone parents	0.02	0.1	0.08	0.43	0.02	0.07	0.01	0.13	0.01	0.13

Source: Bargain *et al.* (2012), Immervoli *et al.* (2007).

Table 2 *(continued)*

Labour Supply Elasticities
(simulation: 1 euro tax policy change)

	France		**Spain**		**UK**		**Hungary**		**Slovakia**	
Scenario 1.a	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**
Married women	0.02	0.1	0.08	0.43	0.02	0.07	0.01	0.13	0.01	0.13
Married men	0.02	0.04	0.07	0.07	0	0.06	0	0.07	0	0.07
Single women	0.02	0.09	0.04	0.19	0.04	0.24	0.01	0.07	0.01	0.07
Single men	0.02	0.12	0.09	0.47	0.01	0.22	0.01	0.15	0.01	0.15
Lone parents	0.02	0.1	0.08	0.43	0.02	0.07	0.01	0.13	0.01	0.13
Scenario 3	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**
Married women	0.03	0.18	0.03	0.18	0.03	0.18	0.03	0.18	0.03	0.18
Married men	0.02	0.06	0.02	0.06	0.02	0.06	0.02	0.06	0.02	0.06
Single women	0.03	0.15	0.03	0.15	0.03	0.15	0.03	0.15	0.03	0.15
Single men	0.03	0.24	0.03	0.24	0.03	0.24	0.03	0.24	0.03	0.24
Lone parents	*as single*	*as single*	*as single*	*as single*	*as single*	*as single*	*as single*	*as single*	*as single*	*as single*

Source: Bargain *et al.* (2012), Immervoli *et al.* (2007).

5 Results

This section discusses the results from a marginal reduction in work-related tax reliefs. In the baseline case, the marginal reduction is proportional, whereas the case of a lump-sum equally-sized decrease is also investigated as a sensitivity check.

5.1 Baseline: a proportional reduction in work-related tax expenditures

In all of the baseline simulations, we define our policy shock as a reduction in the taxpayer-specific amount of the considered tax expenditure by 1 percent. As such, the country-specific size of the shock is not fully comparable across countries. This lack of comparability is partly endogenous, stemming directly from the different design of the tax provisions in place in the countries considered. A way to circumvent the issue would be to assume that the same policy is introduced in all the countries. However this would be an inherently different exercise which we leave for further research. As mentioned, we believe that our approach is most useful in understanding the impacts of gradual tax reforms. The "marginal approach" used in the paper is in line with the findings of the political economy literature, suggesting that even radical tax reforms are likely to be introduced gradually.

Table 3 shows the results for France. The mechanical effect – by construction unchanged in both scenarios, as it is independent from the behavioural reactions – is around € 0.73 million. The modest size of the impacts reflects the design features of the policy, in terms both of the number of recipients and the magnitude of individual entitlements, as documented in our descriptive analysis and underpinned by other studies (Immervol and Pearson, 2009). In scenario 1, the total behavioural impact is € –0.34 million. The results suggest that almost one half of aggregate extra-tax revenues raised through the decrease in the tax expenditure is lost once the labour supply reaction is factored in. The total behavioural effect is driven by the changes in participation which appear concentrated in the fourth decile. By contrast, reactions along the intensive margin take place at the very bottom of the income distribution, perhaps not surprisingly given the design of the PPE, targeted at low wage earners. Scenario 2 replicates the exercise differentiating the participation elasticities for lone parents and married women as well. At € –0.68 million, the overall behavioural effect is twice as large as the corresponding value in scenario 1. In other words, more than 90 per cent of the mechanical revenue gain is taken away as a consequence of the reduced labour supply, mainly stemming from adjustment along the extensive margin. Overall, this ultimately eats away the static revenue gain from the tax reform, which amounts to only € 0.05 million.

Table 4 provides simulation results for Spain. In the Spanish case the estimated mechanical effect of a decrease in the tax allowance for employment income – unchanged, by construction, across all simulated scenarios – is estimated at around € 50 million per month. The order of magnitude clearly shows the broad range of application of this tax relief – potentially all employment income earners, with disadvantaged categories receiving a more generous allowance. In contrast with the French case, the reduction in tax expenditure in the Spanish case affects the tax revenues only indirectly since the 1 percent reduction is in fact affecting the tax base in the first place. The differences in magnitude carry over when it comes to the overall impact of the behavioural effect. In scenario 1, roughly one third of the mechanical revenue effect is compensated by the reduced revenue due to lower labour supply, with a negligible contribution from the adjustment on the intensive margin. Overall, the net impact on the budget is an increase in revenue of around € 35 million. Given the nature of the policy instrument, and the assumed constant elasticities in scenario 1, the profile of the behavioural component appears relatively flat along the income deciles, as expected, with the exception of a spike in decile 2. Changing the

Table 3

France: Decomposition of the Impact of a 1 Percent Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 1: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.07	0.15	–0.09	–0.02	–0.06
2	0.19	0.23	–0.04	–0.04	0.01
3	0.05	0.06	–0.01	–0.01	0.00
4	0.02	0.16	–0.14	–0.15	0.01
5	0.03	0.07	–0.04	–0.04	0.00
6	0.02	0.05	–0.03	–0.03	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***0.39***	***0.73***	***–0.34***	***–0.29***	***–0.05***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 3 *(continued)*

France: Decomposition of the Impact of a 1 Percent Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 2: participation elasticities for lone parents and married women decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	–0.10	0.15	–0.25	–0.19	–0.06
2	0.07	0.23	–0.15	–0.16	0.01
3	0.02	0.06	–0.05	–0.05	0.00
4	0.00	0.16	–0.16	–0.16	0.01
5	0.02	0.07	–0.05	–0.04	0.00
6	0.02	0.05	–0.03	–0.03	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***0.05***	***0.73***	***–0.68***	***–0.63***	***–0.05***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 4

Spain: Decomposition of the Impact of a 1 Percent Decrease in MWP Tax Allowance on Labour Tax Revenue
(scenario 1: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.45	0.82	–0.38	–0.25	–0.12
2	3.11	5.41	–2.30	–2.01	–0.29
3	4.02	5.39	–1.38	–1.71	0.33
4	2.80	4.04	–1.24	–1.21	–0.02
5	3.04	4.27	–1.23	–1.19	–0.03
6	3.54	5.23	–1.70	–1.48	–0.22
7	3.93	5.27	–1.34	–1.31	–0.02
8	4.08	5.41	–1.33	–1.33	0.00
9	4.02	5.65	–1.63	–1.28	–0.35
10	5.75	7.16	–1.40	–1.35	–0.05
total	***34.73***	***48.65***	***–13.92***	***–13.14***	***–0.78***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 4 *(continued)*

Spain: Decomposition of the Impact of a 1 Percent Decrease in MWP Tax Allowance on Labour Tax Revenue
(scenario 1: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.38	0.82	–0.45	–0.32	–0.12
2	2.63	5.41	–2.78	–2.49	–0.29
3	3.85	5.39	–1.55	–1.88	0.33
4	2.67	4.04	–1.37	–1.35	–0.02
5	3.06	4.27	–1.20	–1.17	–0.03
6	3.57	5.23	–1.66	–1.44	–0.22
7	4.14	5.27	–1.13	–1.11	–0.02
8	4.33	5.41	–1.08	–1.08	0.00
9	4.64	5.65	–1.01	–0.66	–0.35
10	6.40	7.16	–0.76	–0.71	–0.05
total	***35.67***	***48.65***	***–12.99***	***–12.20***	***–0.78***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 5

UK: Decomposition of the Impact of a 1 Percent Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 1: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	4.14	5.12	–0.99	–0.97	–0.02
2	1.69	2.28	–0.58	–0.57	–0.01
3	0.86	1.14	–0.28	–0.27	–0.01
4	0.17	0.28	–0.10	–0.10	0.00
5	0.15	0.21	–0.06	–0.06	0.00
6	0.02	0.02	0.00	0.00	0.00
7	0.08	0.09	–0.01	–0.01	0.00
8	0.01	0.01	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***7.12***	***9.14***	***–2.02***	***–1.98***	***–0.04***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 5 *(continued)*

UK: Decomposition of the Impact of a 1 Percent Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 2: participation elasticities for lone parents and married women decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	3.65	5.12	–1.48	–1.46	–0.02
2	1.49	2.28	–0.78	–0.77	–0.01
3	0.78	1.14	–0.37	–0.36	–0.01
4	0.17	0.28	–0.11	–0.11	0.00
5	0.15	0.21	–0.06	–0.06	0.00
6	0.02	0.02	–0.01	–0.01	0.00
7	0.08	0.09	–0.01	–0.01	0.00
8	0.01	0.01	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***6.33***	***9.14***	***–2.81***	***–2.77***	***–0.04***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 6

Hungary: Decomposition of the Impact of a 1 Percent Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 1: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.51	0.85	–0.35	–0.35	0.00
2	0.43	0.78	–0.35	–0.35	0.00
3	0.68	1.00	–0.32	–0.32	0.00
4	0.78	1.01	–0.24	–0.24	0.00
5	0.75	1.02	–0.27	–0.27	0.00
6	0.71	0.96	–0.24	–0.24	0.00
7	0.90	1.12	–0.22	–0.22	0.00
8	0.84	1.04	–0.20	–0.20	0.00
9	0.82	0.96	–0.14	–0.16	0.02
10	0.16	0.18	–0.02	–0.02	0.00
total	***6.59***	***8.93***	***–2.34***	***–2.36***	***0.02***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 6 *(continued)*

Hungary: Decomposition of the Impact of a 1 Percent Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 2: participation elasticities for lone parents and married women decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.17	0.85	–0.68	–0.68	0.00
2	–0.04	0.78	–0.82	–0.82	0.00
3	0.39	1.00	–0.61	–0.61	0.00
4	0.50	1.01	–0.51	–0.51	0.00
5	0.59	1.02	–0.43	–0.43	0.00
6	0.58	0.96	–0.38	–0.38	0.00
7	0.87	1.12	–0.26	–0.26	0.00
8	0.80	1.04	–0.24	–0.24	0.00
9	0.87	0.96	–0.09	–0.11	0.02
10	0.17	0.18	–0.02	–0.02	0.00
total	***4.89***	***8.93***	***–4.04***	***–4.06***	***0.02***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 7

Slovakia: Decomposition of the Impact of a 1 Percent Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 1: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.05	0.13	–0.08	–0.09	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***0.05***	***0.13***	***–0.08***	***–0.09***	***0.00***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 7 *(continued)*

Slovakia: Decomposition of the Impact of a 1 Percent Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 2: participation elasticities for lone parents and married women decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	–0.13	0.13	–0.26	–0.26	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***–0.13***	***0.13***	***–0.26***	***–0.26***	***0.00***

Source: authors' calculations, based on Euromod F6.0++ simulations.

participation elasticities for married women – as in scenario 2 – results in a marginal change in the overall behavioural revenue effect (€ –13 million) and slightly differentiated impacts along the various deciles of the income distribution. In particular, a larger revenue impact (in absolute value) is apparent in deciles 1-4 as opposed to a smaller contribution from deciles 5-10. Thus, the revenue loss from the lowest deciles is larger in scenario 2 than in scenario 1.

Table 5 shows the simulation results for the UK, where the work-related tax relief is provided via an income-tested refundable tax credit. Overall, the marginal change in the tax expenditure – independent from the labour supply assumptions – results in a mechanical revenue gain of around € 9 million per month. Similarly to the French case, the mechanical revenue gain is concentrated on the low-wage earners, in particular those in deciles 1 to 3. In scenario 1, the overall behavioural impact takes away roughly one-fourth of the mechanical effect, with the adjustment along the extensive margin accounting for almost the full decrease in revenue. Inspection of the results by deciles clearly shows that the contribution to the revenue erosion is decreasing monotonically with income, and is concentrated in the lower half of the distribution. Assuming participation elasticities decreasing across deciles also for married women (as in scenario 2) increases the total behavioural revenue loss by 40 per cent, to slightly less than € 3 million. The total net impact on revenue would then be in the order of € 6 million per month.

Results for Hungary are shown in Table 6. A marginal reduction in the tax credit yields around € 9 million of extra-revenue, without accounting for labour supply responses. Once those are factored in, revenues increase by slightly less than € 7 million (scenario 1) or € 5 million (scenario 2). While, following the assumptions on the elasticities, the behavioural impacts on the extensive margin decrease monotonically along the entire income distribution, the mechanical effects have roughly the same order of magnitude across deciles (except for the top decile). Strikingly, adjustments in hours worked are practically null in both scenarios.

The results for Slovakia are reported in Table 7. As is apparent, the policy (change) affects only workers in the bottom decile of the income distribution. The purely mechanical effect is around € 0.13 million per month, whereas the behavioural impacts (only due to adjustments in participation) range from € 0.08 million (scenario 1) to € 0.26 million (scenario 2), in absolute value. As a result, when one allows for heterogeneous labour supply responses from married women, the reduction in the work-related tax credit turns out worsening the public balance.

5.2 Sensitivity analysis: a lump-sum reduction in work-related tax expenditures

The results in the previous section show a large degree of heterogeneity across countries, in terms both of the magnitude of the aggregate impacts and of their distributional effects. The discrepancies stem from the differences in the national tax-benefit systems, and in particular in the design of the tax reliefs considered. Although, as such, they are largely unavoidable, it is nonetheless interesting to check whether the results are robust to different working assumptions. We run sensitivity analyses based as before on a marginal shock. However, in this case, it is assumed to take the form of a lump-sum reduction in the work-related tax expenditure at the taxpayer's level equal to € 1 per month. We simulate the policy change applying the set of elasticities that allows for a differentiated participation response only for lone parents (scenario 1.a, directly comparable to the baseline scenario 1). In addition, to "clean" the results from the effects of different labour supply responses across countries we re-calculate the behavioural impacts using average elasticities (scenario 3). In this way, the cross-country differences in the results should capture the pure effects of the national tax (and benefit) policies, and of the underlying income distributions, rather than differences in labour market and other institutions which might be behind the labour supply elasticities.

Table 8 shows the results for France. The mechanical impact of the lump sum reform is almost € 6 million per month, around 8 times as large as the one form the proportional policy change, indicating that the individual monetary gain from the PPE might indeed be tiny for a significant share of recipients.[11] The overall behavioural impact is roughly € 3.3 million, around 60 per cent of the mechanical impact. In the scenario with equal elasticities across countries the cost of the reform in terms of revenue loss increases to € 4 million per month.

In the case of Spain, the lump sum policy change halves the size of the mechanical effects (now around € 23 million per month) compared to the case of a proportional change in the tax allowance (Table 9). The total behavioural impact is reduced by the same proportion when country-specific elasticities are used, whereas averaging the elasticities across countries would imply a much smaller revenue loss (around € 3.8 million).

Also for the UK, the lump sum shock implies a reduced mechanical revenue gain compared to the proportional change in the tax credit (Table 10). The aggregate value is around € 4.7 million. Like in the baseline case, roughly one-fourth of the gain is eroded by the behavioural reactions, slightly more pronounced when average elasticities are considered.

Both for Hungary and Slovakia (Tables 11 and 12) the lump sum shock translates into larger mechanical revenue effects compared to the proportional policy change. In Hungary, the revenue gain absent behavioural reactions reaches almost € 16 million per month. The reduction due to the labour supply responses hovers at around one-third, and is dampened in the case with average elasticities. For Slovakia, a lump sum reduction in the tax credit would increase the revenue impacts tenfold compared to the proportional policy shock under scenario 1.a, implying an overall revenue loss of roughly € 1.5 million a month. The sign of the net effect on revenues is reversed in the case of average elasticities, with a positive contribution to the budget equal to € 0.3 million.

5.3 Quantifying the marginal cost of public funds

Equipped with the full set of results illustrated in the previous sections, we can straightforwardly derive the MCF of the different simulated reforms by applying equation 2. In Table 13 we report the values for the aggregate MCF obtained by first aggregating the relevant variables, *i.e.*, the welfare and the revenue changes, across deciles, and then taking the ratio between the two. As a sensitivity check, we also calculated decile-specific MCF and then averaged these measures across the deciles affected by the policy (change). The relative magnitude of the measures is mostly unchanged. The aggregate values in Table 14 are clearly above 1, the benchmark level for the MCF for a proportional tax reform in the absence of extensive labour supply responses (Ballard and Fullerton, 1992).[12] In some cases, the deviation from the unit benchmark is substantial.

Scenario 1, which simulates the proportional reform in tax expenditure with a minimum level of differentiation in labour supply elasticities, leads to relatively modest aggregate welfare losses for all countries except France and Slovakia, where the tax credits are more targeted to low income earners, and the resulting MCF is slightly below 2 and 3, respectively. The distortions are minimal in the UK case by contrast, which is likely to be due to the compensating effect of extra child benefit provided since a loss in disposable income due to the reduction in tax credit is automatically compensated by an increase in the child benefit.

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[11] In this respect, the policy change should be intended as equal to € 1 at most, as for some taxpayers the individual tax credit before the policy change is lower than that amount.

[12] The uncompensated hours-of-work elasticity is assumed equal to zero.

Table 8

France: Decomposition of the Impact of a Lump-sum Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 1.a: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.38	0.40	–0.02	–0.06	0.04
2	0.49	1.45	–0.97	–0.25	–0.72
3	0.80	1.03	–0.23	–0.23	0.00
4	0.11	0.64	–0.53	–0.49	–0.04
5	0.36	0.98	–0.63	–0.59	–0.04
6	0.49	1.41	–0.91	–0.92	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***2.63***	***5.92***	***–3.29***	***–2.54***	***–0.75***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 8 *(continued)*

France: Decomposition of the Impact of a Lump-sum Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 3: elasticities as in scenario 1, but averaged across countries)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.36	0.40	–0.05	–0.11	0.06
2	–0.07	1.45	–1.52	–0.45	–1.07
3	0.68	1.03	–0.35	–0.35	0.00
4	0.07	0.64	–0.57	–0.51	–0.06
5	0.32	0.98	–0.66	–0.61	–0.06
6	0.49	1.41	–0.92	–0.93	0.01
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***1.84***	***5.92***	***–4.08***	***–2.96***	***–1.12***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 9

Spain: Decomposition of the Impact of a Lump-sum Decrease in MWP Tax Allowance on Labour Tax Revenue
(scenario 1.a: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.60	1.23	–0.62	–0.46	–0.17
2	1.93	2.71	–0.78	–0.96	0.18
3	1.35	1.98	–0.63	–0.62	–0.01
4	1.49	2.15	–0.66	–0.66	–0.01
5	1.25	1.84	–0.59	–0.52	–0.07
6	1.69	2.38	–0.69	–0.65	–0.03
7	1.77	2.34	–0.57	–0.56	–0.01
8	1.83	2.44	–0.61	–0.60	–0.01
9	1.84	2.59	–0.75	–0.59	–0.16
10	2.53	3.18	–0.65	–0.63	–0.03
total	***16.28***	***22.84***	***–6.56***	***–6.25***	***–0.31***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 9 *(continued)*

Spain: Decomposition of the Impact of a Lump–sum Decrease in MWP Tax Allowance on Labour Tax Revenue
(scenario 3: elasticities as in scenario 1, but averaged across countries)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.83	1.23	–0.40	–0.32	–0.07
2	2.14	2.71	–0.57	–0.64	0.08
3	1.58	1.98	–0.40	–0.40	0.00
4	1.77	2.15	–0.38	–0.37	0.00
5	1.52	1.84	–0.32	–0.29	–0.03
6	2.00	2.38	–0.38	–0.37	–0.01
7	2.02	2.34	–0.31	–0.31	0.00
8	2.10	2.44	–0.33	–0.33	0.00
9	2.22	2.59	–0.37	–0.31	–0.06
10	2.83	3.18	–0.35	–0.34	–0.01
total	***19.03***	***22.84***	***–3.80***	***–3.68***	***–0.12***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 10

UK: Decomposition of the Impact of Lump–sum Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 1.a: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	1.49	1.81	–0.32	–0.33	0.00
2	1.09	1.35	–0.26	–0.26	0.00
3	0.87	1.04	–0.17	–0.17	0.00
4	0.29	0.34	–0.05	–0.05	0.00
5	0.06	0.07	–0.01	–0.01	0.00
6	0.02	0.02	0.00	0.00	0.00
7	0.04	0.04	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***3.86***	***4.68***	***–0.83***	***–0.82***	***0.00***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 10 *(continued)*

UK: Decomposition of the Impact of Lump–sum Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 3: elasticities as in scenario 1, but averaged across countries)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	1.42	1.81	–0.39	–0.28	–0.12
2	1.19	1.35	–0.16	–0.23	0.07
3	0.87	1.04	–0.17	–0.15	–0.02
4	0.16	0.34	–0.18	–0.05	–0.14
5	0.01	0.07	–0.06	–0.01	–0.04
6	0.00	0.02	–0.02	0.00	–0.01
7	0.04	0.04	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***3.70***	***4.68***	***–0.98***	***–0.72***	***–0.26***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 11

Hungary: Decomposition of the Impact of Lump–sum Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 1.a: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.57	1.71	–1.14	–1.13	–0.01
2	0.42	1.33	–0.91	–0.95	0.04
3	0.83	1.62	–0.79	–0.78	–0.01
4	0.97	1.69	–0.72	–0.71	–0.01
5	1.08	1.69	–0.60	–0.59	–0.01
6	1.09	1.63	–0.54	–0.54	0.00
7	1.44	1.80	–0.36	–0.36	0.00
8	1.36	1.69	–0.33	–0.33	0.00
9	1.62	1.80	–0.18	–0.18	0.00
10	0.72	0.81	–0.09	–0.09	0.00
total	***10.10***	***15.75***	***–5.66***	***–5.66***	***0.00***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 11 *(continued)*

Hungary: Decomposition of the Impact of Lump–sum Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 3: elasticities as in scenario 1, but averaged across countries)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.96	1.71	–0.75	–0.72	–0.03
2	1.08	1.33	–0.25	–0.39	0.13
3	1.08	1.62	–0.54	–0.51	–0.03
4	1.20	1.69	–0.49	–0.46	–0.02
5	1.14	1.69	–0.55	–0.49	–0.06
6	1.15	1.63	–0.47	–0.46	–0.01
7	1.39	1.80	–0.41	–0.42	0.01
8	1.30	1.69	–0.39	–0.39	0.00
9	1.44	1.80	–0.36	–0.36	0.00
10	0.66	0.81	–0.14	–0.14	0.00
total	***11.41***	***15.75***	***–4.34***	***–4.33***	***–0.01***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 12

Slovakia: Decomposition of the Impact of Lump–sum Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 1.a: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	–1.42	1.39	–2.81	–2.83	0.02
2	–0.02	0.01	–0.03	–0.03	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***–1.44***	***1.40***	***–2.84***	***–2.86***	***0.02***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 12 *(continued)*

Slovakia: Decomposition of the Impact of Lump–sum Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 3: elasticities as in scenario 1, but averaged across countries)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.31	1.39	–1.08	–1.16	0.08
2	0.00	0.01	–0.01	–0.01	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***0.31***	***1.40***	***–1.09***	***–1.17***	***0.08***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 13

The Marginal Cost of Public Funds for a Reduction in MWP Tax Expenditure

	Simulated Scenarios				*Cross–scenario st. dev.*
Country	**S1**	**S2**	**S1.a**	**S3**	
France	1.87	15.37	2.25	3.22	*5.62*
Spain	1.40	1.36	1.40	1.20	*0.08*
UK	1.28	1.44	1.21	1.26	*0.09*
Hungary	1.36	1.83	1.56	1.38	*0.19*
Slovakia	2.85	–	–	4.47	*0.81*
Cross–country st. dev.	*0.59*	*5.99*	*0.39*	*1.32*	

Source: authors' calculations, based on Euromod F6.0++ simulations.

Allowing for differentiated elasticities for lone parents increases the cost of reforming the tax reliefs granted through a direct reduction of the tax liability (for France, the UK and Hungary), whereas leaves the welfare cost of reducing the allowance (as it is the case for Spain) virtually unaffected. The welfare cost jumps to 15 for France, showing the sensitivity of the MCF to the participation elasticities for more vulnerable groups. Although this might seem a rather high value, particularly against the standard setup where the MCF is derived, it is still well in the range of estimates which can be obtained in the context of labour tax reforms accounting for responses along the extensive margin. In fact, the result is driven by the very low value of the denominator, because net revenue raised for France approach zero under the assumption of heterogeneous labour supply responses, as in scenario 2. Importantly, averaging the decile-specific MCF across the affected deciles would result in an overall MCF of 9.

The variability in the estimates of the MCF is to a large extent explained by the assumptions used regarding the elasticity of labour supply at the extensive margin. The cross-country variability in results (measured by the standard deviation of the MCFs) is indeed nearly tenfold when moving from Scenario 1 to Scenario 2 in the last row of Table 14. France and Slovakia are the countries for which the assumptions regarding the labour supply elasticities have the biggest impact. When using a homogenous definition of the tax policy change (€ 1) as in Scenario 1.a the cross-country differences in results becomes much smaller (with a standard deviation of 0.4), thus pointing to an important role played by the country-specific tax policy rules in places and possibly also due to the differences in income distributions. Interestingly, when moving from Scenario 1.a to Scenario 3 where elasticities are assumed to be identical across countries, the cross-country differences in MCF are more than tripled, thus pointing to the strong country-specific component of our results. Overall, the results obtained on the MCF point to large efficiency losses tied to reduction in the tax reliefs offered to low-wage workers.

6 Conclusion and discussion

The paper examines the impact on tax revenue of a marginal reduction in actual work-related tax expenditures in five European countries, France, Spain, the United Kingdom, Hungary and

Slovakia. The marginal approach used in the paper is in line with the findings of the political economy literature, suggesting that even radical tax reforms are likely to be introduced gradually. Moreover, assuming reforms to existing policies makes the exercise concretely based on real-life institutions, and allows for a significant degree of heterogeneity given the differences in the national tax-benefits systems considered. We combine static results from the micro-simulation model EUROMOD with a relatively new theoretical framework to obtain a measure of the behavioural impacts induced by the adjustment of the labour supply both at the extensive (labour market participation) and at the intensive margin (hours worked).

The results suggest that the behavioural effects wash away at least one-fourth of the mechanical impact of the reform, and in most instances between one-third and two-thirds of it. Participation decisions play a pivotal role in determining the size of the behavioural impacts. This would be the combined effect of both the behavioural reactions (particularly the calibration of the labour supply elasticities to allow for heterogeneity across groups) and the individuals targeted by the work-related tax benefits being concentrated at the bottom of the earnings distribution.

Differences across countries are remarkable, and mostly driven by the design of the tax relief. In particular, the revenue gain erosion might become significant the more the tax instrument is targeted at the low end of the income distribution. In extreme cases, the reduction of the tax expenditure might even ultimately translate into a revenue loss. As suggested by the use of different scenarios, the results are affected by the calibration of the labour supply elasticities across agents, with the extensive margin playing a much larger role than the intensive margin, as expected. Moreover, allowing for more heterogeneity in the behavioural responses across groups of individuals, and particularly singling out married women and lone parents, leads to larger revenue losses.

Since participation responses are mostly concentrated at the bottom of the earnings distribution, the revenue effects are more pronounced in countries where such low income levels are supported (e.g., via minimum wage or work-tested benefits). At the same time, the purely mechanical effect on revenue is largest at the lower end of the distribution for the policies clearly targeted at the low income workers, like it is the case for the tax credits in place in Slovakia, France and, to a lesser extent, the UK. The implications for the costs of the reforms are substantial. The revenue erosion from a proportional shock is at least 50 per cent in the case of France and Slovakia, and might grow even larger than the static mechanical impact in the case with more heterogeneous elasticities. As in our framework there is a direct correspondence between the mechanical impacts and the change in welfare, the size of the behavioural component determines also the welfare cost of the reform. Normalising that in terms of revenue raised, as indicated by the MCF, shows that aggregate welfare loss per unit of revenue raised is unambiguously above one, and in some of the simulated scenarios significantly larger than that.

Some limitations of our analysis should be borne in mind when drawing policy conclusions. In particular, arguably, the assumption of competitive labour markets with voluntary unemployment underlying the theoretical model might severely limit the applicability of our framework to the current juncture. Nonetheless, as pointed out by Kleven and Kreiner (2006), theories of imperfect labour markets would still predict higher unemployment following tax rate increases, while differing from the perfect labour market model only in the transmission mechanism (wages instead of individuals' voluntary participation decisions). Since unemployment would still have a revenue impact, our reasoning on the risk of revenue erosion would still apply to the new scenario.

A second factor which might play an important role in adverse business cycle conditions is the presence of the underground economy. Although its level should not affect our results, given that they depend only on observed revenue, however dropping out of the official labour market

following a tax increase might be a somewhat appealing option for low income earners. Nonetheless, in this respect, we are confident that the size of the labour supply elasticities used in our computations account for those factors, and therefore consider our result sufficiently robust to this other caveat.

All in all, although the budget consolidation needs currently faced by many European countries call for increasing government revenue, particularly by reviewing and reducing tax exemptions and relief, our results suggest some caution with respect to which tax expenditures might more efficiently be reduced. In particular, reducing work-related tax relief appear particularly costly, both in terms of the revenue erosion and in terms of the welfare costs to society following behavioural responses in labour supply. Put in a more positive way, the budgetary cost of tax expenditures in MWP policies turns out to be much lower when taking into account the behavioural effects, while they generate significant gains in terms of both economic activity – induced by a stronger labour supply – and welfare – caused by higher consumption.

APPENDIX 1
THEORETICAL FRAMEWORK

Following Immervoll *et al.* (2007) and Saez *et al.* (2012) we set up a theoretical framework where heterogeneous taxpayers take decisions on labour and pay taxes. Individuals take decisions about whether to work or not, which reflects the presence of fixed costs related to working (*i.e.*, the extensive margin). Conditional on this decision, the number of hours worked is chosen (*i.e.*, the intensive margin). Individuals thus face a nonlinear tax schedule from zero to positive income tax rate depending on their decision to work and on the number of hours worked. Changes in the tax system alter both the net-of-tax wage rate and, consequently, the opportunity cost of working (through the labour/leisure decision). Building on this simple framework we derive analytical expressions in which the changes in government tax revenues reflects the potential changes in labour supply and thus allows to gauge the relative strength on the behavioural vs. mechanical effect of a given change in tax expenditure and corresponding change in effective taxation.

Let us assume that the total population N is divided into i groups according to their skill level, which in turn determines their pre-tax wage. Each group has N_j individuals that earn the same exogenous wage rate w_i. Individuals within each group may differ in the fixed cost of working such that they may also differ in their extensive responses. Preferences are represented by the following additively separable utility function:

$$u_i(c, l, q) \tag{4}$$

where c is consumption, l labour and q the fixed cost of working. The partial derivative of (4) with respect to c is positive while the partial derivatives with respect to l and q are negative, conditional on labour participation. The budget constraint is given by:

$$c = w_i l - T(w_i l, z) \tag{5}$$

where $T(w_i l, z)$ represents the net taxes paid by the individual of group i; the parameter z is just a way to denote the tax reforms considered below. When the individual does not work (l=0), the above tax function becomes $-T_0(0, z)$, that is, the welfare benefit received by those who do not work. In such case, the budget constraint is $c_0 = -T_0(0, z)$.

Plugging (5) into (4) and maximising the new expression gives the optimal labour supply

$$l_i((1 - \tau_i)w_i) = l_i(W_i) \tag{6}$$

where Wi is the net-of-tax wage rate. As usual in the literature, we ignore income effects on labour supply in order to simplify the analysis and in absence of a general consensus in the literature about the size of such as income effects (see Blundell and MaCurdy, 1999, for a survey), which in many cases is simply insignificant.

A key variable in this analysis is the elasticity of labour supply with respect to the net-of-tax wage rate. In absence of income effects, the uncompensated and compensated elasticities can be considered as being identical, such that we have:

$$\varepsilon_i = \frac{\partial l_i}{\partial W_i} \frac{W_i}{l_i} \tag{7}$$

In relation to the extensive response, we first need to define the critical value of the fixed cost q that determines whether the individual enters the labour market or not. In terms of utility levels, the necessary condition to supply a strictly positive number of hours of work is given by:

$$u_i(w_i l - T(w_i l, z), l, q_i) > u_i(-T(0, z)) \tag{8}$$

which implicitly defines an upper-bound value for qi, denoted by $\bar{q}_i$. Provided that the individual cost of working qi is below $\bar{q}_i$, the labour supply will be strictly positive. Let the fixed cost qi be distributed across the individuals belonging to group i following the distribution function $F_i(q)$, with $f_i(q)$ as density function. Hence, $F_i(\bar{q}_i)$ is the proportion of individuals who choose to work because their qi is below $\bar{q}_i$. The total employment in group i is then given by $E_i \equiv N_i F_i(\bar{q}_i)$.

In line with Saez (2002), let the extensive elasticity for each individual of group i be defined as:

$$\eta_i = \frac{\partial F_i}{\partial (c_i - c_0)} \frac{(c_i - c_0)}{F_i} = \frac{f_i(\bar{q}_i)(c_i - c_0)}{F_i(\bar{q}_i)} \tag{9}$$

The variable ηi represents the percentage change in the number of workers in group i as result of a one-percentage change in the difference in consumption when working and not working are compared.

At this point, the mechanical effect of a tax reform (given by a change in the personal tax expenditures in our case) can be defined as:

$$dM = \sum_{i=1}^{I} \left[\frac{\partial T_i}{\partial z} F_i N_i + \frac{\partial T_0}{\partial z} (1 - F_i) N_i \right] \tag{10}$$

The first term refers to the change in the tax revenues by modifying personal tax expenditures in the case of employed individuals while the second term is the effect of the tax reform on the benefits received by non-working individuals.

The behavioural effect, on the other hand, takes into consideration the effect of changes in the labour supply (intensive response) and in the decision on participation in labour market (extensive response) on the tax revenues after the tax reform. Analytically this can be expressed by the following expressions:

$$dB = \sum_{i=1}^{I} \left[\tau_i d(w_i l_i) E_i + (T_i - T_0) \frac{dF_i}{dz} N_i \right]. \tag{11}$$

The first term of 11) is the behavioural effect related in the intensive response while the second term represents the behavioural effect in the extensive response. After differentiating totally the labour income and some algebraic manipulations using 7), we arrive at the following

expression of the first term of (11): $\sum_{i=1}^{I}\left[-\frac{\tau_i}{1-\tau_i}d\tau_i E_i w_i l_i \varepsilon_i\right]$, where the usual assumption that there is no incidence effect of changes in labour supply on pre-tax wage rate (dw=0) has been used.

As mentioned above, the second term of (11) refers to the behavioural effect related to the extensive response. Denoting by $a_i = \frac{T(w_i l_i) - T(0)}{w_i l_i}$ the participation tax rate, a more comprehensive expression of this second term can be obtained: $\sum_{i=1}^{I}\left[-\frac{a_i}{1-a_i}\frac{\partial(T_i - T_0)}{\partial z}\eta_i E_i\right]$, where the expression 5) – and its equivalent when l=0 –, the elasticity 9), dw=0 and the envelope theorem have been used. Hence the total behavioural effect of expression 11) can be rewritten as:

$$dB = \sum_{i=1}^{I}\left[-\frac{\tau_i}{1-\tau_i}d\tau_i E_i w_i l_i \varepsilon_i - \frac{a_i}{1-a_i}\frac{\partial(T_i - T_0)}{\partial z}\eta_i E_i\right]. \quad (12)$$

Finally, adding expression (10) and (12), we obtain the total change in the personal income tax revenues:

$$dR = dM + dB =$$
$$\sum_{i=1}^{I}\left[\frac{\partial T_i}{\partial z}E_i + \frac{\partial T_0}{\partial z}(N_i - E_i) - \frac{\tau_i}{1-\tau_i}d\tau_i E_i w_i l_i \varepsilon_i - \frac{a_i}{1-a_i}\frac{\partial(T_i - T_0)}{\partial z}\eta_i E_i\right], \quad (13)$$

where terms among brackets are, respectively, the intensive mechanical effect, the extensive mechanical effect, the intensive behavioural effect and the extensive behavioural effect.

APPENDIX 2
MAKE-WORK-PAY TAX EXPENDITURES IN FRANCE, SPAIN, THE UK, HUNGARY AND SLOVAKIA

The main features of the work-related tax expenditures in our sample of countries are described in this section. The reference year for the tax rules is 2010.

France

The Employment Bonus (Prime pour l'emploi – PPE) is an individual tax credit established in order to encourage the return to employment and improve earnings from working.

The amount depends on:

- The earned income (employee and self-employment)
- The tax unit income
- The number of hours worked

To be eligible for the PPE, the household *"Revenu Brut Global"*, must be under € 16,251 for a single person, or € 32,498 for couples. Each dependent child increases the basic amount by € 4,490. The PPE is also based on the individual earned income, corresponding to employment income and self-employment income. For part-time workers, this earned income is converted to full-time equivalent.[13] The credit is equal to 7.7 per cent of the annual employment or self-employment income earned when not exceeding the minimum wage (€ 12,475), increased by € 36 for each dependent person (double for the first child of a single, divorced or widowed person). If the earned income exceeds this amount, the credit is 17 per cent of the difference between the earned income and the ceiling (€ 17,451 or 26,572, for a single, divorced or widowed person with one child or more; or for a married person with a non-working spouse). The credit is assessed by the tax authorities and is aggregated at the household level. If the total tax credits exceed the household's income tax liability, the excess is refunded.

Spain

Work-related tax incentives (*Reducción por rendimientos del trabajo, prolongación de la actividad laboral y movilidad geográfica y personas con discapacidad que obtengan rendimientos del trabajo como trabajadores activos*) are granted through an income related non-refundable tax allowance for taxpayers who receive employment income. The amount of the allowance diminishes as the level of net employment income increases, and varies between € 2,652 and € 4,080.[14]

The allowance, which cannot exceed total net employment income, is doubled for employees who accept an employment in a different city or who are older than 65. Further provisions are applicable in case of disabled taxpayers. In the case of joint taxation, and even if both partners have incomes from work, the allowance is only applicable once.

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[13] The conversion coefficient is defined as: 1820/ yearly number of hours worked for employees or 365/yearly number of days worked for self-employees.

[14] Tax payers with net employment income equal or below € 9,180 may reduce the tax base by € 4,080. Taxpayers with net income over € 13,260 or non-employment income over € 6,500 may only reduce the tax base by € 2,652. Tax payers in between will reduce their tax base by € 4,080 minus the result of multiplying by 0.35 by the difference between net income and € 9,180.

United Kingdom

The working tax credit (WTC) is an income-tested refundable tax credit, calculated on the basis of the previous tax year's annual income. WTC contains a number of elements depending on family composition (basic, couple and lone parent element), health (disability and severe disability element), number of hours worked (30 hour element) and age of the claimant (50+ element).

The eligibility conditions for working adults are:

- working at least 30 hours per week and aged above 24 years old,
- working at least 16 hours per week and have a dependent child or
- working at least 16 hours per week and disabled.

Examples of the different elements are as follows:

- a basic element of £1,890 payable to everyone (in 2009/10)
- a couple and lone parent element (£1,860)
- a 30 hour [working week] element (£775)
- a disabled worker element (£2,530)
- a severely disabled worker element (£1,075)
- a 50+ return-to-work payment (discontinued after April 2012).

Hungary

The Employee Tax Credit is a refundable tax credit for low income individuals. It amounts to 17 per cent of wage income earned, subject to a monthly maximum credit of HUF 15,100 (€ 55). That implies that the tax credit can be fully exploited if the annual wage earnings are lower than HUF 3,188,000 (€ 11,572). The tax credit tapers off in the income range HUF 3,188,000-4,698,000 (€ 17,054), when the reduction is equal to 12 per cent of the income exceeding HUF 3,188,000 (€ 11,572). No tax credit is available for those earning more than HUF 4,698,000 (€17,054). Eligibility does not depend on family (e.g., number of children) characteristics. Note: the tax credit was abolished as of 2013.

Slovakia

The employee tax credit was introduced in January 2009. Entitled are employees who have worked at least 6 months during the year and have annual earnings of at least 6 minimum wages (with the minimum wage standing at € 307.7 per month in 2010). Eligibility is conditional on receiving only employment income. If annual earnings are lower than 12 minimum wages, the tax credit amounts to 19 per cent of the difference between the basic tax allowance (equal to 22.5 × the minimum subsistence level, fixed at € 185.19 per months in 2010) and the minimum wage less social insurance contributions. If annual earnings are higher than 12 minimum wages, the tax credit amounts to 19 per cent of the difference between the individual basic tax allowance and taxable income. The tax credit becomes zero when taxable income is equal to the basic tax allowance. The tax credit is refundable.

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COMMENT TO "WORK-RELATED TAX EXPENDITURES IN THE EU: IMPLICATIONS FOR TAX REVENUE" BY SALVADOR BARRIOS, SERENA FATICA, DIEGO MARTÍNEZ LÓPEZ AND GILLES MOURRE

Ferhan Salman[*]

Main takeaways

By combining the EUROMOD simulations with labor supply elasticities the paper traces the behavioral impact of tax expenditure reforms and argues that the welfare gain of maintaining these measures are not negligible.

At least one-fourth of the extra tax revenues collected through a reduction in make-work pay tax incentives is washed away after factoring in labor supply responses, especially through lower participation by individuals most at risk of exclusion.

In some instances, the revenue gain erosion might become substantial. Even for policies strongly targeted at the bottom of the earnings distribution, the reform might even bring about a net revenue loss, depending upon the calibration strategy of the labor supply elasticities and reflecting the heterogeneity across types of workers.

Policy implication: Removing tax expenditure in upper income quintile can minimize the labor supply distortions and maximize fiscal revenues.

Comments

The main results are derived from benchmarking France and UK against Hungary and Slovakia. These two groups of countries represent different income levels and tax to GDP ratios neglecting the smaller tax bases of the latter group. Results would likely to be overestimating the impact on Hungary and Slovakia due to the higher share of informal economies.[1] In this respect, the paper can benefit from benchmarking to a more comparable sample for robustness i.e. other emerging economies could be used as benchmarks for Hungary and Slovakia.

One of the shortcomings of these models is the difficulty in aggregation (Tyson, 2014) with overlapping tax expenditures. This may lead to multiple equilibria in identifying the macroeconomic feedbacks with the use of varying models to trace microeconomic dynamics, *i.e.*, Various tax expenditure policies may lead to various tax outcomes.

Could the paper extend the current strategy of policy change to optimal policies? With tax expenditures governments presence grow, which can be distortionary. However, such approach ignores positive spillovers (e.g., incentive to work) and introduces another layer of cost for the benefit of transparency (ITEP, 2011). Rather than simulating policy changes, welfare improving policies should be preferred to minimize the tax burden. Such a strategy will be able to deliver a superior welfare outcome and can highlight the tradeoff between austerity and growth.

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[1] The size of the informal economy is estimated to be around 20-25 per cent in Hungary and Slovakia, and 12-15 per cent in the UK and France (Schneider, 2001)

It would be useful to clarify the benchmark tax rate in the model. A uniform tax rate could be associated with efficient tax expenditures and would identify the space for maneuver and balance growth when redistributive tax policy is in question.

The paper can benefit from providing the details of how EUROMOD integrates the labor supply model for an average reader.

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A FISCAL JOB? AN ANALYSIS OF FISCAL POLICY AND THE LABOR MARKET

Elva Bova,[*] Christina Kolerus[*] and Jules S. Tapsoba[*]

This paper examines the impact of fiscal policy on labor market outcomes, including at times of recessions and recoveries. Using a panel of 34 OECD countries over the last three decades (1975-2012), we find that unemployment gaps widen during recessions, while they do not change significantly at times of recoveries, suggesting that recoveries may be on aggregate neither jobless nor jobful. Fiscal policy can help close unemployment gaps, through discretionary current spending, especially spending on goods and services and on public sector wages. We also find that lower statutory tax rates reduce unemployment in the short term, and that the impact on employment of social contributions is higher than that one of consumption taxes (VAT). Consistently with the relevant literature, unemployment benefits and early retirement benefits have a positive impact on unemployment (also when a one-year lag is considered), while evidence on active labor market policies is mixed. Finally, we find that the impact of fiscal variables on the labor market does not change substantially during recessions and recoveries.

1 Introduction

The global financial crisis has exacerbated conditions in the labor market of many advanced economies, most of which were already marked by high structural unemployment at the onset of the crisis. According to recent statistics, unemployment currently amounts to 7.6 per cent in the OECD, corresponding to about 46 million unemployed, 11 millions more than in July 2008 (OECD, January 2014). The years of the crisis have been crucial in terms of policy making, as they triggered a series of old and new policy responses aimed at containing job losses, through incentives to the labor demand and supply (IMF, 2012).

While the literature provides a comprehensive review of fiscal policy's role for growth during the global financial crisis, studies on how specific tax or expenditure measures sustain jobs in this context are limited. This paper provides an analysis of the channels through which fiscal policy can impact the short-term dynamics of the labor market by addressing three main questions. First, we empirically investigate how specific fiscal instruments can prop up jobs in the short term, looking at changes in the unemployment and employment gaps. Second, we analyze whether the impact of these instruments is different along output deviations from its long-term trend. Third, we check the effectiveness of these instruments at times of recessions and recoveries.

We examine the effectiveness of fiscal instruments using a panel of 34 OECD countries for the period 1975-2012. To address these questions, we consider the short-run dimension of the labor market, where movements in both labor demand and supply are affected by deviations of output from its long-run trend, as predicated by the so-called Okun's law (Okun, 1962). Hence, the focus of the paper is to assess how fiscal policy impacts on (un)employment gaps through labor demand and labor supply, where (un)employment gaps are defined as (un)employment's deviations from its long run trend. By looking at both unemployment and employment gaps, we also capture differences in the labor force participation.

We find a stable relationship between (un)employment gaps and output gaps across different specifications, providing further evidence of the validity of the Okun's law, as largely documented in the literature. Recessions cause a widening of unemployment gaps during a time horizon of up to

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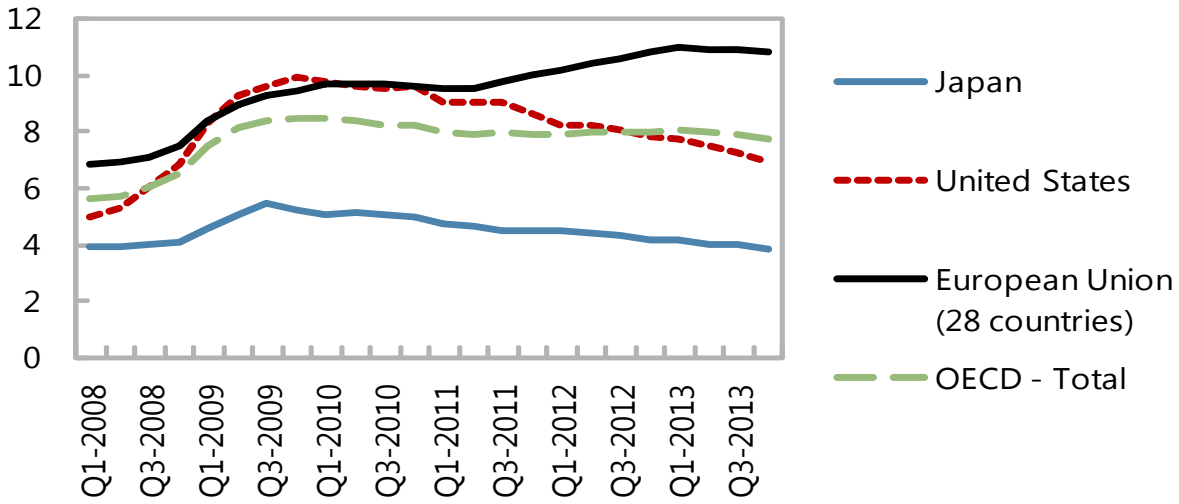
Figure 1

Global Financial Crisis: Harmonized Unemployment Rate



Source: OECD.

two years, while the impact of recoveries is not stable. Fiscal policy can help close unemployment gaps, through discretionary current spending, especially spending on goods and services and on public sector wages. We also find that cutting statutory tax rates reduces unemployment gaps in the short term. In particular, the positive impact of cutting social contributions on employment is higher than the one of consumption taxes (VAT), suggesting that fiscal devaluations, conducted through a reduction in social contributions and an increase in consumption taxes, can have a positive impact on employment. Consistent with the relevant literature, unemployment benefits and early retirement benefits worsen unemployment, while evidence on active labor market policies is mixed. Finally, we find that the impact of discretionary spending on the labor market does not change during recessions and recoveries, while the impact of the personal income and consumption tax rates during recessions is different from that one at normal times.

The remainder of the paper is structured as follows. Section 2 provides a review of the theoretical and empirical literature; Section 3 presents the empirical analysis, with a focus on the model, data and the results of the estimation; Section 4 concludes.

2 A review of the literature

In the classical labor market model, the labor demand identifies the number of workers (or working hours) firms are willing to hire at any given rate of the real wage. The hiring decision depends on a firm's profit maximization function and is, thus, determined by the level of real wages and the marginal productivity of labor *vis-à-vis* the capital stock and the level of technology. The labor supply identifies, instead, the number of workers willing to supply labor at each level of the real wage by maximizing workers' utility derived from leisure activities and the consumption of goods and services.

Overall changes in output directly affect labor demand, thereby lowering unemployment. In assessing the impact of fiscal policy on the labor market most studies do, in fact, focus on the

growth channel, and examine how fiscal policy affects aggregate demand and through this the labor market.[1] Yet, fiscal policy can shape the efficiency of labor markets through more direct channels with an impact both in the short and medium terms. In the short term, these policies could stimulate job creation by boosting labor demand, improving the matching of workers with existing job vacancies, and create incentives to work.

On the expenditure side, **spending on goods and services and capital spending** directly affects aggregate demand and through this labor demand. The impact of **the wage bill** is instead more direct, as the public sector is usually the largest single employer in the country. Studies for the United States (Fatás and Mihov, 2001; Burnside *et al.*, 2004; Galí *et al.*, 2007; Cavallo, 2005) find positive effects on employment following a government spending shock. In particular, Monacelli *et al.* (2010) provide an empirical estimate of the unemployment multipliers of government spending in US data, focusing in more detail on the transmission of fiscal policy to the labor market. They show that an increase in government spending boosts total hours, employment and the job finding probability. In a real business cycle model with competitive labor markets and lump-sum taxation, Finn (1998) suggests that an increase in government employment can lead to lower private sector employment (if the wealth effect is small) and higher real wages, as well as lower private sector hours, output and investment. However, Lane and Perotti (2003) and Alesina *et al.* (2002) find evidence of the opposite impact. They show that an increase in government purchases and the wage bill leads to higher wages in the private sector, lower firm profits and ultimately lower employment and business investment in current and future periods. As a result, output, income and private consumption expenditure contract.[2]

It is usually acknowledged that **social benefits** weaken the link between labor supply and incomes. In general, as they make labor more costly, they tend to reduce the labor demand. Social assistance can reduce work incentives, especially if benefits are withdrawn as earnings rise.[3] **Pension benefits** (usually the largest share of social benefits) tend to affect pension decisions and when they increase they would reduce the labor force, and employment. There is a consensus on the fact that **unemployment benefits** have a significant positive impact on unemployment (Duval and Bassanini, 2006; Scarpetta, 1996; Nickell, 1998; Nunziata, 2002). Duval and Bassanini estimate that a 10 per cent increase in unemployment benefits would increase unemployment by 1.2 percentage points. Krueger and Meyer (2002) conclude that a 10 per cent increase in unemployment benefits raises the average duration of unemployment by around 5 per cent – although this impact is likely to be much higher in countries with relatively weak eligibility conditions. Empirical evidence also suggests that strengthening the link between contributions and benefits improves labor market outcomes (Disney, 2004).

On the revenue side, the literature agrees that **labor taxes** (personal income tax and social security contributions) negatively affect employment by impacting both on the labor supply and demand. Higher taxes reduce after-tax wages for workers which supply less work as the incentive to opt for leisure as opposed to work is now higher (if the substitution effect prevails). Higher taxes on labor reduce labor demand as they can drive up labor costs. Whether the burden of the tax is borne more by the workers or the firms depends ultimately on the elasticities of labor supply and

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1 The empirical literature shows that different combinations of spending measures and taxes can have positive and negative effects on economic growth and, through this, on employment (Dao and Loungani, 2010; Vitek 2010; OECD, 2009; IMF, 2010; Darius *et al.*, 2010; Chen *et al.*, 2011).

2 See also Pappa (2009), Cavallo (2005) and Ardagna (2007).

3 The mode of financing of social benefits also matters. Depending on workers' perceptions, financing social benefits through payroll contributions rather than taxes could help employment. From a worker's perspective, mandatory payroll deductions that have no or only weak links to the benefits they finance are likely to have the same adverse effect on labor supply as a tax on wages. However, where workers perceive a strong relationship between the amount and number of years of contributions to the pension system and pension benefits, the adverse impact on labor supply will be mitigated (IMF, 2012).

labor demand. Cahuc and Zylberberg (2004) find that the price elasticity of labor demand is close to about –1, implying that a reduction of personal tax rates by three per cent would increase labor demand by about 2.5 per cent. On the other hand, the elasticity of labor supply to real wages is found to be between 0.2 and 0.5 per cent (IMF, 2012).

Given the negative elasticity of labor demand, adjustments in the rate of labor income taxes have a significant impact on the labor market. Similarly, the higher **the tax wedge**, *i.e.*, the difference between the cost of a worker to the firm and take home pay, the lower labor demand and labor supply, hence the higher unemployment. Bassanini and Duval (2006) focusing on OECD countries find that higher labor taxes (whether including consumption taxes or not) raise unemployment; in particular they estimated that a 10 percentage points higher labor tax wedge would raise structural unemployment by 2.8 percentage points. Likewise, **taxes on final consumption** (VAT, excises) have the impact of increasing the costs for consumption goods therefore they reduce real wages which, if the substitution effect prevails over the wealth effect, would lower the labor supply.

Corporate taxes can affect employment by reducing investment and production, and by reducing labor supply to the extent that firms pass on these taxes to employees in the form of lower wages.[4] For instance, business tax relief can ease financing constraints for firms relying on retained earnings and boost investment. These effects are consistent with the finding that reductions in the cost of capital reduce unemployment (Phelps, 1994, Blanchard, 1997).

In addition, **compositional shift of taxes** from labor to consumption taxes could boost labor demand. For instance, reductions in employer social security contributions financed by higher consumption taxes (as in a fiscal devaluation case) can raise labor demand by lowering (non-wage) labor costs. The long-term employment effects of tax shifts depend on the extent to which the tax burden is shifted away from labor income and onto other incomes. Compared to the long-run equilibrium under full wage flexibility, the impact of a tax shift on employment is thus expected to gradually disappear across time.[5]

Active labor market policies (ALMP) consist of job placement services and labour market programs such as job-search, vocational training or hiring subsidies. These are supposed to have a positive impact on employment as they improve the matching of labor demand and supply and hence reduce labor demand frictions. The largest components of ALMPs are usually training and job searching/matching services. Empirical evidence has not found a robust impact of ALMPs on the labor market (IMF, 2012). However, when proper account is made for the long-term impact, intensive employment services, individual case management and mixed strategies with selective referrals to long-term programs are found to have a large impact negative impact on unemployment. A study by Card and others (2010) examines how participation in active labor market program (ALMP) affects labor market outcomes. Consistent with earlier summaries, their analysis suggests that subsidized public sector employment programs are relatively ineffective, whereas job search assistance and related programs have generally favorable impacts, especially in the short run. Classroom and on the job training programs are not particularly effective in the short run but have more positive impacts after two years. Orlandi (2012) finds that ALMPs have a negative and significant impact on unemployment. Estevão (2007) finds that ALMPs do increase

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4 Reductions in the effective tax rate on corporate income have two opposing effects: substitution from labor to capital reduces labor demand higher investment raises output – including over the longer term – and therefore labor demand.

5 The adjustment, however, can take quite some time (De Mooij and Keen, 2012). Moreover, there may be more subtle effects that render the long-term effects of a tax shift positive on growth and employment. This is confirmed by model simulations (Auerbach and Kotlikoff, 1987) as well as empirical studies (Daveri and Tabellini, 2000; Arnold, 2008). For instance, consumption taxes have a broader base than social contributions, bearing on all incomes that support consumption, including income from economic rents and social transfers.

employment, especially in the form of direct subsidies for job creation; whereas expenditure in training programs seems to have been largely ineffective.[6]

There is no consensus in the literature on the concept of **jobless recoveries**. While there is clear evidence on the existence of lags between labor market recovery and economic recovery in the shorter term (IMF, 2010; Groshen and Potter, 2003; Aaronson *et al.*, 2004), a sustained deviation of the Okun's law in the longer term is not documented. Galí *et al.* (2012), for instance, argue that there are no jobless recoveries but simply delays in the response of unemployment in recovery periods. Most studies, however, acknowledge that the rebound employment following recessions has become less forceful in recent years. Jaimovich and Siu (2012) explain this phenomenon by job polarization (disappearance of occupations in the middle of the skill distribution) due to progress in technology which substitutes for labor in routine tasks. Also, as a consequence of recent reforms in various countries which rendered labor market institutions more flexible, the responsiveness of unemployment to output has increased during recessions and crises (IMF, 2010; Cazes *et al.*, 2013), generating higher unemployment or employment losses which need more time to recover.

3 Empirical analysis

3.1 The model

To assess the effectiveness of fiscal policy on the labor market, we rely on the short term relationship between (un)employment gaps and output gaps, better defined as the Okun's law:

$$U_t - U_t^* = \beta_o + \beta_1(Y_t - Y_t^*) \quad (1)$$

$$E_t - E_t^* = \alpha_o + \alpha_1(Y_t - Y_t^*) \quad (2)$$

The main prediction of the Okun's law is that short-term shifts in aggregate demand cause output to fluctuate around its long term trend. Output movements affect firms' decisions to hire and fire workers, causing employment to deviate from its long term trajectory and the unemployment rate to move in the opposite direction (Okun, 1962; Ball *et al.*, 2013).

Within the Okun's law we assess whether fiscal variables impact (un)employment gaps either directly or through their interaction with the output gap:

$$U_t - U_t^* = \beta_o + \beta_1(Y_t - Y_t^*) + \beta_2(X_t) + \beta_3(Y_t - Y_t^*)(X_t); \quad (3)$$

$$E_t - E_t^* = \alpha_o + \alpha_1(Y_t - Y_t^*) + \alpha_2(X_t) + \alpha_3(Y_t - Y_t^*)(X_t); \quad (4)$$

where:

- $Y_t - Y_t^*$ represents the output gap obtained from the current real output level minus its long term level; $U_t - U_t^*$ and $E_t - E_t^*$ are unemployment and employment gaps obtained as a deviation of their current levels from their long-term values. Y_t^*, U_t^* and E_t^* are all calculated using Hodrick-Prescott filtering.[7]
- X_t represents a vector of fiscal variables: i) total public expenditure, current primary expenditure, capital expenditure, spending on wages and salaries, on goods and services, on social benefits; ii) statutory tax rates of corporate and personal incomes taxes, value added tax and social security contributions; iii) the tax wedge; and, iv) active and passive labor market policies, including public employment services, training, job rotation and job sharing;

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6 See also Tagkalakis (2013) for the impact of ALMPs on Greece.

7 In both cases we used 6.25 as a smoothing parameter; however, other parameters were considered and the results do not change significantly.

employment incentives; supported employment and rehabilitation; direct job creation and startup incentives, as well as unemployment benefits and early retirement.

- the coefficients β_3 and α_3 express the impact of fiscal policy on unemployment and employment gaps, respectively, conditional to changes in the output gap.

As high unemployment (or low employment) can trigger immediate fiscal policy responses, for instance via unemployment benefits and other automatic stabilizers, the model is sensitive to endogeneity. To solve for endogeneity in government expenditures, we follow Fatás and Mihov (2003, 2006), Afonso *et al.* (2010), and Agnello *et al.* (2013). Discretionary fiscal policy is calculated by extracting the automatic stabilizer component of public spending. To this end, we estimate a "fiscal rule" accounting for inflation, GDP, debt, and a time trend. The residual is then taken as the proxy of discretionary policy. Further, we include lags to solve for endogeneity in non-spending variables and use panel fixed effects to control for the simultaneous bias.

We control for differences in the flexibility of the labor market (employment protection legislation) and other institutional variables (minimum wage, union concentration and membership) but find that these estimates are not robust while the loss of observation was sizeable. This is consistent with some of the literature which finds estimates of the effects of labor institutions on employment to be not very conclusive (IMF, 2012). As follows, our baseline only controls for differences in the output gap, assuming that other country-specific differences would be accounted for by panel fixed effects.

Several studies show that the impact on output of fiscal variables can be different along the business cycle and at time of recessions or negative output gaps (Auerbach and Gorodnichenko, 2012; Baum *et al.*, 2012). Hence we examine how fiscal policy impacts unemployment and employment in periods of recessions and recoveries:

$$U_t - U_t^* = \beta_o + \beta_1(Rec) + \beta_2(X_t) + \beta_3(X_t)\,(Rec) + \beta_4(X_t)(Recov) \quad (5)$$

$$E_t - E_t^* = \alpha_o + \alpha_1(Rec) + \alpha_2(X_t) + \alpha_3 f(X_t)(\,Rec) + \alpha_4(X_t)(Recov) \quad (6)$$

- where *Rec* identifies a recession dummy which takes value one when real output growth is negative. In the sample of 34 OECD countries for 1975 to 2012 we find 173 recession years. *Recov* is a recovery dummy for the time span following a recession until real GDP is equal to or higher than real GDP of the year before the recession. Using this filter, we identify 132 recovery years, and most recoveries take place in only one year after the recession.

3.2 Data

The analysis is based on a panel of 34 OECD countries for the period 1975-2012. Data on unemployment and employment come from the OECD database. Data on real GDP and public spending items are from the IMF-WEO database. The tax wedge comes from the OECD and corresponds to the average tax wedge of one-earner married couple at 100 per cent of average earnings with 2 children. Spending on labor market policies are also from the OECD database. Statutory tax rates are from Iltzeski's (2011) database, which has observations for 15 countries for the period 1981-2008.[8] We also introduce as control variable an index of strictness in the labor market regulations which comes from the World Economic Freedom dataset (WEF) but find it to be not significant in almost all specifications.

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[8] Available at http://personal.lse.ac.uk/ilzetzki/index.htm/Data.htm

Table 1

Testing the Okun's Law

	HP ?=6.25		HP ?=100	
	u-gap	**e-gap**	**u-gap**	**e-gap**
yokun	–0.339***	0.235***	–0.357***	0.247***
	(0.0256)	*(0.0234)*	*(0.0317)*	*(0.0219)*
Observations	763	512	763	512
R^2	0.534	0.449	0.572	0.491
Number of countries	34	34	34	34

Standard errors in parentheses. *** p<0.01, ** p < 0.05, * p < 0.1.
Note: the regression has been done with country-fixed effect; an intercept has been included.

3.3 Estimation results

We find that the Okun's law is strongly and statistically significant throughout the different specifications of the model with a magnitude of around 0.3, similar to what has been found by the literature (Table 1). This can imply that a deviation from long term output of one per cent would lead to a deviation of unemployment from its natural rate (or long term trend) of about 0.3 per cent. The coefficient is slightly lower for employment gaps (with opposite sign) suggesting that short term changes in output do also affect labor force participation.

Compared to normal times, the contemporaneous unemployment gap widens by about 0.4 per cent during a recession, with a widening of almost 1.4 per cent on a cumulative basis for about three years; and the impact disappears after the third year.[9] During recoveries, the contemporaneous unemployment gap widens by about 0.6 per cent, but this effect is not robust when including the outer years. Overall, unemployment losses occurred during recessions seem to not be made up during recoveries (Table 2). The impact on employment gaps is less clear, as recessions and recoveries cause a reduction in the gap during the first year but the impact on the outer years is not stable.

Discretionary spending has a strong negative (positive) effect on unemployment (employment) gaps with the impact being significant for current primary spending and insignificant for capital spending (Table 3). An increase of one per cent of GDP in discretionary current primary spending would reduce unemployment gap by 10 per cent. The impact comes mostly from wages and spending on goods and services which reduce the unemployment gap by 20 and 34 per cent, respectively. Social benefits seem to negatively affect the unemployment gap by 16 per cent. In advanced economies about two-thirds of social benefits consist of pension spending. In theory, the higher pension benefits, the higher the incentive for retirement, with no anticipated effect on unemployment (given the withdrawal from the labor force) but a reduction in employment. Here we find the opposite dynamics, suggesting that higher pension benefits reduce unemployment. This

[9] Following the Akaike information criterion, our analysis uses specifications (2) and (4).

Table 2

What Is the Impact of Recessions and Recoveries on U- and E-gaps?

	1	2	3	3	4	5
	u-gap	**u-gap**	**u-gap**	**e-gap**	**e-gap**	**e-gap**
recess	0.00447***	0.00249*	0.00271*	–0.00232**	–0.000557	–0.000703
	(0.00108)	*(0.00142)*	*(0.00142)*	*(0.000973)*	*(0.00124)*	*(0.00121)*
L.recess		0.00796***	0.00689***		–0.00641***	–0.00575***
		(0.00247)	*(0.00213)*		*(0.00224)*	*(0.00194)*
L2.recess			0.00378**			–0.00256
			(0.00184)			*(0.00159)*
L3.recess						
recov	0.00595***	–0.000678	–0.000580	–0.00379***	0.00142	0.00160
	(0.000908)	*(0.00187)*	*(0.00192)*	*(0.000680)*	*(0.00163)*	*(0.00172)*
L.recov		0.00230***	–0.000971		–0.00215***	–6.82e-05
		(0.000590)	*(0.00149)*		*(0.000648)*	*(0.00138)*
L2.recov			0.00104*			–0.000464
			(0.000584)			*(0.000385)*
Observations	833	828	823	538	536	534
R^2	0.079	0.122	0.131	0.044	0.094	0.102
Number of countries	34	34	34	34	34	34

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Note: the regression has been done with country fixed effects and an intercept has been included.

could be explained by the fact that large spending on pension is associated with a higher share of long term contracts as opposed to short term contracts, which are usually more affected by job cuts. For employment gaps, the coefficients are positive and significant for wages, goods and services and social benefits, with the magnitude for social benefits higher than for unemployment gaps, suggesting an impact on the labor force participation. Interactions with the output gap are insignificant implying that the impact of expenditure items on the labor market does not change at different levels of the output gap.[10]

The impact of total and current spending on (un)employment gaps is slightly higher than the Okun's law specification when using the alternative baseline with recessions and recoveries, although wages and salaries are now insignificant. The interaction terms suggest that the impact of fiscal policy on the labor market considering times of recessions and recoveries is not different from normal times (Table 4).

[10] The size of the expenditures coefficients with and without interaction term is very similar, supporting the assumption that discretionary spending has been correctly identified and there is no remaining collinearity between spending and the output gap.

Table 3

What is the Impact of Expenditure on Unemployment and Employment Gaps?

	1 u-gap	2 u-gap	3 u-gap	4 u-gap	5 u-gap	6 u-gap	7 e-gap	8 e-gap	9 e-gap	10 e-gap	11 e-gap	12 e-gap
yokun	-0.345*** *(0.0269)*	-0.348*** *(0.0372)*	-0.319*** *(0.0274)*	-0.338*** *(0.0329)*	-0.345*** *(0.0351)*	-0.347*** *(0.0319)*	0.232*** *(0.0250)*	0.214*** *(0.0340)*	0.213*** *(0.0274)*	0.210*** *(0.0313)*	0.212*** *(0.0332)*	0.212*** *(0.0261)*
disexpy	-0.0604*** *(0.0206)*						0.0544*** *(0.0206)*					
yokundisexpy	-0.332 *(1.528)*						1.503 *(1.720)*					
discurexp		-0.0975*** *(0.0349)*						0.0901** *(0.0407)*				
yokundiscurexp		-1.628 *(2.372)*						2.674 *(1.899)*				
discapexp			0.0647 *(0.0493)*						0.00496 *(0.0596)*			
yokundiscapexp			-2.452 *(2.310)*						2.036 *(4.567)*			
dis_W&S				-0.204** *(0.102)*						0.260** *(0.122)*		
yokundis_W&S				-11.26 *(8.258)*						8.471 *(6.545)*		
dis_G&S					-0.343*** *(0.120)*						0.279* *(0.164)*	
yokundis_G&S					-1.840 *(9.167)*						10.67 *(10.58)*	
dis_SocBen						-0.158** *(0.0788)*						0.213*** *(0.0819)*
yokundis_SocBen						4.010 *(5.973)*						3.657 *(3.620)*
Observations	639	367	527	402	389	498	508	293	426	321	307	399
R^2	0.557	0.529	0.502	0.512	0.520	0.512	0.466	0.383	0.386	0.376	0.371	0.386
Number of countries	34	21	30	23	22	26	34	21	30	23	22	26

Standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Note: the regression has been done with country fixed effects and bootstrapping; an intercept has been included.

Table 4

What is the Impact of Discretionary Spending on U-gaps and E-gaps During Recessions and Recoveries?

	1	2	3	4	5	6	7	8	9	10	11	12
	u-gap	u-gap	u-gap	u-gap	u-gap	u-gap	e-gap	e-gap	e-gap	e-gap	e-gap	e-gap
recess	0.00216	0.00370	0.00228	0.00324*	0.00332	0.00365**	-0.000282	-0.00186	-0.000680	-0.00172	-0.00162	-0.00134
	(0.00173)	(0.00247)	(0.00161)	(0.00189)	(0.00231)	(0.00184)	(0.00136)	(0.00179)	(0.00130)	(0.00138)	(0.00169)	(0.00151)
L.recess	0.00887***	0.00676***	0.00619***	0.00565***	0.00672***	0.00655***	-0.00654***	-0.00457*	-0.00471**	-0.00440*	-0.00460*	-0.00442**
	(0.00243)	(0.00228)	(0.00180)	(0.00212)	(0.00229)	(0.00186)	(0.00218)	(0.00250)	(0.00203)	(0.00241)	(0.00242)	(0.00208)
recov	-0.00171	-0.000933	-0.000486	2.37e-05	-0.000399	0.000606	0.00180	0.000763	0.000824	0.000601	0.000504	0.000399
	(0.00184)	(0.00223)	(0.00167)	(0.00219)	(0.00225)	(0.00177)	(0.00164)	(0.00206)	(0.00162)	(0.00208)	(0.00201)	(0.00172)
L.recov	0.00230***	0.00245***	0.00164**	0.00239***	0.00243***	0.00223***	-0.00201***	-0.00192**	-0.00160**	-0.00194**	-0.00202**	-0.00212**
	(0.000695)	(0.000934)	(0.000701)	(0.000924)	(0.000894)	(0.000806)	(0.000682)	(0.000939)	(0.000694)	(0.000946)	(0.000895)	(0.000835)
disexpy	-0.101***						0.0961***					
	(0.0346)						(0.0237)					
recovdisexpy	-0.179						0.0886					
	(0.132)						(0.112)					
recessdisexpy	0.110						-0.117					
	(0.107)						(0.0920)					
discurexp		-0.118**						0.0656				
		(0.0496)						(0.0510)				
recovdiscurexp		-0.197						0.0726				
		(0.236)						(0.163)				
recessdiscurexp		-0.0817						0.125				
		(0.116)						(0.119)				
discapexp			-0.00699						0.0465			
			(0.0542)						(0.134)			
recovdiscapexp			0.0879						0.0243			
			(0.164)						(0.194)			
recessdiscapexp			0.354*						-0.139			
			(0.212)						(0.239)			
dis_W&S				-0.193						0.168		
				(0.150)						(0.146)		
recovdis_W&S				-0.341						-0.137		
				(0.521)						(0.675)		
recessdis_W&S				-0.365						0.539		
				(0.595)						(0.422)		
dis_G&S					-0.341**						0.155	
					(0.171)						(0.200)	
recovdis_G&S					-0.745						0.497	
					(0.840)						(0.667)	
recessdis_G&S					-0.664						0.927	
					(0.555)						(0.602)	
dis_SocBen						-0.185						0.200**
						(0.141)						(0.0945)
recovdis_SocBen						0.0848						0.0589
						(0.276)						(0.235)
recessdis_SocBen						-0.325						0.132
						(0.276)						(0.273)
Observations	639	367	527	402	389	498	508	293	426	321	307	399
R-squared	0.161	0.118	0.129	0.098	0.114	0.142	0.120	0.093	0.075	0.090	0.092	0.090
Number of code	34	21	30	23	22	26	34	21	30	23	22	26

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: the regression has been done with country fixed effects and bootstrapping; an intercept has been included.

The impact of **statutory taxes** is significant mostly for employment gaps, but the personal income tax seems to worsen unemployment as well. A one per cent increase in each of these tax rates is equivalent to a reduction in employment gaps of about 0.9 per cent for personal income tax and VAT, one per cent for corporate income tax and 1.8 per cent for social contributions. The fact that the impact of social contributions is greater than that one of VAT may imply that a fiscal devaluation could have a positive impact on employment. In this case as well, the interaction term is insignificant indicating that the impact of statutory tax rates does not change at different positions of output *vis-à-vis* its long term trend (Table 5).

Considering the alternative baseline specification with normal, recession and recovery times, personal income tax rates have a stronger positive impact on unemployment gaps during recessions and a stronger negative impact on employment. On the contrary, the VAT rate has a less negative impact on employment gaps during recessions (Table 6).

The tax wedge has no significant impact on (un)employment gaps in the baseline specification, including when it interacts with the output gap (Table 7). It has a weakly significant and positive impact on unemployment gaps and stronger negative impact on employment at normal times, in the alternative specification when controlling for recessions and recoveries (Table 6).

Labour market policies have an impact on unemployment (employment) gaps (Table 8). As consistent with the literature, passive labor market policies, namely unemployment and early retirement benefits, have a negative and significant impact on employment of a magnitude of about 0.4, implying that a one per cent increase would lead to a 40 per cent reduction of employment gaps. For retirement benefits no impact is discernible on unemployment, suggesting that changes in these benefits affect the labor force together with the unemployed; while unemployment benefits have a positive impact on unemployment gaps with a magnitude of about 0.18; but when they are associated with changes in the output gap the impact is slightly higher.[11] For active labor market policies, we find only job rotation to substantially reduce the unemployment gap while training seems to increase employment gaps.

Considering the alternative specification with recessions and recoveries dummies, the coefficients for labor market policies are higher at normal times than in the baseline specification. Also, we find that during recoveries employment services (PES), incentives, and rehabilitation services might work to reduce unemployment gaps (Table 9).

4 Conclusion

This study investigates the impact of fiscal policy instruments on unemployment. In the short run, the theory postulates that unemployment and employment deviations from their long-term trend are tightly linked to output deviation from its long term trend. We find a strong evidence of this relationship. While there is a consensus on the negative impact of recessions on employment, various conjectures exist on (un)employment dynamics during recoveries. We find that recessions exacerbate unemployment over a two–year time period, while the impact of recoveries on unemployment and employment is not significant or worsen labor market outcomes. This may suggest that the job losses of a recession are not reversed during a recovery, defined as the catch-up phase of GDP until its pre-crisis level.

We find that fiscal policy can help close unemployment gaps, through discretionary current spending, especially through spending on goods and services and on public sector wages. We also

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[11] This is because the average value of the output gap is negative and very small (–.0004).

Table 5

What Is the Impact of Statutory Tax Rates on Unemployment and Employment Gaps?

	1 u-gap	2 u-gap	3 u-gap	4 u-gap	5 e-gap	6 e-gap	7 e-gap	8 e-gap
yokun	-0.307***	-0.383***	-0.297***	-0.355***	0.188***	0.344***	0.142***	0.288***
	(0.0661)	(0.0809)	(0.0531)	(0.0689)	(0.0479)	(0.0671)	(0.0455)	(0.0741)
L.PITr	0.00627**				-0.00924**			
	(0.00210)				(0.00401)			
yokunlpitr	-0.166				0.189			
	(0.292)				(0.249)			
L.VATr		0.00458				-0.00847***		
		(0.00290)				(0.00254)		
yokunlvatr		0.276				-0.705*		
		(0.480)				(0.391)		
L.CITr			0.00424				-0.0110**	
			(0.00338)				(0.00417)	
yokunlcitr			-0.169				0.334*	
			(0.177)				(0.188)	
L.SCr				0.00757				-0.0188***
				(0.00495)				(0.00448)
yokunlsstr				0.0254				-0.185
				(0.211)				(0.204)
Observations	281	281	281	232	182	182	182	148
R-squared	0.568	0.564	0.565	0.575	0.551	0.559	0.559	0.591
Number of code	14	14	14	13	14	14	14	13

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: a constant has been included in the regression.

Table 6

What Is the Impact of Statutory Tax Rates on U- and E-gaps during Recessions and Recoveries?

	1	2	3	4	5	6	7	8
	u-gap	u-gap	u-gap	u-gap	e-gap	e-gap	e-gap	e-gap
recess	0.00455*	0.00447*	0.00442*	0.00360	-0.00268	-0.00241	-0.00243	-0.000806
	(0.00226)	(0.00233)	(0.00229)	(0.00265)	(0.00216)	(0.00225)	(0.00212)	(0.00266)
L.recess	0.00612	0.0117**	0.0134	0.0122*	-0.00544	-0.0157***	-0.00553	-0.0136**
	(0.00556)	(0.00394)	(0.0118)	(0.00627)	(0.00418)	(0.00339)	(0.00976)	(0.00493)
recov	-0.00166	0.000323	-0.000131	-0.00136	0.00500	0.00432	0.00411	0.00692
	(0.00450)	(0.00406)	(0.00450)	(0.00526)	(0.00395)	(0.00382)	(0.00403)	(0.00527)
L.recov	0.00393*	0.00645***	0.00626	0.00717**	-0.00432***	-0.00811***	-0.00404	-0.00542**
	(0.00213)	(0.00125)	(0.00495)	(0.00239)	(0.000973)	(0.000763)	(0.00289)	(0.00210)
L.pitr	0.00454				-0.00954			
	(0.00463)				(0.00765)			
L.recovpitr	0.00358				-0.00404			
	(0.00930)				(0.00608)			
L.recesspitr	0.0224***				-0.0241***			
	(0.00713)				(0.00612)			
L.vatr		0.000919				-0.00913		
		(0.00819)				(0.00581)		
L.recovatr		-0.0137				0.0211**		
		(0.0140)				(0.00734)		
L.recessvatr		-0.0183				0.0489***		
		(0.0250)				(0.0131)		
L.citr			0.00399				-0.0114**	
			(0.00495)				(0.00501)	
L.recovcitr			-0.00560				-0.00234	
			(0.0109)				(0.00707)	
L.recesscitr			-0.0114				-0.0110	
			(0.0215)				(0.0182)	
L.sstr				0.000727				-0.0192
				(0.0108)				(0.0174)
L.recovsstr				-0.00619				0.00182
				(0.00825)				(0.00836)
L.recesssstr				-0.00478				0.00742
				(0.0149)				(0.0193)
Observations	281	281	281	232	182	182	182	148
R-squared	0.154	0.143	0.143	0.129	0.164	0.162	0.147	0.140
Number of countries	14	14	14	13	14	14	14	13

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: the regression has been done with country fixed effects; an intercept has been included.

Table 7

What is the Impact of the Tax Wedge on U and E-gaps, Including During Recessions and Recoveries?

	1	2	3	4
	u-gap	u-gap	e-gap	e-gap
yokun	–0.347***		0.293***	
	(0.0622)		*(0.0841)*	
L.taxwed	0.00799		–0.00964	
	(0.00656)		*(0.00649)*	
yokunltaxwed	0.0563		–0.205	
	(0.237)		*(0.270)*	
recess		0.00100		–6.82e-05
		(0.00171)		*(0.00132)*
L.recess		0.0130***		–0.0108**
		(0.00411)		*(0.00459)*
recov		–0.00312		0.00166
		(0.00189)		*(0.00160)*
L.recov1		0.00172		–0.00172
		(0.00138)		*(0.00166)*
L.taxwed		0.0313*		–0.0277**
		(0.0164)		*(0.0134)*
recov1xltaxwed		0.000460		–0.000169
		(0.00527)		*(0.00519)*
recess1xltaxwed		–0.0115		0.0135
		(0.0106)		*(0.0116)*
Observations	393	393	388	388
R^2	0.558	0.126	0.477	0.113
Number of countries	34	34	34	34

Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
Note: the regression has been done with country fixed effects; an intercept has been included.

Table 8

What Is the Multiplicative Impact of Labor Market Policies on Unemployment and Employment Gaps?

	1 u-gap	2 u-gap	3 u-gap	4 u-gap	5 u-gap	6 u-gap	7 u-gap	8 u-gap	9 u-gap	10 e-gap	11 e-gap	12 e-gap	13 e-gap	14 e-gap	15 e-gap	16 e-gap	17 e-gap	18 e-gap
yokun	-0.355***	-0.326***	-0.358***	-0.350***	-0.352***	-0.340***	-0.308***	-0.269***	-0.356***	0.260***	0.228***	0.241***	0.258***	0.243***	0.243***	0.233***	0.195***	0.245***
	(0.0542)	(0.0457)	(0.0330)	(0.0344)	(0.0371)	(0.0420)	(0.0363)	(0.0443)	(0.0356)	(0.0368)	(0.0323)	(0.0285)	(0.0274)	(0.0306)	(0.0278)	(0.0327)	(0.0289)	(0.0294)
L.pes	0.742**									-1.119*								
	(0.363)									(0.564)								
yokunlpes	1.130									-18.60								
	(22.39)									(14.50)								
L.training		0.0337									-0.683**							
		(0.167)									(0.320)							
yokunltraining		-16.22									9.144							
		(10.43)									(13.84)							
L.jobrot			-3.255***									0.978						
			(1.031)									(1.026)						
yokunljobrot			141.7									-79.28						
			(134.2)									(77.62)						
L.incentives				0.398									-0.274					
				(0.337)									(0.383)					
yokunlincentives				-5.416									-28.79					
				(20.07)									(23.70)					
L.rehab					0.373*									-0.496				
					(0.187)									(0.435)				
yokunlrehab					-2.497									-8.282				
					(10.91)									(9.833)				
L.jobcreat						0.170									-0.401			
						(0.221)									(0.407)			
yokunljobcreat						-17.56									-8.428			
						(14.52)									(33.15)			
L.startup							1.379									-1.636		
							(0.852)									(1.321)		
yokunlstartup							-287.4**									44.89		
							(122.8)									(121.6)		
L.benefit								0.182***									-0.416***	
								(0.0508)									(0.0881)	
yokunlbenefit								-9.144***									4.981*	
								(3.036)									(2.798)	
L.ealryret									0.131									-0.423***
									(0.103)									(0.142)
yokunlealryret									2.574									-8.608
									(10.40)									(8.901)
Observations	608	636	649	645	643	641	648	647	649	409	430	443	439	437	439	442	441	443
R-squared	0.537	0.531	0.532	0.531	0.530	0.534	0.552	0.572	0.529	0.464	0.464	0.452	0.460	0.453	0.454	0.454	0.507	0.454
Number of code	31	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: a constant has been included in the regression

Table 9

What Is the Impact of LMPs on Unemployment and Employment Gaps at Times of Recessions and Recoveries?

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	uokun	uokun	uokun	uokun	uokun	uokun	uokun	uokun	uokun	eokun	eokun	eokun	eokun	eokun	eokun	eokun	eokun	eokun
recess	0.00152	0.000856	0.000824	0.000884	0.000925	0.000879	0.000905	0.00126	0.00103	-1.85e-05	0.000295	0.000530	0.000542	0.000490	0.000376	0.000507	0.000180	0.000309
	(0.00135)	(0.00134)	(0.00137)	(0.00141)	(0.00138)	(0.00137)	(0.00135)	(0.00129)	(0.00137)	(0.00122)	(0.00116)	(0.00120)	(0.00122)	(0.00122)	(0.00120)	(0.00119)	(0.00111)	(0.00121)
L.recess	0.0120**	0.00757*	0.00840***	0.00921**	0.00859**	0.00710**	0.00841***	0.00703*	0.00839***	-0.00841*	-0.00552	-0.00624**	-0.00833**	-0.00600*	-0.00624**	-0.00670**	-0.00551	-0.00658**
	(0.00482)	(0.00373)	(0.00275)	(0.00354)	(0.00333)	(0.00333)	(0.00280)	(0.00350)	(0.00302)	(0.00429)	(0.00340)	(0.00268)	(0.00340)	(0.00307)	(0.00293)	(0.00285)	(0.00334)	(0.00287)
recov	-0.00199	-0.00104	-0.00112	-0.00108	-0.000967	-0.000874	-0.000916	-0.00147	-0.00111	0.00170	0.000920	0.000944	0.000829	0.000839	0.000678	0.000790	0.00109	0.000753
	(0.00182)	(0.00187)	(0.00178)	(0.00201)	(0.00194)	(0.00190)	(0.00182)	(0.00186)	(0.00175)	(0.00182)	(0.00177)	(0.00169)	(0.00182)	(0.00182)	(0.00184)	(0.00171)	(0.00188)	(0.00170)
L.recov	0.00451***	0.00264**	0.00266***	0.00396***	0.00331***	0.00285***	0.00204**	0.00307**	0.00306***	-0.00331**	-0.00194	-0.00243***	-0.00251**	-0.00219**	-0.00213**	-0.00203**	-0.00134	-0.00241**
	(0.00104)	(0.00112)	(0.000818)	(0.000941)	(0.000875)	(0.000942)	(0.000859)	(0.00118)	(0.000835)	(0.00121)	(0.00115)	(0.000775)	(0.00104)	(0.000850)	(0.000832)	(0.000901)	(0.00138)	(0.000886)
L.pes	1.435*									-1.401*								
	(0.760)									(0.729)								
L.recovpes	-1.007**									0.557								
	(0.464)									(0.473)								
L.recesspes	-1.295									0.562								
	(1.511)									(1.207)								
L.training		0.0307									-0.749**							
		(0.271)									(0.290)							
L.recovtraining		0.0433									-0.227							
		(0.337)									(0.366)							
L.recesstraining		0.421									-0.487							
		(0.627)									(0.844)							
L.jobrot			-3.767**									1.821						
			(1.461)									(2.023)						
L.recovjobrot			1.252									2.611						
			(4.275)									(2.050)						
L.recessjobrot			3.952									-3.493						
			(2.900)									(3.851)						
L.incentives				0.506									-0.405					
				(0.534)									(0.597)					
L.recovincentives				-0.932***									0.155					
				(0.321)									(0.378)					
L.recessincentives				-0.567									2.059					
				(0.769)									(1.270)					
L.rehab					0.404									0.0526				
					(0.350)									(0.828)				
L.recovrehab					-0.583**									-0.304				
					(0.256)									(0.236)				
L.recessrehab					-0.146									-0.365				
					(0.698)									(0.524)				
L.jobcreat						0.162									-0.545			
						(0.306)									(0.371)			
L.recovjobcreat						-0.118									-0.433			
						(0.514)									(0.570)			
L.recessjobcreat						1.305									0.175			
						(0.987)									(1.931)			
L.startup							-0.857									-0.707		
							(1.891)									(2.303)		
L.recovstartup							3.464									-1.684		
							(2.134)									(1.890)		
L.recessstartup							0.314									2.804		
							(3.626)									(3.286)		
L.benefit								0.345***									-0.536***	
								(0.0659)									(0.130)	
L.recovbenefit								-0.0953									-0.0161	
								(0.0735)									(0.133)	
L.recessbenefit								0.0593									0.0369	
								(0.138)									(0.177)	
L.ealryret									0.542**									-0.822**
									(0.217)									(0.354)
L.recovealryret									-0.105									-0.175
									(0.230)									(0.347)
L.recessealryret									0.203									0.409
									(0.528)									(0.562)
Observations	608	636	649	645	643	641	648	647	649	409	430	443	439	437	439	442	441	443
R-squared	0.143	0.113	0.115	0.116	0.114	0.120	0.114	0.164	0.116	0.126	0.107	0.097	0.112	0.098	0.098	0.099	0.162	0.105
Number of countries	31	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note:the regression has been done with country fixed effects; an interecept has been included in the regression.

find that cutting statutory tax rates reduces unemployment in the short term, and that the positive impact of cutting social contributions on employment is higher than the one of consumption taxes (VAT), suggesting that fiscal devaluations (conducted through a reduction in social contributions and an increase in consumption taxes) can have a positive impact on employment. Consistent with the relevant literature, unemployment benefits and early retirement benefits worsen unemployment, and evidence on active labor market policies is mixed. Finally, we find that the impact of discretionary spending on the labor market does not change at different output's levels relative to its long term trend. Also, discretionary spending, social contributions and corporate income taxes have no different impact on the labor market at times of recessions and recoveries. On the contrary, personal income and value added tax rates, and some specific active labor market policies affect labor market outcomes differently at times of recessions or recoveries.

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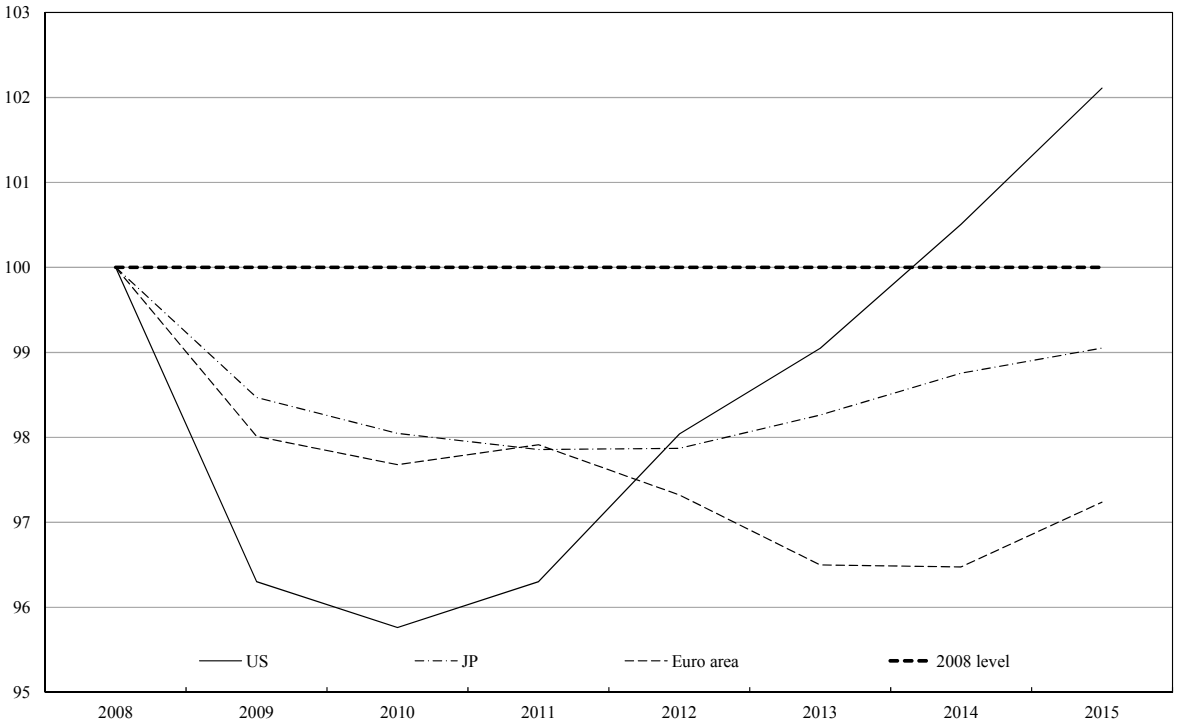
COMMENT TO "A FISCAL JOB? AN ANALYSIS OF FISCAL POLICY AND THE LABOR MARKET" BY ELVA BOVA, CHRISTINA KOLERUS AND JULES S. TAPSOBA

Gilles Mourre[*]

The paper is very rich and offers two complementary focuses. The first one regards the analysis of the cyclical pattern of employment and unemployment, in particular of its asymmetry. This analysis echoes the "jobless recovery" literature and is particularly topical in this time of nascent and moderate recovery (see Figure 1). The second focus is on the impact of public finances on the business cycle and the identification of fiscal variables apt to boost a recovery. This perspective is relevant in the current context of fiscal constraints in many countries, highlighting the importance of quality of public finances. This discussion sets out the main findings of the paper and continues with general remarks. Then, it presents some caveats or room for improvement.

Figure 1

Employment Level
(2008=100)



Source: AMECO (Autumn 2013).

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The views expressed therein are those of the author only and do not necessary reflect those of the European Commission.

Table 1

Impact of Fiscal Variables

Increasing discretionary current spending
Spending on goods and services (++)
Public sector wages (+)
Unemployment benefits (–)
Early retirement benefits (–)
Active labor market policies (?)
Cutting tax rates
Labour taxation (social contributions on employment) (++)
Consumption taxes (VAT) (+)
Therefore: **fiscal devaluation** (+)
Personal income tax (+)
Corporate income tax (+)
Fiscal policy can help close the employment gap
Effect unchanged in recessions and recoveries w.r.t. normal times
Spending on goods and services (++)
Public sector wages (+)
Unemployment benefits (–)
Early retirement benefits (–)
Social contributions on employment) (++)
Corporate income tax (+)
Different in recession and recoveries w.r.t. normal times
Consumption taxes (VAT) (+)
Personal income tax (+)
Active labor market policies (?)

1 Main findings

The paper confirms the validity of the Okun's law, by finding a stable relationship between unemployment/employment gaps and output gaps across different specifications. It also shows its asymmetric pattern. Recessions cause a widening of unemployment gaps during a time horizon of up to two years, while the cumulated impact of recoveries is not stable.

The paper also shows that fiscal policy can help close the employment gap. Table 1 summarises the main findings related to the impact of fiscal variables.

2 General remarks

The topics covered by the paper are very relevant. Its findings are in line with the literature. The paper is well drafted, albeit too concise sometimes. It highlights key policy messages, based on sound intuitions rather than econometric sophistication.

The approach of the paper rests on macroeconometric panel analysis, covering many relevant fiscal variables (see Table 1 above) in a holistic view. The empirical framework is fairly simple but uses a relatively large numbers of empirical observations (although not for all variables), covering 25 years over 32 OECD countries.

The two specifications used are:

- Okun's law (U, E) + fiscal variables + interacted terms
  $U_t - U_t^* = \beta_o + \beta_1(Y_t - Y_t^*) + \beta_2 f(X_t) + \beta_3(Y_t - Y_t^*) f(X_t)$
- Dummy variables (with lags) of recessions and recoveries + fiscal variables + interacted terms
  $U_t - U_t^* = \beta o + \beta 1(Rec) + \beta 2 f(Xt) + \beta 3 f(Xt)\,(Rec) + \beta 4 f(Xt)\,(Recov)$

3 Caveats and room for improvement

Following are four main points that may deserve specific discussions or further work.

3.1 Running robustness checks on the indicators of business cycle

The definition of the cycle is convenient but rough, namely the use of the HP filters, while heated debates in some countries arose about the true magnitude of the business cycle (e.g., for Spain). There is a need to cross-check the results using NAWRU and potential output (based on a production function approach instead of a purely statistical filtering. The use of annual data is not fully adequate to a recession/recovery analysis, where quarterly data preferable when it comes to computing the output gap. Lastly, alternative definitions of discretionary measures could be used. While the paper uses a top down approach (residual from simple fiscal rules), it could be complemented by a bottom up perspective, using the sum of legislated changes in spending.

3.2 Acknowledging the microeconomic dimension and the quality of policy design, not captured by marcro approaches

The macro-approach needs to be qualified. Beyond the monetary value of expenditures and revenue, the micro policy design should be taken into account. The importance of micro effects should be recalled shortly in the paper.

For revenue, the detailed policy design matters a lot:

- Targeting tax cuts on the most vulnerable groups (tax shift focused on the low-skilled/low wage earners and second earners)
- Design of tax bases (e.g., Keen, 2013, for the structure of VAT, exemption and reduced rates),

- Interaction with tax compliance (some increases in statutory rates may stimulate grey economy and blur the frontier unemployment/employment in absence of good tax governance).

For expenditures, the policy design matters a great deal as well, explaining some unclear macro results (Arpaïa and Mourre, JES, 2009):

- Role of the incentives (activation mechanism and monitoring in ALMP, duration and job-search criteria for unemployment benefits),
- Targeting expenditures on the most vulnerable groups (employment support, in-work benefits),
- Administrative capacity for efficient implementation (public employment services, vocational training).

3.3 Fleshing out the very brief discussion of fiscal devaluation

The paper could include a short discussion on tax shift, which recalls its two main dimensions:

- supply side effects (increase incentives to work) operating mainly in the long run but also in the short term. This corresponds to the structural impact of a tax shift,
- short term competiveness effects or "fiscal devaluation" effect. It operates through cuts in labour costs, with increase in labour demand, as claimed in the paper, but also through terms of trade effect since exports are VAT-free.

The fiscal devaluation impact is not very strong, if many countries are applying it at the same time (beggar-thy-neighbour policy). Moreover, fiscal devaluation is perhaps less suited in times of recession or low business cycle, while it is possibly better suited in case of structural loss in trend output, due to cumulated loss of competiveness.

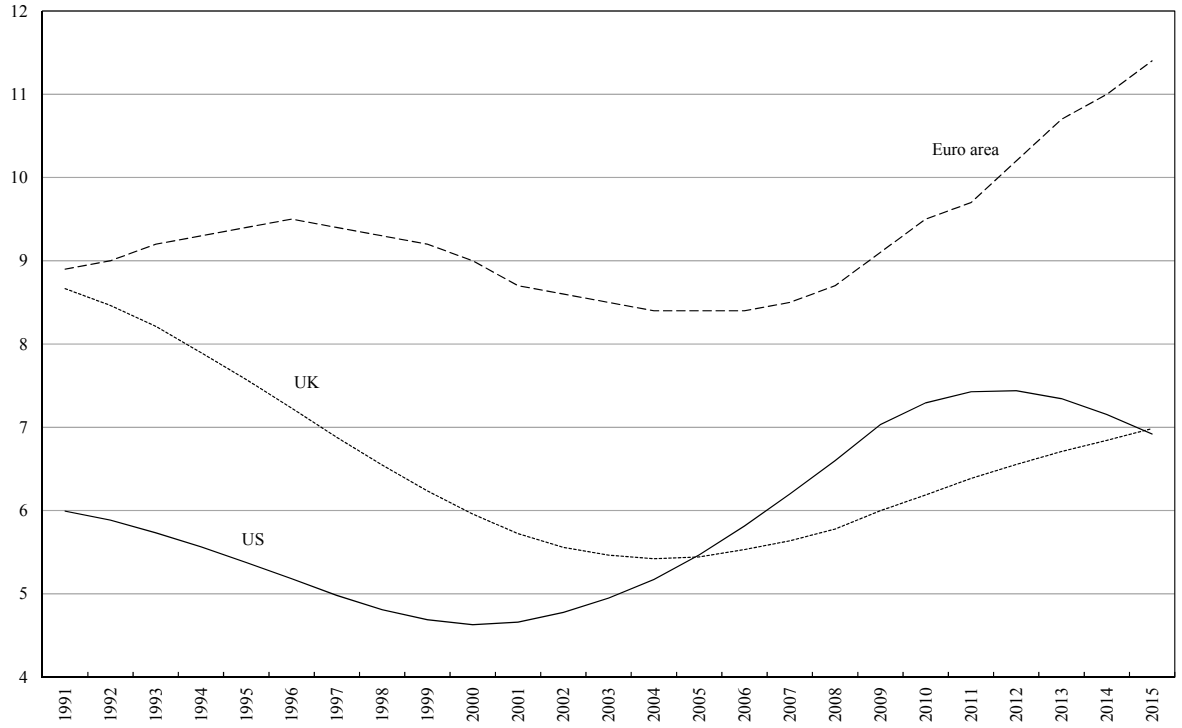
3.4 The development of (un)employment gap in recovery: checking if the results hold in different country groups

The evidence supporting an unstable effect of recovery on (un)employment gaps is a bit thin. A possible explanation (not highlighted in the paper) is the great deal of uncertainty at times of nascent recovery. The latter is also established statistically with some delay. This encourages prudent behaviour by firms regarding hiring and investment.

As a concrete suggestion, the paper may differentiate by group of countries, to see if the pooling assumption is correct. This would be economically justified by the difficulty to disentangle cycles from trends and the existence of very different trends across (groups of) countries. For instance, different results are expected for European Countries, compared with other advanced economies and emerging economies. In the euro area, the structural unemployment, captured by the NAWRU, is higher than that of the US or UK and on an upward trend, as shown in Figure 2.

Figure 2

NAWRU



Source: AMECO (Autumn 2013).

DISAPPOINTING PERFORMANCE OF PENSION PRIVATIZATION IN EASTERN EUROPE

Nikola Altiparmakov[*]

During first 15 years of their existence, mandatory private pension funds in Eastern Europe have realized rates of return that were lower and more volatile than the corresponding Pay-As-You-Go rates of return, even before the emergence of global financial crisis. Suboptimal investments in domestic government bonds dominated pension portfolios in many countries. Econometric analysis suggests that pension privatization failed to produce anticipated side-effect benefits, such as increased national saving or accelerated economic growth. If pension privatization structural weaknesses are unlikely to be resolved successfully then implementing reform reversals could improve short-term fiscal balance without deteriorating long-term pension sustainability.

1 Introduction

While transitioning from centrally-planned to free-market economies, many Eastern European countries opted for radical *pension privatization* reforms around the turning of the millennium. This approach entailed partial termination of existing public Pay-As-You-Go pension schemes and introduction of mandatory private pension funds in their place, the so-called *second pension pillar*. The professional public at the time was strongly divided regarding the feasibility of this reform approach. While the World Bank (1994) favored pension privatization and argued that it would not only enable future beneficiaries to obtain higher returns on their pension contributions but would also increase national saving and accelerate economic growth, opponents challenged most of the promised reform benefits (Beattie and McGillivray, 1995; Stiglitz and Orszag, 2001; Barr, 2000).

In this paper we analyze initial reform results and experiences from Eastern European countries 15 years after the start of pension privatization trend. We show that most of the reform expectations have thus far remained unfulfilled. Pension privatization failed to produce anticipated side-effect economic benefits such as improved national saving or accelerated economic growth. Most disappointingly, second pillar returns were lower and more volatile than PAYG returns in most Eastern European countries, even before the occurrence of global financial crisis in 2008. Besides known pension privatization weaknesses, such as high operating costs and inadequate organization of the payout phase, we identify the prevalence of domestic government bonds in second pillar portfolios as a major structural deficiency of pension privatization in Eastern Europe.

Faced with the absence of positive economic effects and the need to finance significant transitional deficits, many Eastern European countries have recently decided to partially or completely reverse pension privatization reforms. Concerns have been raised that these reform reversals represent short-sighted and irresponsible policies that deteriorate long-term pension sustainability. However, we show that poor second pillar performance makes it possible for reform reversals to improve short-term fiscal position without necessarily deteriorating long-term sustainability. Consequently, recent economic crisis should not be considered a major driver behind

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reform reversals but merely a catalyst that highlighted and exacerbated existing pension privatization structural deficiencies (Fultz, 2012). These deficiencies need to be resolved in order to avoid maintaining a suboptimal pension system design throughout the 21st century.

This paper is organized as follows: Section 2 describes pension privatization dynamics in Eastern Europe and Section 3 shows that second pillar returns were lower and more volatile than PAYG returns. In Section 4 we explain that second pillar portfolios were often dominated by the inefficient investments in domestic government bonds. Econometric analysis in Section 5 shows that pension privatization failed to produce statistically significant improvements in national saving or economic growth. In Section 6 we argue that concerns over recent reforms reversals have not been backed with solid economic analysis, while the concluding remarks are presented in Section 7.

Appendix A briefly describes political aspects of recent reform reversals in several countries. Appendix B presents annual data on the performance of mandatory private pension funds in Eastern Europe. Appendix C explains that stark differences between this paper and World Bank policy conclusions can at least partly be explained by the fact that recent World Bank studies have been based on incorrect and upwardly biased data on the performance of mandatory private pension funds in Eastern Europe.

2 Description of Pension Privatization in Eastern Europe

Reforming countries opted for scaling down of existing Bismarck-style public PAYG systems and partial pension privatization approach whereby one quarter to one third of existing PAYG contribution was diverted from the public pension system to the newly created system of mandatory private pension funds (MPFs) based on full funding and individual accounts. This *carve-out approach* to pension privatization created a huge revenue shortfall in the public PAYG system, the so-called *transitional deficit*, which has to be financed over the next four to five decades until existing accrued PAYG liabilities are serviced in full.[1]

Since inception, many reforming countries have been progressively increasing the second pillar contribution rate over the years, thus consequently increasing the revenue shortfall in the public PAYG system. This trend lasted until 2008 when the global economic crisis triggered fiscal destabilization of many Eastern European economies which had to cope not only with the economic recession but also with financing significant pension privatization transitional deficits which in 2010 equaled 1.1 per cent of GDP in Estonia, 1.2 per cent of GDP in Slovakia, 1.4 per cent of GDP in Hungary, 1.7 per cent of GDP in Poland and 2.3 per cent of GDP in Latvia (Egert, 2012). Faced with severely strained public finances, several reforming countries – Poland, Latvia, Lithuania, and Slovakia – have decided to permanently reduce the amount of pension contributions diverted to MPFs. Hungary decided to nationalize MPFs and completely terminate the second pension pillar in 2011.

3 Performance of mandatory private pension funds in Eastern Europe

The *Samuelson-Aaron Theorem* explains that in a PAYG system contributors earn a rate of return equal to the GDP growth g while contributors in funded systems earn the rate of return r on

[1] The carve-out approach should be contrasted with the *add-on pension privatization* where MPFs' contributions are legislated on top of existing PAYG contributions, thus avoiding the emergence of transitional deficits. The add-on approach is however feasible only in countries with modest Beveridge-style public pension systems, such as Australia or Denmark.

Table 1

Dynamics of Pension Privatization in Eastern Europe

Country	Pillar 2 Inception	Pillar 2 Contribution Rate *(percent of wage)*		
		At Inception	2007	2012
Hungary	Jan 1998	6.0	8.0	0.0
Poland	Jan 1999	7.3	7.3	2.3
Latvia	Jul 2001	2.0	8.0	2.0
Bulgaria	Apr 2002	2.0	5.0	5.0
Croatia	May 2002	5.0	5.0	5.0
Estonia	Jul 2002	6.0	6.0	6.0
Lithuania	Jun 2004	2.5	5.5	1.5
Slovakia	Apr 2005	9.0	9.0	4.0
Macedonia	Feb 2006	7.4	7.4	7.4
Romania	May 2008	2.0	n.a.	3.5
Average		4.9	6.8	3.7

Notes: Estonia is the only country which partially relied on the add-on approach – MPFs' contributions totaled 6 per cent of gross wages with 4 per cent being diverted from the PAYG system and 2 per cent representing additional contributions for workers participating in the second pillar. Lithuania implemented a quasi-mandatory second pillar whereby workers were allowed to voluntary opt-in but could not opt-out afterwards.

accumulated pension assets (Samuelson, 1958; Aaron, 1966). Funded pension systems are thus more efficient, in a Pareto sense, and provide higher pension payments for the same amount of contributions made if and only if $r > g$. It should be stressed that the Samuelson-Aaron criterion is directly applicable only in the case of add-on pension privatization.[2] Due to the existence of accrued PAYG liabilities (*implicit pension debt*) and transitional deficits, it is impossible to implement carve-out pension privatization that would constitute a Pareto improvement for all generations (Breyer, 1989).[3]

Pension privatization could nonetheless be justified if the $(r - g)$ spread is significant and social preferences of existing generations are such that the welfare of future generations is highly valued.[4] A major motivation for implementing pension privatization was precisely the fact that

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[2] As Settergren and Mikula (2005) stress, the Samuelson-Aaron theorem holds exactly only for populations in a steady state. Increasing life expectancy, present in most countries, actually makes the PAYG IRR slightly larger than the GDP growth. For simplicity reasons, we will ignore this issue in this paper.

[3] A few authors have tried to identify Pareto transitions from PAYG to funded pension systems. In doing so, they have either relied on efficiency-driven tax reform (Kotlikoff, 1998; Breyer and Straub, 1993) or on positive externalities to capital accumulation (Belan *et al*., 2000). If such Pareto improvements would indeed be feasible in reality, they should be undertaken irrespective of pension reform efforts.

[4] Emergence of PAYG systems in the early 20th century seems to imply the opposite in social preferences – the welfare of existing generations had been given precedence over the welfare of future generations.

Table 2

Initial Performance of Second Pension Pillar in Eastern Europe
(percent)

Country	Second Pillar Inception	Since Inception Until end-2007			Since Inception Until end-2012			Standard Deviation	
		2nd Pillar	GDP	Diff	2nd Pillar	GDP	Diff	2nd Pillar	GDP
Hungary	Jan 1998	2.6	3.6	–1.0	1.4	2.4	–0.9	9.3	3.1
Poland	Jan 1999	8.2	4.1	4.1	5.3	3.9	1.5	9.0	1.8
Latvia	Jul 2001	–2.4	8.9	–11.4	–1.6	3.8	–5.4	8.8	8.2
Bulgaria	Apr 2002	4.3	6.1	–1.8	0.3	3.5	–3.3	9.5	3.9
Croatia	May 2002	4.5	4.8	–0.4	2.6	1.6	1.0	7.3	4.1
Estonia	Jul 2002	3.4	8.1	–4.7	–0.2	3.7	–3.9	11.6	7.2
Lithuania	Jun 2004	2.4	8.3	–5.9	–0.1	3.1	–3.1	12.2	7.4
Slovakia	Apr 2005	1.3	8.7	–7.4	–1.3	4.3	–5.6	3.8	4.7
Macedonia	Feb 2006	2.7	5.6	–2.9	1.8	2.9	–1.1	8.8	2.7
Romania	May 2008	–	–	–	5.7	–0.2	5.9	4.4	5.1
AVERAGE		3.0	6.5	–3.5	1.4	2.9	–1.5	8.5	4.8

Notes: Authors calculations based on official data from national supervisory authorities. Average performance is based on geometric averaging. Calculations appropriately take into account cases where second pillar inception was in mid-year. Data for Hungary concludes with 2010.

Table 3

Portfolio Structure of Mandatory Private Pension Funds
(end-2007)

Country	Assets *(percent of GDP)*	2nd Pillar Portfolio Structure			
		Gov't Bonds	**Equities**	**Bank Deposits**	**Other**
Hungary	7.8%	58.5%	32.8%	0.9%	7.9%
Poland	11.9%	59.9%	34.9%	2.9%	2.3%
Latvia	1.6%	33.4%	24.3%	42.1%	0.2%
Bulgaria	2.1%	18.5%	28.3%	16.2%	37.0%
Croatia	6.7%	63.6%	26.7%	2.2%	7.4%
Estonia	4.5%	31.0%	40.0%	8.0%	21.0%
Lithuania	1.7%	29.6%	39.3%	17.5%	13.6%
Slovakia	2.8%	49.6%	15.1%	30.5%	4.8%
Macedonia	0.9%	59.9%	21.6%	18.5%	0.0%

Source: Altiparmakov (2011).
Note: We analyze end-2007 data since later data could be considered biased due to the emergence of global financial crisis. *Other assets* include corporate and municipal bonds, and also "investments abroad" for countries where these investments are treated separately (Bulgaria and Croatia).

(gross) returns on capital are in general tangibly higher than GDP growth.[5] At the time pension privatization was being implemented in Eastern Europe, most simulations assumed that mandatory private pension funds' net returns would outperform GDP growth by 1.5 to 2 percentage points in the long term (World Bank, 2013, p. 61). However, early empirical evidence from Eastern Europe in Table 2 suggests that net second pillar returns were mostly lower than GDP growth.[6]

Data for the first 15 years of pension privatization in Eastern Europe reveals a very disappointing performance of mandatory private pension funds. Second pillar returns in most countries were lower than GDP growth, even before the global financial crisis. It is especially disappointing that MPFs in Estonia, Latvia, Lithuania and Slovakia posted negative real returns, while the returns in Bulgaria were barely positive. Polish second pillar seems to represent a major exception with returns tangibly higher than GDP growth both before and after the emergence of the global financial crisis.[7]

While realized returns were much lower than expected, the volatility of second pillar returns is, in line with expectations, tangibly higher than GDP volatility.[8] This echoes the fact that returns to capital are inherently more volatile and risky thus requiring an appropriate downward risk adjustment when being compared against less volatile PAYG returns (Geanakoplos *et al.*, 1998; Orszag and Stiglitz, 2001). It should be stressed that poor second pillar performance was not driven by the global financial crisis since even before the crisis only Polish second pillar funds were able to outperform GDP growth.[9] In order to analyze this issue more carefully we break down MPFs' investment portfolios into four major asset classes.

We can notice that the majority of MPFs' assets in Central Europe have been invested in government bonds which, at the end of 2007, accounted for over 50 per cent of second pillar portfolios. Investments in government bonds have been much less pronounced in the Baltic States, reflecting, *inter alia*, more liberal regulations with respect to investments abroad. On the other hand, Central European countries adopted strict limitations to investing abroad, hoping to use most of the accumulated mandatory retirement saving to finance domestic investments and accelerate economic growth.

Investments in government securities seemed to solve both the investment challenges of private pension funds and the government financing problems. Faced with shallow and undeveloped capital markets in transitioning Eastern European economies on one side and limitations on investments abroad on the other, government bonds represented a natural investment choice for MPFs. At the same time, Eastern European governments have realized that transitional deficits have been seriously underestimated and neglected during the preparatory stage of pension privatization (Drahokoupil and Domonkos, 2012). Faced with the task of financing significant

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[5] Opponents argued that although gross rates of return on capital are in general higher than GDP growth, one can not *a priori* justify pension privatization due to high management costs of private pension funds, appropriate risk adjustment and the need to finance accrued PAYG liabilities (Barr, 2000).

[6] Second pillar returns in Table 2 could be more precisely described as "semi-net return" since they measure gross returns net of annual management fees but gross of any contribution and exit fees. These fees were not deducted in order to avoid possible methodological ambiguities.

[7] Romania has only recently introduced second pillar, after the emergence of global financial crisis, which makes the data for this country statistically unreliable for extrapolating long-term trends or drawing firm conclusions. Also, the Croatian data is somewhat upward biased due to politically motivated inflation of second pillar returns in the inception year – government bonds were sold with an extraordinarily high discount yielding a 15 per cent real rate of return in the inception year (Matkovic *et al.*, 2009).

[8] Low volatility of returns in Romania and Slovakia are exceptions. As mentioned, second pillar has been introduced in Romania after the emergence of global financial crisis and cannot be considered representative. Since 2009 MPFs in Slovakia were required to cover, from own capital, any negative nominal returns to retirement savings. This stringent regulation has induced pension funds to mostly invest in low-risk assets with a correspondingly low, even negative, level of real returns.

[9] Bielecki (2011) shows that second pillar returns net of all fees were actually lower than PAYG returns in Poland over the 1999-2010 period. As mentioned, we will not be deducting front-loaded contribution fees from second pillar returns in this article to avoid any methodological ambiguities.

transitional and budget deficits, issuing bonds and borrowing from cash-rich MPFs was a quick-fix solution for government finances. These short-term partial solutions however gave rise to a suboptimal allocation of resources from the overall national perspective.

4 Disguised-PAYG financing mechanism

For decades, government bonds have represented a crucial investment instrument for pension funds in most developed countries. However, the pension privatization environment in Eastern Europe is not directly comparable to that of developed countries, not the least because participation in private pension funds is voluntary in most developed countries implying different intra- and inter-generational distribution of risks and benefits compared to the mandatory carve-out participation in Eastern Europe. In the context of the carve-out pension privatization, beneficiaries' welfare would have been higher if MPFs assets invested in government bonds had not been diverted from the PAYG system in the first place. Diverting first pillar PAYG contributions to the second pillar only to have MPFs invest the money back to the government represents a very expensive form of PAYG financing which we will refer to as *disguised-PAYG* financing.

Traditional PAYG financing strictly dominates disguised-PAYG financing due to hefty second pillar management fees. In particular, (un-weighted) average contribution fee in Eastern Europe stood at 2 per cent in 2012 while the average management fee was 0.8 per cent.[10] Inferiority of disguised-PAYG financing is most obvious exactly in the case of Poland which runs an NDC first pension pillar.[11] In this case beneficiaries could have earned a notional rate of return in the first pillar NDC accounts by about 0.5 percentage points higher than what they have been earning in the second pillar DC accounts.

It should be stressed that disguised-PAYG financing is not suboptimal only in countries running an NDC first pension pillar – it applies to all instance of carve-out pension privatizations since NDC systems, point systems and traditional defined-benefit systems are basically equivalent forms of PAYG financing (Whitehouse, 2006). Disguised-PAYG financing thus represents a major pension privatization deficiency in Eastern Europe which not only reduces beneficiaries' welfare but also increases public debt (Section 6).[12] In particular, at the end of 2012 government debt securities accounted for 65 per cent of second pillar assets in Croatia, Slovakia and Macedonia and 75 per cent in Romania.[13]

The problems of disguised-PAYG financing and low second pillar returns bellow GDP growth have already been documented in the literature, for example Impavido and Rocha (2006) in the case of Hungary. However, these were mostly considered as isolated cases or exceptions to the general trend of impressive second pillar performance. In fact, the World Bank (2009, Table 2, p. 7) incorrectly asserts that second pillars in Eastern Europe were able to outperform GDP growth before the global financial crisis, when we can clearly see from Table 2, and also from Appendix C – that quite the opposite was the case.

Disappointing second pillar returns have lead many countries to amend investment regulations and consider more liberal limits to investments abroad, expansion of alternative risk-return portfolios and introduction of life-cycle investment strategies. However, from national

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[10] It should be remembered that management fees reduce pension saving exponentially – 1 per cent annual management fee reduces any pension savings by 20 per cent over the 40-year working career (Whitehouse, 2001).

[11] NDC stands for Notional Defined Contribution – a PAYG scheme that mirrors the functioning of private fully-funded defined contribution pension funds.

[12] Disguised-PAYG financing could also increase labor market distortions since it replaces pension contributions with tax levies and thus completely breaks the link with potential pension benefits.

[13] Extremely high second pillar returns in Romania in Table 2 are also due to disguised-PAYG financing.

point of view, the crucial aspect of second pillar portfolios that should be addressed is the presence of suboptimal disguised-PAYG financing.

Groundbreaking pension privatization in Chile was preceded with draconian austerity measures that produced a surplus of 8 per cent of GDP in the non-pension part of the public sector (Arenas De Mesa and Mesa-Lago, 2006). This huge surplus allowed for non-debt financing of transitional deficits and precluded the dominance of disguised-PAYG financing. However, other reforming countries were mostly unsuccessful at implementing appropriate austerity measures to support pension privatization "resulting to a large extent on a debt-financed transition and relatively large issues of Government bonds, which ended up in the portfolios of pension funds" (Impavido and Rocha, 2006, p. 8).[14]

Lack of political support for strict and long lasting austerity measures required to preclude the emergence of disguised-PAYG financing severely undermines the feasibility of carve-out pension privatization. A "modest second pillar, financed by about 3 percentage points diverted from the first pillar, seems to be a maximum that is politically feasible in Central-Eastern European countries" (Drahokoupil and Domonkos, 2012). However, such a modest second pillar would represent a poor diversification of retirement provision and would likely be inefficient due to relatively high management costs. If current generations are not willing or not able to make a sacrifice big enough to enable the creation of a meaningful second pension pillar, then one should consider alternative reform approaches.

For example, Eastern European countries with good public governance record could consider establishing a public pension reserve fund in line with best international practices. This approach would enable the minimization of management costs even at a relatively low level of annual funding commitments and would also solve the second pillar payout phase problems.[15] Countries with less than satisfactory quality of public governance could consider the option of public debt repayment, which represents an alternative form of intergenerational transfer from current to future generations (Diamond, 1965). Further strengthening of voluntary retirement savings is another option Eastern European countries have at their disposal. However, the workers should not be allowed to choose between public PAYG provision and private second pillar since common citizens neither have technical expertise nor relevant information to make a rational welfare-maximizing decision in this case. For example, for many older workers which voluntarily joined Hungarian second pillar in 1998 the ultimate accumulated second pillar savings were lower than the foregone PAYG benefits.

5 Macroeconomic side-effects of pension privatization

In this section we use reduced-form regressions to investigate whether pension privatization produced statistically significant improvements in the national saving rate or the rate of economic growth. We use a balanced panel of annual data over the 1998 to 2012 period for 10 Eastern European countries for which comparable macroeconomic data was available from the Eurostat database. Pension privatization is modeled by the percentage points of pension contributions diverted from the PAYG system into the second pillar in any particular year. This allows us to

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[14] Disguised-PAYG financing described in this paper is actually a special case of a more general issue: if carve-out pension privatization is not accompanied with appropriate austerity measures to cover transitional deficits then long-term pension sustainability would be improved only if second pillar returns are higher than both GDP growth *and* the cost of government borrowing required to finance the transitional deficits.

[15] Public reserve fund might be an appealing alternative to maintaining a next to meaningless second pillar in Poland with the reformed contribution rate set at only 2.9 per cent of wage. Especially since Poland already has a Demographic Reserve Fund whose operations could be modernized and expanded for this purpose.

Table 4

National Saving Regression Results

Variable	Const	Growth Rate	Unemployment	Inflation	Investment	Second Pillar
Value	13.39954	–0.066835	0.180773	–0.116444	0.208760	0.051941
p-stat	0.0000	0.1720	0.0273	0.0019	0.0030	0.6147

Note: R-squared value is 0.651610, adjusted R-squared is 0.615481

capture the variability of second pillar size over different countries as well as the second pillar variability within the country over the years. Panel regression with fixed country effects was used to estimate second pillar effects.[16]

Table 4 presents results from the national saving regression. GDP growth rate, unemployment rate, inflation and domestic investment (as per cent of GDP) were used as control variables. Except for the GDP growth rate, all other control variables are found to be statistically significant and broadly in line with expectations – higher inflation rate was found to discourage saving, uncertainty associated with higher unemployment was found to increase (precautionary) saving, while domestic investment was found to be positively correlated with national saving rate in line with Feldstein-Horioka puzzle. The effect of pension privatization on national saving rate was found to be insignificant. The emergence of disguised-PAYG financing no doubt contributed to the absence of positive effects on national saving since debt financing of transitional deficits is unlikely to increase national saving (World Bank, 2014, p. 117).

Dragutinovic-Mitrovic and Ivancev (2010) analyze growth performance of Eastern European countries in the second decade of transition and find statistically significant effects of macroeconomic stabilization policies (captured by the rate of inflation), public sector reforms (captured by the share of government expenditures in GDP) and foreign trade liberalization (captured by the share of imports and exports in GDP). We extend their model with the second pillar explanatory variable, see Table 5. All the control variables are found to be statistically significant and in line with expectations. The effect of pension privatization on economic growth was found to be negative and statistically significant. Testing alternative regression specifications can produce one or two specifications with a statistically insignificant effect of pension privatization. However, no regression specification has been found to suggest statistically significant positive effects of pension privatization. Thus, we can conclude that the absence of positive effects of pension privatization on economic growth is a fairly robust empirical result.

Empirical analysis in this section suggests the absence of macroeconomic improvements associated with pension privatization in Eastern Europe. This conclusion is in line with earlier findings of the World Bank Independent Evaluations Group (2006) that secondary objectives of pension privatization "have remained largely unmet".[17] The absence of side-effect benefits further added to the discontent over disappointing second pillar performance, thus reinforcing the likelihood of reform reversals.

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[16] Countries included in the panel analysis are Hungary, Poland, Latvia, Estonia, Lithuania, Romania, Bulgaria, Slovakia, Czech Republic and Slovenia.

[17] World Bank Independent Evaluations Group reached this conclusion mostly based on the experiences from Latin America. This article shows experiences from Eastern Europe portray a similar picture.

Table 5

Economic Growth Regression Results

Variable	Const	EU-15 Growth Rate	Investment	Foreign Trade	Government Expenditures	Inflation	Second Pillar
Value	21.06608	1.248551	0.256400	0.034820	–0.685004	–0.099223	–0.292287
p-stat	0.0001	0.0000	0.0001	0.0256	0.0000	0.0135	0.0060

Note: R-squared value is 0.715471, adjusted R-squared is 0.683620.

6 Concerns over reform reversals

Faced with the disappointing second pillar returns, the absence of side-effect economic benefits and the need to finance significant transitional deficits amid global economic recession, many Eastern European countries implemented reform reversals in recent years. Estonia temporarily reduced second pillar contribution rate from 6 to 2 per cent over the 2009-2011 period. Latvia, Lithuania and Slovakia opted for permanent reductions and down-sizing of second pension pillars (Table 1). Poland legislated provisions to prevent the emergence of disguised-PAYG financing in the future and has reduced the second pillar contribution rate from 7.3 to 2.9 per cent in 2013. Hungary decided to completely terminate and nationalize second pension pillar in 2011.

Several international institutions, including the World Bank and OECD, have raised concerns that reform reversals represent short-sighted policies that improve short-term fiscal position at the cost of deteriorating long-term pension sustainability. In particular, World Bank (2014, p. 145) states that reversing pension privatization "addresses the short-term problem at the cost of significantly worsening the long-term fiscal situation, reducing the future pensions of individuals, or a combination of both". In this section we evaluate the validity of these concerns and investigate the arguments behind them.

When analyzing second pillar retrenchment in Poland, OECD notes that "the increased role of the public pay-as-you-go system in a context of rapid population ageing may further lower future replacement rates" (OECD, 2014, p. 18). However, it seems unlikely that terminating second pillar disguised-PAYG financing and replacing it with the traditional first pillar NDC PAYG financing would result in lower future replacement rates. In fact, the elimination of hefty second pillar management fees should improve pension system sustainability without reducing future entitlements, or equivalently, pension entitlements could be improved without deteriorating long-term sustainability. OECD concerns are based on the OECD Working Paper (Egert, 2012) which makes alternative simulations 200 years into the future and identifies that Polish reform reversal might deteriorate pension system sustainability in some (pessimistic) scenarios. However, it seems ill-advised to base the assessment on inherently unreliable 200-year long projections when the crucial information on Polish reform reversal is already available at hand. If disguised-PAYG financing is indeed inferior to traditional PAYG financing, as we have been suggesting in this paper, then Polish reform reversal can not lead to the deterioration of long-term sustainability under any simulation scenario.

World Bank (2014, p. 146) states that the "asymmetry in the treatment of explicit and implicit debt is at the heart of the incentives for reversing pension reforms". It should be noted that the asymmetrical treatment is well deserved due to significant differences between the two and the fact that implicit pension debt is likely to be more easily manageable than explicit public debt (Franco, 1995). Nonetheless, even if implicit and explicit debt were to be hypothetically treated equally within the Stability and Growth Pact framework, disguised-PAYG financing would still be dominated by NDC PAYG financing due to the absence of hefty management fees. Thus, incentives for eliminating disguised-PAYG financing go beyond statistical treatment of implicit pension and explicit public debt and rest on the possibility to increase pension benefits without deteriorating long-term sustainability.

Disguised-PAYG financing was also a major issue in Hungary where more than 60 per cent of second pillar assets were invested in government bonds. Hungary however opted for a more radical reform reversal whereby not only disguised-PAYG financing was eliminated but second pension pillar was terminated altogether. Complete pension privatization reversal has several potential advantages over partial reversal aimed only at eliminating the disguised-PAYG financing. Under reasonable assumptions, workers should save (at least) 20 per cent of their wages during the working career in order to afford adequate consumption smoothing in retirement. A very small second pillar with a contribution rate of only 2.9 per cent provides rather poor diversification of retirement income against the public PAYG system. Furthermore, pension fund business is a fixed cost per account business (Schwartz, 2011), which means that second pillar fees could eat up even more retirement savings as second pillar contributions get smaller. Also, complete nationalization solves the second pillar payout phase problem which Eastern European countries were unable to resolve using private market instruments.[18] The final argument in favor of complete reform reversal is the fact that second pillar returns in Hungary, as in most Eastern European countries, were lower and more volatile than PAYG returns.

Slovakia, Latvia and Lithuania opted to permanently reduce second pillar contribution rates in recent years (Table 1). Second pillar returns in these countries were not only lower than PAYG returns, but were in fact negative in real terms.[19] Latvian real returns are especially troublesome since they were significantly negative even before the global financial crisis. Negative real rates of return can not possibly produce decent replacement rates which were anticipated at the time of pension privatization. Thus, down-sizing the second pillar and relying more heavily on the first PAYG pillar can make sense in these countries given the extremely poor performance of their mandatory private DC funds.

The World Bank (2014, p. 144) states that pension privatization "solves a long-term fiscal problem, but it also creates discomfort during the transition, often requiring additional fiscal efforts for at least a couple of decades". However, in order for pension privatization to improve pension sustainability in the long term two crucial preconditions have to be met: 1) disguised-PAYG financing should not dominate second pillar operations and 2) second pillar returns should be tangibly higher than GDP growth. No country in Eastern Europe has thus far been successful at fulfilling these two preconditions. Failure to fulfill them would mean that pension privatization would deteriorate short-term fiscal position without improving long-term pension sustainability. In this case reform reversals could improve short-term fiscal balances without necessarily deteriorating long-term sustainability.

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[18] In fact, recent reforms in Poland prescribe that the government will become responsible for paying out second pillar savings in order to allow adequate inflation and longevity insurance. A similar solution had been contemplated in Hungary before MPFs were nationalized.

[19] Despite extremely poor performance, MPFs in the Baltics have been charging the highest management fees in Eastern Europe in 2012 which stood at 1.5 per cent of assets in Latvia and Estonia, and 1 per cent in Lithuania.

7 Concluding remarks

Critical assessments of pension privatization strengths and weaknesses seem to have been absent in many Eastern European countries at the time this reform approach was being implemented. One crucial aspect that was not properly addressed at the time is the need to finance substantial transitional deficits over the period of 40 years or more. Initial empirical evidence shows that second pillar returns in Eastern Europe were disappointingly low, negative in real terms in some countries, even before the emergence of global financial crisis. Pension privatization also seems to have failed to increase national saving or accelerate economic growth.

In order for the carve-out pension privatization to improve long-term pension sustainability two crucial preconditions have to be fulfilled: 1) disguised-PAYG financing should not dominate second pillar operations and 2) second pillar returns should be tangibly higher than GDP growth. None of the Eastern European countries have thus far succeeded in fulfilling these preconditions. Not fulfilling those means that pension sustainability will not improve even if countries are able to successfully finance 40 or 50 years of transitional deficits. In this scenario reform reversals could improve short-term fiscal position without necessarily deteriorating long-term sustainability.

Recent economic crisis created an opportunity to use the available data and experiences to critically assess pension privatization performance thus far and to see to what extent have reform expectations been fulfilled. If second pillar weaknesses identified in this paper are unlikely to be successfully resolved it seems reasonable to consider partial or complete reform reversal plans instead of maintaining a suboptimal pension system design throughout the 21st century. Regardless whether Eastern European countries opt to preserve or reverse pension privatization, long-term pension sustainability in these countries will inevitably have to rely on the appropriate parametric changes and PAYG reforms in the coming years – as is the case in most Western European countries that have not resorted to carve-out pension privatization.

APPENDIX A
POLITICAL ASPECTS OF REFORM REVERSALS IN EASTERN EUROPE

Proponents of pension privatization have been arguing that MPFs would be insulated from fiscally irresponsible political influences which were seen as a contributing factor to the insolvency of PAYG schemes in many countries (World Bank, 1994). On the other hand, opponents of pension privatization were stressing that retirement income provision presents such a crucial segment of modern societies that making it immune to political interferences was highly unrealistic (Orszag and Stiglitz, 2001; Barr, 2000). In fact, even in the case of the ground-breaking complete pension privatization in Chile the pension system failed to be immune from political interference. Inability of MPFs to provide adequate protection against old-age poverty created social discontent and political pressures that in 2008 lead to the introduction of non-contributory tax-financed social pensions. Partial pension privatization efforts in Eastern Europe have proven to be even more susceptible to political interference.

Carve-out pension privatization in Eastern Europe was marked with fierce political debates (Mueller, 2003). Second pillar thus never gained cross-party consensus or broad-based support from social partners. Interestingly enough, when disappointing results started to emerge, it was not only political parties that have opposed pension privatization but also parties that championed second pillar introduction – that started to express the discontent and to contemplate reform reversal plans. Examples in this section indicate that pension privatization might have, in fact, degraded the quality of political debates and resulted in suboptimal, welfare reducing, provisions in some instances.

In Croatia and Poland, the right-wing parties that championed pension privatization were the ones to introduce reform reversal plans onto political agenda. Croatian prime minister and minister of finance from the right-wing HDZ party were the first to declare "second pillar a failure" in early 2009. Their initiative was however short-lived since it met strong and well organized resistance from the local financial community. On the other hand, Polish right-wing PO party was determined to implement significant reform reversals despite strong opposition from the local financial community. In 2013 Poland implemented legal changes to eliminate disguised-PAYG financing: second pillar contribution rate has been reduced from 7.3 to 2.9 per cent of wages and mandatory private pension funds were forbidden from investing in government securities.

Downsizing of second pillars in Latvia and Lithuania also met resistance from local financial communities, albeit to a lesser extent than in Croatia or Poland. Nonetheless, Lithuanian Constitutional Court was asked to forbid the decrease of second pillar contributions.

Right-wing FIDESZ party in Hungary and left-wing SMER party in Slovakia have been long-time opponents of pension privatization. It was thus no big surprise when FIDESZ government decided to terminate and nationalize second pension pillar in 2010, after winning a land-slide election victory. Interestingly enough, the most radical reform reversal in Eastern Europe to date did not face major political resistance since the opposition Socialist party, which introduced MPFs in Hungary in 1998, was itself contemplating possible reform reversal plans to address the disappointing second pillar performance. On the other hand, SMER party faced fierce political resistance in trying to down-size Slovakian second pension pillar and reduce second pillar contributions from 9 to 4 per cent of wages.

Political debates between SMER party and right-wing parties that championed pension privatization in 2005 resulted in suboptimal pension policies which included a limited opportunity for participants to opt-out of second pillar, significant reduction of management fees from 0.7 to 0.3 per cent per annum and requirement for second pillar funds to guarantee non-negative nominal returns to their beneficiaries. However, common citizens can hardly be expected to rationally

decide whether they should opt-out or remain in the second pension pillar, especially given significant policy uncertainty regarding future prospects of the Slovakian public pension system. Furthermore, the combination of low management fees and non-negative returns guarantee resulted in extremely conservative investment portfolios which generated negative real returns. After a land-slide election victory in 2012, SMER party managed to implement its original plan and reduced second pillar contribution rate from 9 to 4 per cent of wages.

APPENDIX B

Table 6

Second Pension Pillar Performance in Eastern Europe, Until end-2012

		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Hungary	Nominal Returns	15.7	17.1	7.9	8.0	7.4	3.4	16.3	13.0	4.5	7.0	–20.0	23.7	7.6	n/a	n/a
	Real Returns	4.9	5.3	–2.0	1.1	2.5	–2.2	10.2	9.4	–1.9	–0.4	–22.7	17.2	2.8	n/a	n/a
	GDP Growth	4.1	3.2	4.2	3.8	4.5	3.8	4.6	4.1	3.9	0.1	0.7	–6.7	1.2	1.7	–1.7
Poland	Nominal Returns		15.1	13.2	7.3	13.6	10.9	14.0	15.0	16.3	6.2	–14.2	13.7	11.2	–4.6	16.4
	Real Returns		4.8	4.3	3.6	12.7	9.1	9.2	14.2	14.7	2.2	–17.0	9.8	7.8	–8.8	13.6
	GDP Growth		4.5	4.3	1.2	1.4	3.9	5.3	3.6	6.2	6.8	5.1	1.6	3.9	4.3	2.0
Latvia	Nominal Returns				4.9	6.3	0.3	3.8	6.7	2.8	2.5	–11.5	12.3	7.6	–2.0	9.0
	Real Returns				1.7	4.7	–3.1	–3.4	–0.3	–3.7	–10.1	–19.8	13.9	5.1	–5.6	7.3
	GDP Growth				7.3	7.2	7.6	8.9	10.1	11.2	9.6	–3.3	–17.7	–0.9	5.5	5.6
Bulgaria	Nominal Returns					14.1	11.0	11.8	7.6	7.3	15.4	–20.1	7.9	5.0	–0.4	7.5
	Real Returns					9.9	5.1	7.5	0.2	1.2	3.4	–25.5	6.2	0.5	–2.4	4.6
	GDP Growth					4.7	5.5	6.7	6.4	6.5	6.4	6.2	–5.5	0.4	1.8	0.8
Croatia	Nominal Returns					17.1	5.1	7.4	7.1	5.7	6.8	–12.5	8.7	8.6	0.5	12.3
	Real Returns					15.0	3.3	4.5	3.3	3.6	0.9	–14.9	6.7	6.6	–1.5	7.3
	GDP Growth					4.9	5.4	4.1	4.3	4.9	5.1	2.1	–6.9	–2.3	0.0	–2.0
Estonia	Nominal Returns					2.6	7.6	9.9	13.1	7.2	6.2	–24.3	12.7	9.7	–4.5	9.5
	Real Returns					0.0	6.5	4.7	9.2	2.0	–3.1	–29.2	14.6	4.1	–8.3	5.5
	GDP Growth					7.9	7.8	6.3	8.9	10.1	7.5	–4.2	–14.1	3.3	8.3	3.2
Lithuania	Nominal Returns							11.6	10.6	5.3	3.8	–19.7	17.3	8.8	–2.9	11.2
	Real Returns							8.5	7.4	0.8	–4.1	–26.0	15.9	5.0	–6.1	8.0
	GDP Growth							7.4	7.8	7.8	9.8	2.9	–14.8	1.5	5.9	3.6
Slovakia	Nominal Returns								4.0	4.6	4.6	–6.7	0.6	1.2	1.4	2.9
	Real Returns								0.3	1.1	2.2	–9.8	0.5	–0.1	–3.0	–0.5
	GDP Growth								6.7	8.3	10.5	5.8	–4.9	4.4	3.2	2.0
Macedonia	Nominal Returns									6.7	8.8	–9.9	14.5	7.2	1.9	8.5
	Real Returns									3.5	2.0	–13.4	16.4	4.1	–0.8	3.6
	GDP Growth									5.0	6.2	5.0	–0.9	2.9	2.9	–0.3
Romania	Nominal Returns											10.6	17.6	15.0	3.2	10.5
	Real Returns											4.1	12.3	6.6	0.1	5.3
	GDP Growth											7.3	–6.6	–1.1	2.2	0.3

Notes: Inflation and GDP data has been taken from the IMF World Economic Database, April 2013 edition. Data on nominal returns of second pillar pension funds have been taken from official national authorities' websites: http://www.knf.gov.pl (Poland), http://www.fktk.lv (Latvia), http://www.fsc.bg (Bulgaria), http://www.hanfa.hr (Croatia), http://www.pensionikeskus.ee (Estonia), http://www.lb.lt (Lithuania), http://www.adss.sk (Slovakia), http://www.mapas.gov.mk (FYR Macedonia), http://www.csspp.ro (Romania). Data for Hungary in the 1998-2007 period is based on Impavido and Rocha (2006, Table 11) and World Bank (2009), while the data for 2008-2010 period is taken from the official website http://www.pszaf.hu

National supervisory authorities in Latvia, Bulgaria, Croatia, Estonia and Lithuania produce aggregate returns data for the entire second pillar industry. National supervisory authorities in Hungary, Poland, Slovakia, Macedonia and Romania do not provide aggregate returns data for the entire second pillar industry on a regular basis, but only data pertaining to individual second pillar pension funds. Aggregate second pillar returns for these countries represent authors calculations based on weighted average returns of individual pension funds. Only private pension funds that were in operation both at the beginning and at the end of the year have been included in aggregate second pillar rate of return calculations in the referenced year. In cases where second pillar was introduced in mid-year the relevant returns data in the inception year have been annualized.

APPENDIX C
INCORRECT WORLD BANK DATA ON EASTERN EUROPE

World Bank (2009, Table 2, p. 7) and Holzmann (2009, slide 12) state that prior to the global financial crisis, second pillar returns had been higher than GDP growth in all Eastern European countries except Latvia.

Table 7

Rate of Return of Pension Funds since Inception till End 2007
(in real terms and as differential over GDP growth)

Country	Year of Inception	Real Rate of Return	RoR over GDP Growth
Bulgaria	2002	3.2	0.5
Estonia	2002	4.9	0.6
Hungary	1998	2.6	0.6
Latvia	2001	–3.5	–0.3
Lithuania	2004	5.7	0.7
Poland	1999	8.9	2.2
Slovakia	2005	0.9	0.1

Sources: World Bank staff using data from national sources.
Original World Bank Table, excerpt from World Bank (2009, p. 7) and Holzmann (2009, slide 12).

However, when we compare World Bank real rate of return estimates from Table 7 above with official GDP growth statistics from IMF WEO database (April 2014 edition) we can easily see that, with the exception of Poland, second pillar real rates of return have been tangibly lower (not higher!) than GDP growth in all Eastern European countries until the end of 2007. This sharply contrasts with the final results published in World Bank (2009) and Holzmann (2009).

Table 8

Rate of Return of Pension Funds since Inception Until end-2007
Versus the GDP Growth in the Same Period
(percent)

Country	Year of Inception	Real Rate of return (World Bank Data)	GDP Growth (IMF Data)	RoR over GDP Growth
Bulgaria	2002	3,2	6,3	-3,1
Estonia	2002	4,9	8,1	-3,2
Hungary	1998	2,6	3,6	-1,0
Latvia	2001	-3,5	9,5	-13,0
Lithuania	2004	5,7	8,3	-2,6
Poland	1999	8,9	4,1	4,8
Slovakia	2005	0,9	8,7	-7,8

Furthermore, World Bank real rate of return estimates are themselves plagued with upwardly biased calculation errors (Altiparmakov, 2014). Thus, the World Bank should consider publishing data correction and explanation notice to clarify obvious data problems in its recent publications on Eastern Europe.

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COMMENT TO "DISAPPOINTING PERFORMANCE OF PENSION PRIVATIZATION IN EASTERN EUROPE" BY NIKOLA ALTIPARMAKOV

Lukas Reiss[*]

1 Introduction

In his very interesting and well written paper, Nikola Altiparmakov discusses a hot topic with several crisis-related aspects: the rising concerns about the viability of both private and public pension systems. While many private schemes have suffered under the stock market crash of 2008 and/or the current low interest rate environment, adjustment needs for public pension systems have arisen as a result of increases in trend unemployment rates and downward revisions of potential output estimates (on top of the implications from the ageing of societies).

Figures 1 and 2 show the gross replacement rates of public and private mandatory pension systems according to the OECD pension model (OECD, 2013). The figures indicate that mandatory[1] private pension schemes/second pillars are in place in many (but certainly not all) European OECD economies.

Interestingly, mandatory second pillars are to be found in two very different types of European countries, namely several economies from Northern and Western Europe with very high incomes and transformation economies from Central and Southeastern Europe.[2] However, the author points out that most of these transition economies "carved out" (gutted) "Bismarck-style" public pension systems by decreasing contribution rates to public systems (and introducing/increasing conributions to private systems), while countries like Denmark introduced a second pillar on top of a public "Beveridge-style" system ("add-on approach").

In the following I will try to complement the conceptual comparison of public and private systems (Section 2), and I will also discuss the authors' empirical work on pension funds' yields (Section 3.1) and the growth effects of having/introducing private systems (Section 3.2).

2 Comparison between mandatory second pillars and public pension systems

A substantial part of the paper is dedicated to the comparison of mandatory second pillars and public pension systems.

2.1 Public pension liabilities are not like explicit government debt, …

When contrasting public pension liabilities with explicit government debt (like bonds), one has to bear in mind that government balance sheets are quite different from corporate ones. While

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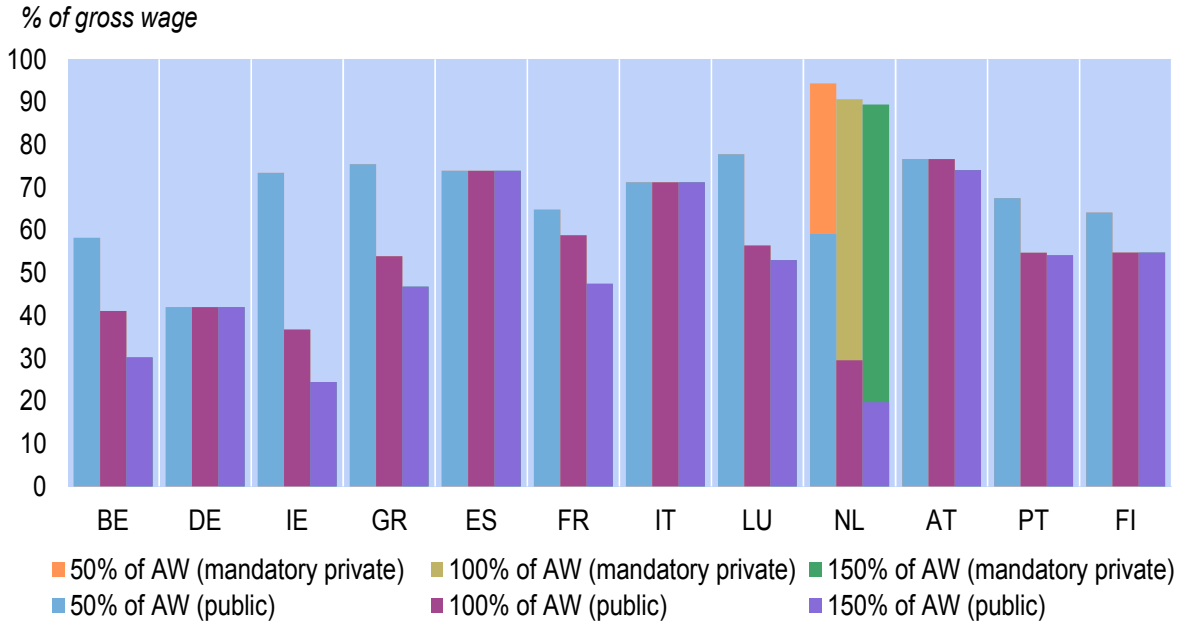
Opinions expressed by the author do not necessarily reflect the official viewpoint of the Oesterreichische Nationalbank or of the Eurosystem.

[1] Several further European countries have voluntary second pillars (e.g., the UK); they are not further discussed in this paper.

[2] Note that most European transformation economies which are not OECD members do have mandatory second pillars as well (e.g., the other countries mentioned in the paper, *i.e.*, Latvia, Bulgaria, Croatia, Lithuania, Macedonia und Romania) and that Hungary abolished its second pillar only relatively recently.

Figure 1

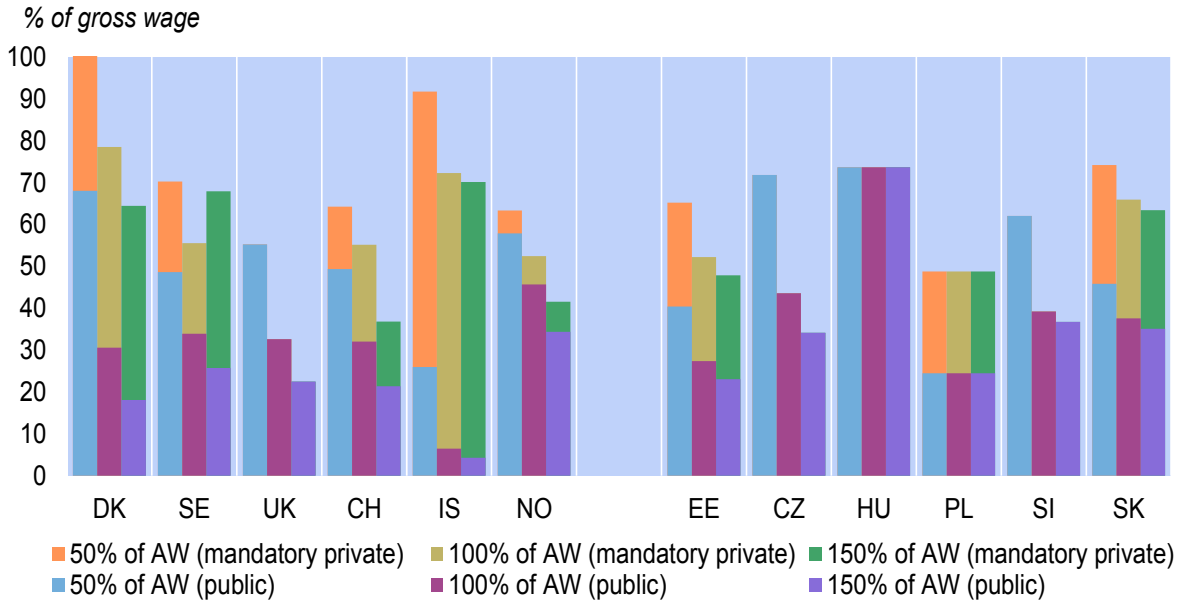
Pension Gross Replacement Rates in OECD Pension Model: EA-12



Source: OECD (2013).

Figure 2

Pension Gross Replacement Rates: Rest of (OECD) Europe



Source: OECD (2013).

implicit assets and liabilities may play some role for certain corporations (e.g., value of brands), they typically add up to immensely large amounts (typically exceeding explicit assets and liabilities by far) in government accounts. This is because of the right to tax reflected on the asset side and due to the vast amount of promises which governments give to their citizens (especially on the basis of entitlement spending legislation).

Theoretically, both high explicit debt and high "pension liabilities" (*i.e.*, high implicit debt) can be sustainable as long as tax revenue is high enough and the government/the system does not have to be shut down. However, there are several arguments why implicit debt may be less problematic from a government's viewpoint:

- Public pension liabilities typically cannot be withdrawn or traded (by "creditors"). Therefore, in contrast to explicit debt instruments, they are unlikely to cause situations with multiple equilibria where the perception of a higher default risk raises interest rates on explicit debt and therefore makes a default more likely.
- While explicit government debt instruments are mostly nominal and do generally not adjust to changes in real variables, pension liabilities adjust automatically to some extent (due to formulas for retirement age, indexation of pension payments and/or contributions to wage developments).
- Public pension liabilities are de facto "junior" to explicit government debt. While defaults on the latter have been rare in advanced economies after World War 2, there have been countless government "defaults" on pension liabilities over this time span. This includes not only major reforms, but also measures like (small) deviations from indexation formulas. While the latter may be considered as a standard consolidation measure in times of fiscal stress, "equivalent" measures on government bonds like a slight reduction of principal and/or coupons during a recession would be considered as a default.

2.2 ... hence 2nd pillars investing in government bonds do not necessarily qualify as "disguised PAYG"

However, and this is one small point of disagreement with the author, this implies that the phenomenon of pension funds heavily investing in government bonds is not necessarily "disguised PAYG" as government bonds are typically nominal and tend to be "senior" to PAYG pensions. In theory, PAYG pension liabilities could be made equally "senior",[3] but this is usually hampered by lack of trust by citizens and/or lack of (legally possible) commitment by governments.

In general, there are good reasons for such a lack of trust, especially so for younger generations: While sustained deteriorations in the present value of net pension liabilities are often not immediately reflected in measures on pension systems, fiscal space is occasionally used to give goodies to the elderly (like temporary early retirement schemes, extended by Austria in 2008 or introduced by Germany in 2013). Therefore, in a world of imperfect commitment it may make sense that pension funds invest into domestic government bonds.

2.3 Low trust in government and insurance against shocks to public finances are arguments for 2nd pillars (especially in emerging economies) ....

Arguments in favour of a mandatory second pillar are somewhat stronger for small emerging economies like the countries covered in this paper. At least according to a Gallup survey in 2011, trust in government (both absolute and relative to the financial sector) in the EU transition

[3] The underlying indexation in PAYG systems to price and/or wage developments may be considered as an advantage of PAYG anyway.

economies tends to be lower than in the rest of the EU. Furthermore, at least from the perspective of its citizens, there are good reasons to make returns to the pension system not only related to potentially volatile domestic economic developments.[4] Most EU transition economies are relatively small, and several of them have witnessed a long pre-crisis boom followed by a prolonged recession since 2008/09. Foreign investments of pension funds could reduce uncertainty concerning future returns to pension contributions.

2.4 ... but arguments for public systems are still compelling[5]

Notwithstanding these arguments, there many good reasons not to gut "Bismarck-style" pension systems:

- The adjustment cost from gutting the public pension system (*i.e.*, the shortfall in government revenue) is simply massive. The potential benefits of second pillars can be easily outweighed by the increased vulnerability due to higher explicit public debt.
- If management fees and contribution fees are as high as in several of the countries analysed by the author, the efficiency loss compared to a public system is very large.[6]
- If there are so many requirements for the design of pension insurance plans (sufficient insurance against longevity, relatively high return with low administration cost, inflation-protection …), the government may just provide it itself.

3 Some further minor comments

3.1 The choice of benchmark for yields of pension funds (in transition economies) is tricky

The analysis of yields is one of the most interesting parts of this paper. Both the differences to other institutions' estimates and the poor performance of funds in some countries are striking. However, the author may set a somewhat too ambitious benchmark for these funds by comparing their yields to domestic GDP growth. While the latter may be seen as an appropriate target in a closed economy or a high-income country, due to the reasons stated in Section 2.3 these funds may (or should) invest abroad; and (pre-crisis) GDP growth in the advanced economies was lower than in the analysed countries.

3.2 Direction of causuality is a big issue when assessing the implications of pension reforms for GDP growth

The author also provides an analysis on the macroeconomic effects of changes to private pension systems (*i.e.*, introduction, changes in contribution rates) and finds no positive effects on GDP growth. However, the interpretation of coefficients is hampered by the fact that several of the included variables are likely to influence each other. This is not only an issue for the control variables: While one would have to assess in detail how big a role short-term growth considerations played in introducing mandatory second pillars, such considerations definitely contributed to the (partial) reversion of these second pillars after the beginning of the crisis.

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[4] In theory, these investments into foreign assets could be also carried out by governments (like the sovereign wealth funds of certain oil exporting countries).

[5] Note that neither Serbia (country of author) nor Austria (country of discussant) has a mandatory second pillar.

[6] In any case, strict regulation of fees may be needed as fixed costs of running a fund and the large importance of reputation hamper free entry of pension funds.

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BETTER PENSIONS, BETTER JOBS: STATUS AND ALTERNATIVES TOWARD UNIVERSAL PENSION COVERAGE IN LATIN AMERICA AND THE CARIBBEAN

Mariano Bosch,[*] *Ángel Melguizo*[**] *and Carmen Pages-Serra*[*]

This article offers an overview of the current state of labor markets and pension coverage in a wide sample of Latin America and the Caribbean countries, and proposes a series of possible avenues toward universal coverage, not only as an instrument to fight poverty during old age, but also as part of an agenda for increasing formal employment and productivity growth. We conclude that the region overall is experiencing a good demographic, socio-economic, and fiscal period, and this provides a real opportunity for initiating bold reforms in pensions, labor and tax needed to achieve universal coverage.

1 The pending pension reform agenda

During the 1980s and 1990s, Latin America and the Caribbean (LAC) implemented an ambitious agenda of social security reforms largely aimed at restoring financial sustainability to pension systems, and simultaneously building a clear link between contributions and benefits. It was expected that these reforms would contribute to a gradual increase in the percentage of workers who contribute, and eventually, in the percentage of elderly with a pension (see World Bank, 1994 and Lindbeck and Persson, 2003 for an analysis of these and other economic benefits, and Barr and Diamond, 2006 for an opposing view).

With approximately twenty years of experience in the region, the effects of these reforms have been many and varied. A large amount of research has addressed the merits and problems of the type of systems, for example of introducing defined contribution and individually funded systems (usually known as "private systems") compared with public pay-as-you-go systems (see Packard and Yermo, 2005 for an analysis of its impact on implicit debt, development of financial markets and pension coverage for LAC). However, much less analyzed and discussed has been the fact that, irrespective of the pension systems involved, pension coverage depends on the capacity of labor markets to create jobs in which workers and firms contribute to the pension system; in other words, formal jobs. Despite the reforms in the region, pension coverage is still considered generally low.

In the region today, according to national household surveys,[1] only four out of ten citizens aged 65 and older are receiving a contributory pension. Recently, many countries have

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This article is based on the book Bosch, M., Á. Melguizo and C. Pages (2013), *Better Pensions, Better Jobs: Toward Universal Coverage in Latin America and the Caribbean*, edited by the InterAmerican Development Bank. A revised version is accepted for publication in the *Journal of Pension Economics and Finance*.

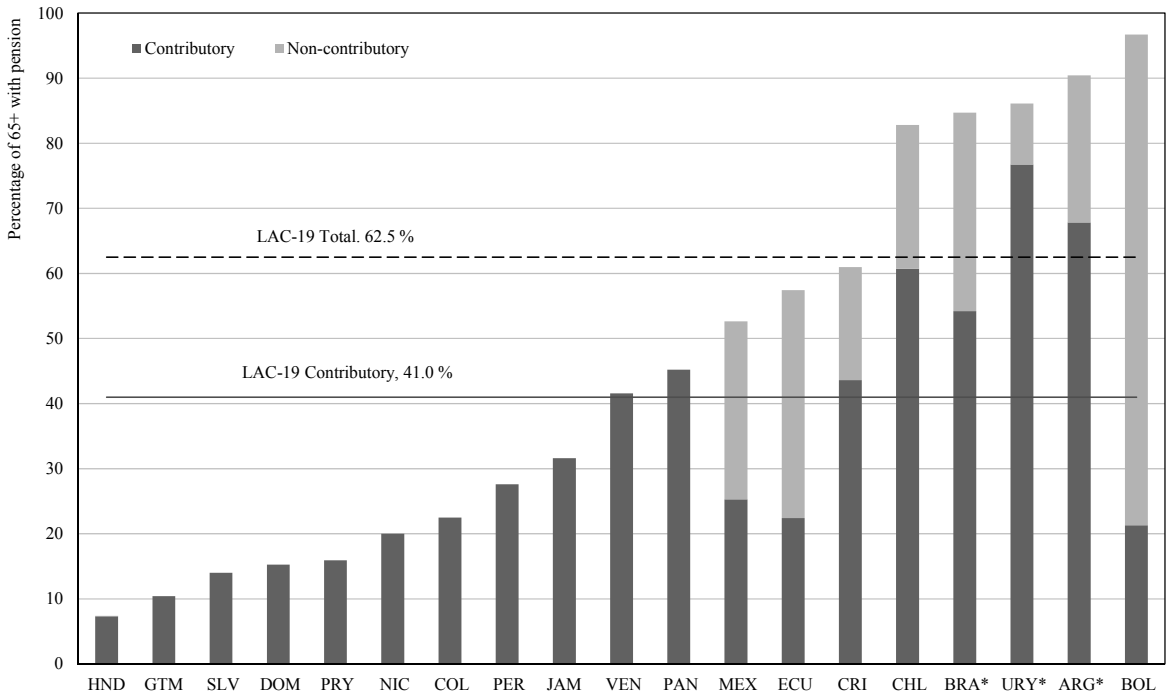
[1] Based on data availability, we are covering the following 19 Latin American and Caribbean economies: Argentina (Encuesta Permanente de Hogares – Contínua, 2010); Bolivia (Encuesta de Hogares, 2009); Brazil (Pesquisa Nacional por Amostra de Domicilio, 2011); Chile (Encuesta CASEN, 2011); Colombia (Gran Encuesta Integrada de Hogares, 2010); Costa Rica (Encuesta de Hogares de Propósitos Múltiples, 2010); Dominican Republic (Encuesta Nacional de Fuerza de Trabajo, 2010); Ecuador (Encuesta Periódica de Empleo, Desempleo y Subempleo, 2010); El Salvador (Encuesta de Hogares de Propósitos Múltiples, 2010); Guatemala (Encuesta Nacional de Empleo e Ingresos, 2010); Honduras (Encuesta de Hogares Permanente de Propósitos Múltiples, 2010); Jamaica (Labor Force Survey, 2010); Mexico (Encuesta Nacional sobre Ingresos y Gastos de los Hogares, 2010); Nicaragua

(continues)

Figure 1

Pension Coverage in LAC, 2010

(percentage of elderly adults (65+) collecting a pension, contributory and non-contributory, 2010)



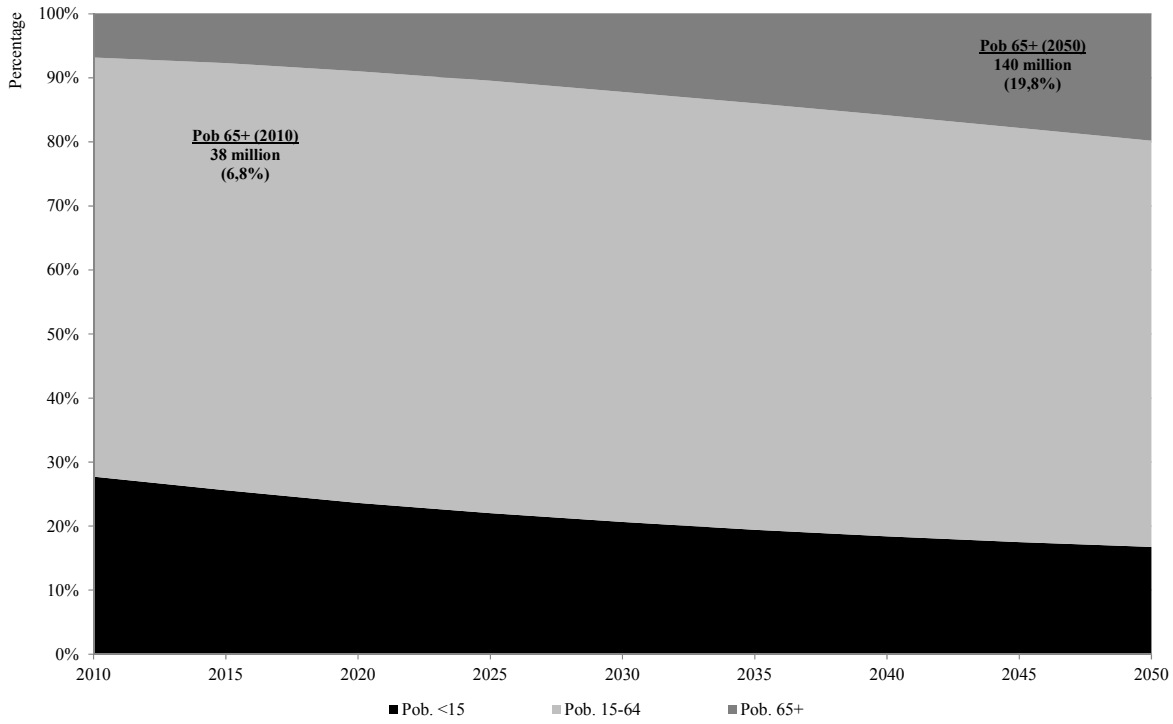
Source: Authors' calculations.
Notes: Based on household surveys (circa 2010). The share of non-contributory pensions in Argentina, Brazil and Uruguay has been obtained by dividing the number of beneficiaries of these programs, calculated as the population 65 and over in the census's administrative records. This could be an imperfect measure of coverage since eligibility for a non-contributory pension could be obtained earlier than 65. Household surveys in Colombia, El Salvador and Paraguay do not record whether individuals received a non-contributory pension. LAC-19 corresponds to the regional weighted average.

substantially increased pension coverage through programs focused on expansion of non-contributory pensions. This expansion has helped raise the proportion of older adults who receive a pension to more than six out of ten. Yet, the majority of pensions (either contributory or non-contributory) pay less than 10 dollars a day. This means that two of the key objectives of pension systems - elimination of poverty in old age and maintenance of an adequate standard of living for workers once they stop working (Barr and Diamond, 2006) are still only achieved for a small number of the region's elderly. In the absence of further reforms, the percentage of workers who contribute to the pension system is not expected to increase significantly. This implies that many will have either a limited or nonexistent access to an adequate future pension in the region (Figure 1). However, very different pension realities coexist in LAC. Our purpose is not to prescribe recipes or formulas, but rather to help understand the causes of certain pension realities and find possible avenues for improvement, taking as a starting point the evidence accumulated from policies already implemented in the region.

(Encuesta Contínua de Hogares, 2010); Panama (Encuesta de Hogares, 2010); Paraguay (Encuesta Permanente de Hogares, 2010); Peru (Encuesta Nacional de Hogares, 2010); Uruguay (Encuesta Contínua de Hogares, 2010); and Venezuela (Encuesta de Hogares por Muestreo, 2010).

Figure 2

Population Projection for LAC, 2010-50



Source: CELADE (2011).

2 Why is low pension coverage in LAC a problem?

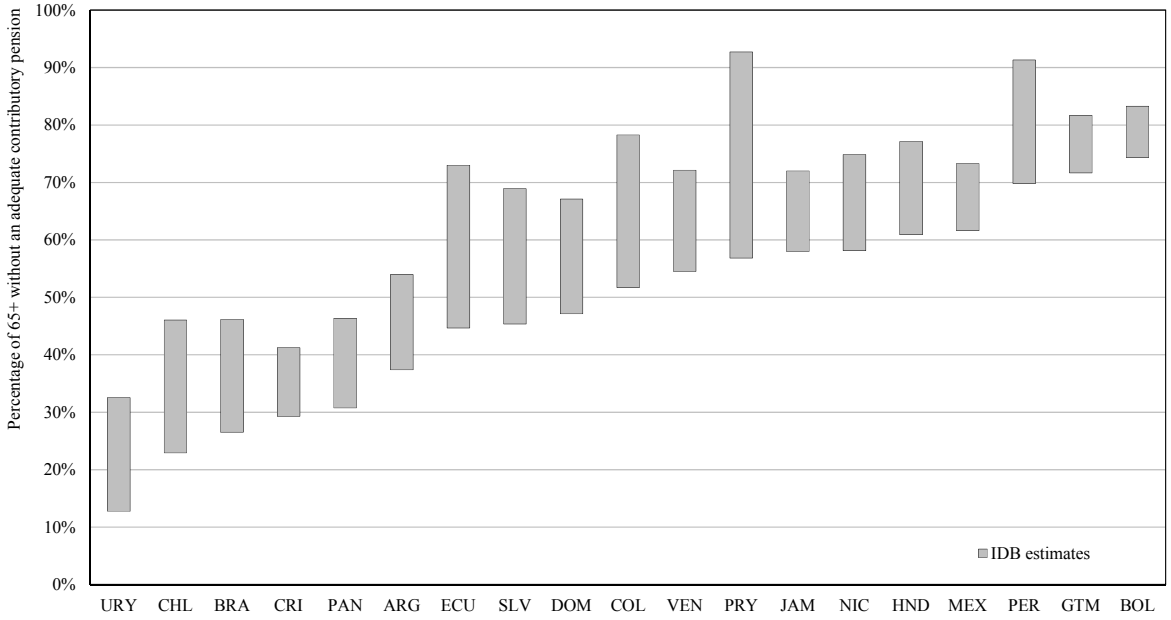
The population in LAC is young but aging rapidly. While in 2010 the percentage of adults who were 65 and older represented only 6.8 per cent of the population, projections by Celade (2011) suggest that by 2050 this age group will grow to 19.8 per cent of the region's total population. Thus, in 2050 there will be more than 140 million people aged 65 and older, nearly four times more than the 38 million elderly living in the region today (Figure 2).

LAC region is confronted with the challenge of providing an adequate income for millions of individuals who will retire in the coming decades. Yet the mechanisms to address these challenges are built on weak foundations. First, there will be fewer potential workers to support each elderly citizen. The number of working-age individuals (age 15-64) for each citizen aged 65 and older will decrease from 9.6 today to 3.2 in 2050, according to the same population projections. Second, contributory pension systems, whose purpose is to transfer present consumption (when a person is able to work) to future consumption (when a person can no longer work), are not currently capable of generating enough savings for old age since most jobs in the region are informal. In other words, the lack of savings stems for the existence of informal jobs in which firms and workers are not contributing to social security.[2] We will explore this point further later in the paper. Third,

[2] We use the term 'pension savings' to identify contributions to pension schemes, so that coverage is always referred to as passive coverage (after retirement). This is done to provide clarity since it is only appropriate for individual account systems where contributions are considered savings according to national accounting.

Figure 3

Share of Elderly Population (65+) Without an Adequate Contributory Pension, 2050



Source: Authors' calculations.

according to our projections and using standard formality-growth elasticities, economic growth, even if it continues at the rate of the last decade, will not be sufficient to fix this problem of providing adequate pensions.[3] Actually, using cross-section data from Pallares-Miralles *et al.* (2012), the LAC region tends to be well below the international trend. The share of workers contributing to social security in countries like Mexico, Colombia or Peru is between 20 and 30 percentage points lower than their respective GDP per capita would predict.

We project that in the absence of reforms, between 47 and 60 per cent of the 140 million elderly adults in 2050 (66 to 83 million people) will reach retirement without having generated the savings needed to fund an adequate pension in their old age[4] (Figure 3). Given the actual state of the labor market, the coverage deficit will be higher among women than men, and will be heavily concentrated among workers who currently have low-and middle-income jobs, work for small businesses, or are non-wage earners (for example, self-employed).

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[3] The elasticity of formality to economic growth (measured by per capita GDP increase) is set at 0.1 in the baseline scenario, following Packard (2001), Djankov *et al.* (2002), Loayza *et al.* (2005) and Loayza and Rigolini (2011). This estimate is in line with our own calculations using panel estimates with fixed effects (although lower than results obtained with cross section analysis, which are set around 0.2). We assume elasticities are the same across countries and deciles. Also, we estimate GDP per capita grows in all countries 2.5 per cent annually and contribution rates are set at 10 per cent of total wages.

[4] The results presented are based on stylized projections exercises. We use the share of workers contributing to social security by decile and by country in 2010 as the baseline. We project this share using GDP per capita growth elasticity of 0.1; *i.e.*, when the GDP per capita doubles, the share of workers contributing increases by 10 percentage points. We also assume a real GDP per capita growth of 2.5 per cent. In order to calculate the coverage share of the population over 65 years, we assume three different hypotheses. First, we assume that present contributors have contribution densities of 100 per cent, and those who do not contribute have contribution densities of 0 per cent. Second, we assume that adequate coverage demands at least a contribution density of 50 per cent. We assume that the share of contributors by decile is a good proxy for the density contributions of that particular decile. Third, we use formality rates of the second exercise and evaluate replacement rates using OECD-IDB-WB (2014). We define as uncovered those with replacement rates under 30 per cent. The calculations presented here provide an interval resulting from the maximum and minimum coverage obtained from each of these three methods.

This low coverage will have significant social, political, fiscal, and economic consequences:

- *Social:* Longer life expectancy and smaller family size means that families will need to devote greater effort and resources to the care of the elderly, which will compete with the investments families must make in health, education, or even housing for future generations.
- *Political:* In the coming decades, adults aged 65 and older will make up between 20 and 30 per cent of the potential electorate of the region, so their needs will be decisive in electing governments. In this context, achieving adequate pension coverage will be a key demand from future governments.
- *Fiscal*: Lack of coverage is a latent fiscal cost in the region. Because democratic governments in LAC are not going to ignore the demands of a growing percentage of the population, countries will have to allocate more resources to compensate for this inadequate pension coverage.
- *Economic*: How coverage gaps are closed can have an impact on the functioning of labor and investment markets and long-term productivity growth.

As a result, pensions are set to become one of the cornerstones of economic and social policy in LAC in the coming decades.

3 The labor market as the epicenter of low coverage

Social protection systems in the region were first established in the 1930s and 1940s under the influence of the social insurance system implemented in Germany by Bismarck during the late nineteenth century. This system was created with the understanding that social benefits are for wage earners who acquire them by means of contributions paid jointly with employers. As a result, by design, only citizens who were wage earners during their working lives, and their families, had access to pensions, leaving others out.

Although some countries in LAC have been including groups of non-wage earners in the pension systems, much of the low coverage observed today is due to this original design. On average, only four out of ten Latin American and Caribbean workers are contributing to a social security system at any given time, according to data taken from the aforementioned national household surveys (Figure 4).

What is even more challenging is that only two out of ten non-wage earners (such as self-employed and employers), who make up about 30 per cent of workers in the region, contribute to the pension systems; a percentage similar to that observed among wage earners in small businesses. These contributions remain low not only for low-income workers but also among middle-class workers[5] (Figure 5).

Our view is that a set of decisions taken by the state, workers, and firms has created a disequilibrium in labor markets in LAC in which only a small percentage of medium- and low-wage earners regularly contribute to the pension systems.

In order to move toward universal coverage, it is crucial to change this disequilibrium by increasing the benefits and/or reducing the costs of complying with formality for workers and employers. In the latter case, this means evaluating not only the contributions to the pension system but also the costs associated with labor legislation (health insurance, termination costs, minimum wages, registration costs) as well as other regulations. Equally important, the benefits of being

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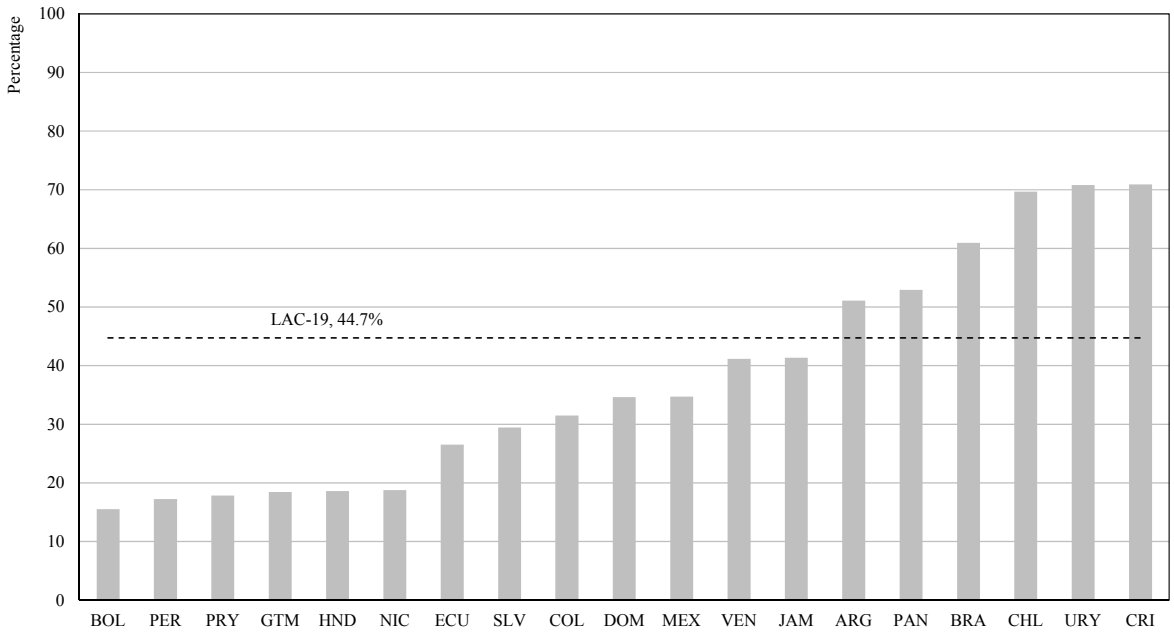
[5] We follow Easterly (2001) and consider 'middle class' those workers who are between the third and the sixth deciles of the income distribution.

Figure 4

Percentage of Contributors over Total Employment in LAC, 2010



Source: Authors' calculations.

informal need to be reduced, and those benefits granted to people who have not saved in the pension system need to be reviewed (Levy, 2008).

4 Experiences toward universal pension coverage

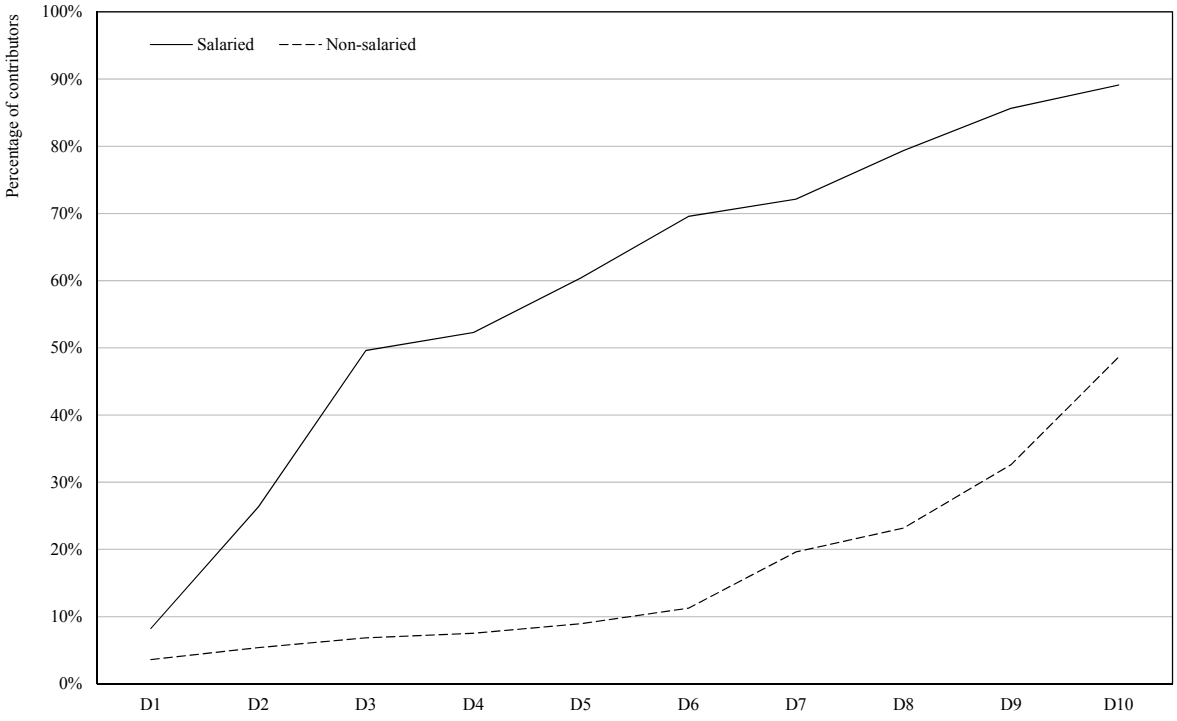
Essentially, there are two ways to increase pension coverage, each with its own advantages and disadvantages: granting pensions to those reaching retirement age who do not have social insurance coverage, or making workers currently in the labor market save for their future (*i.e.*, contribute to a pension scheme).[6] Finding the balance between the two – providing coverage for current older adults and guaranteeing coverage for future retirees – is the challenge that economic policymakers in the region need to solve.

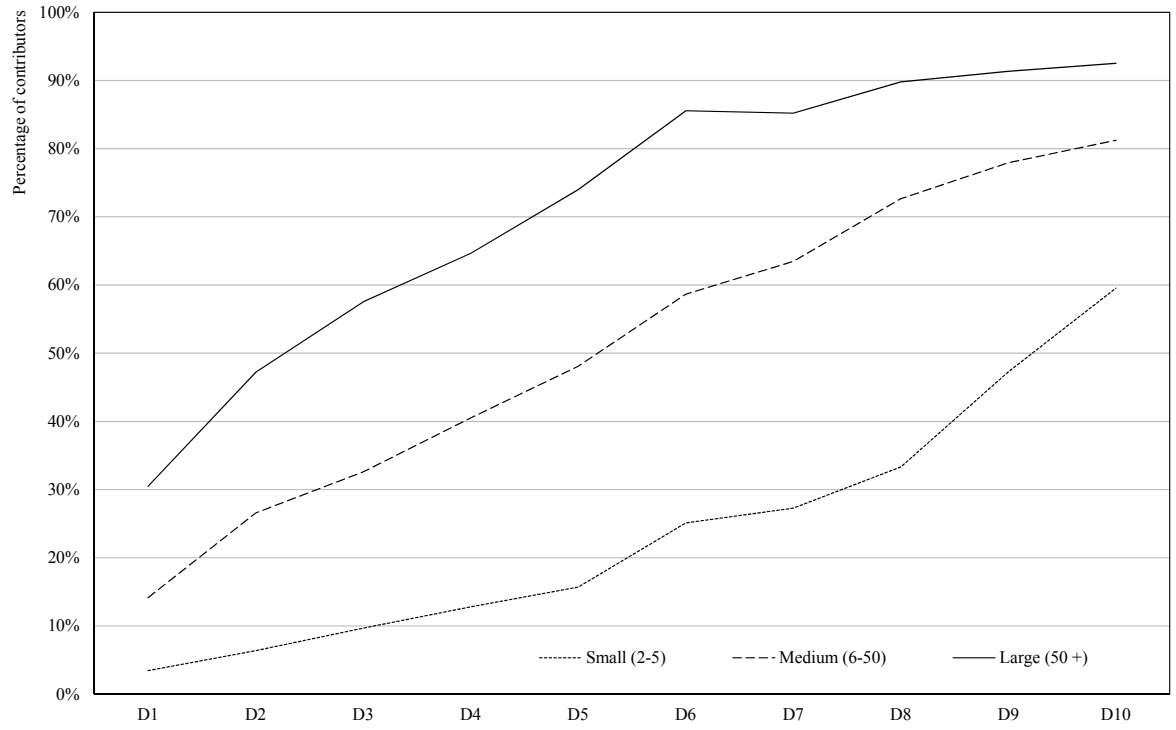
Experiences in the region among countries with different income and formality situations, such as Bolivia and Chile, reveal that non-contributory pensions are effective in increasing the number of people with access to income in old age. In fact, it is the only tool able to provide coverage to the elderly who are currently without social insurance, as well as for the long-term informal workers who will retire in the coming decades. However, depending on their design, non-contributory pensions could significantly affect the decision to participate in the labor market and in the contributory systems (Carvalho Filho, 2008; Galiani and Gertler, 2009; Bosch and Guajarro, 2012; Rodrigues de Oliveira and Kassouf, 2012; and Juárez and Pfutze, 2012). Advances in coverage achieved through non-contributory pensions are very important (see Rofman

[6] See OECD (2010) and Ribe *et al.* (2010) for an extended summary of policy options to increase coverage, and OECD (2013) for a summary of recent reforms in OECD countries.

Figure 5

Pension Savings: Contributors to the Pension System in LAC by Income Decile, Occupation and Firm Size, 2010





Source: Authors' calculations.

et al., 2013, for a detailed description of these programs in LAC), but the design of these tools must include not only proposals for financial sustainability, but also the possible effect of these non-contributory pensions on the labor market and, in particular, on the incentives for participating in the contributory systems.

Moreover, non-contributory pensions are only part of the solution to low coverage. Although they can alleviate or even completely eliminate poverty in old age, they are not effective in ensuring that individuals, particularly those in the middle class, maintain their standard of living in old age. To generate adequate levels of future pensions, pension savings for today's workers need to be urgently increased by expanding both the number of contributors and the frequency of their contributions. To do this, the region has followed different paths. Implementing a reduction of social security costs seem to be effective in generating formal employment, especially in the groups that tend not to be associated with the pension system, such as young people, non-wage earners, and wage earners in small businesses. For example in Chile, a social security subsidy for employees and firms hiring young disadvantaged workers increased the share of these workers in between 2.5 and 4.1 percentage points (Universidad de Chile, 2012). Indeed, several countries are moving in this direction. Colombia's recent tax reform cut formal labor costs by eight percentage points (from 33 to 25 per cent of wages) for all workers, and Brazil has eliminated social security contributions for strategic sectors with the aim of increasing formal employment. Although the question remains to what extent subsidies targeted to particular groups, such as the self-employed or small business employees, could result in discouraging firms from growing or encouraging self-employment. Such outcomes could, in turn, have adverse consequences for the productivity of the economy.

The empirical literature also suggests that the increase in formality (especially among small firms) requires greater supervision but also an improvement in how firms and workers value the benefits of formality. In a controlled experiment, Andrade *et al.* (2013) show that none of the information or financial incentives had an impact on formalization of small firms in Brazil; only a visit by a labor inspector prompted an increase in the registration of these small firms. Although it seems clear that stricter monitoring in the labor market expands the number of formal jobs, it can also destroy jobs that cannot survive regularization due to low productivity or because the firms and workers reject the benefits of social security. Therefore, increased supervision needs to be accompanied by an improvement in the benefits offered by formality and/or reduction in their cost.

Innovations in how the State, and social security agencies in particular, relate to citizens can constitute a low-cost policy for expanding pension coverage. These innovations include financial education campaigns, and improvement in information and channels that facilitate contributions. For example, pilot programs in Peru and Bolivia suggest that sending reminders via a text message or a letter can be an effective and low-cost way of stimulating savings (Karlan *et al.*, 2012).

Overall, it is difficult to suggest or establish a single policy capable of correcting all the problems related to coverage given the diverse realities of the region. In order to achieve long-term solutions, governments will need to explore and make progress on several dimensions. Since the LAC countries are at very different starting points, emphasis on a particular dimension will depend on the specific challenges faced by each.

5 Eliminating poverty in old age and supporting formal employment

In our view, it is possible to move toward universal pensions coverage in LAC, and that under certain conditions, the system is affordable now and in the future. Achieving this goal requires not only establishing sustainable and efficient anti-poverty pensions, but also making a firm commitment to create more formal jobs for the people that are in the labor market today. This

is the only sustainable strategy for providing adequate pensions in the long term. Informality is the outcome of the original designs of social welfare systems, the incentives provided by the state in labor markets, and the value placed by workers and firms on the benefits of formality, all of which can be changed.

For this matter, it is not feasible or desirable to propose a single reform for all LAC countries. However, it is possible to set out a series of key principles for any of the options chosen. The most important are:

- *Universality*: understand the interaction of the pension system with the labor market and tax system.
- *Integrality*: acknowledge the interactions and attempt to connect all the provisions of the social insurance system (contributory and non-contributory) such as retirement, disability, survivors' pensions, and health and unemployment insurance.
- *Efficiency*: create good incentives for pension savings and participation in formal employment.
- *Transparency*: simplify the rules so they are understood by citizens and firms.
- *Innovation*: experiment with subsidy mechanisms for contributions and in the channels that facilitate contributions.

Based on these principles, a set of financial and non-financial instruments designed to expand coverage could be evaluated. The financial instruments, consistent with the two objectives of pension systems (poverty reduction and maintenance of the standard of living of workers after retirement), could include:

- *An anti-poverty non-contributory pension for all citizens.* Established with strict eligibility criteria in terms of age, and at a level sufficient to reduce poverty in old age. This type of pension should have a stable funding source, allow for receiving both non-contributory and contributory pensions, and be supported by strong fiscal institutions (for example, a Fiscal Council).
- *Mechanisms to promote formal employment.* Among other options, subsidies can be offered to reduce contributions for wage and non-wage earners, favoring the incorporation of low- and middle-income workers into the formal system.[7]

These financial instruments would be supplemented by changes in the design and implementation of pension policies, including:

- *Phasing non-wage earners into social security.* Establishing the obligation to contribute for all workers, irrespective of their occupational category (wage earner or not), on financial conditions equal to those of wage earners. Today, affiliation for independent workers is voluntary for all or a subset of non-wage earners in 4 countries in the region (Bolivia, Ecuador, Mexico and Venezuela). Recognition of the special characteristics of this group should be considered when designing new ways for contributing.
- *Progress in supervision, information, and financial education.* Based on links to information sources, improved inspection, and a better pension culture.[8]

Reforms that respect these principles and use the range of financial instruments could completely eliminate poverty in old age, and lead to a significant and sustainable increase in formal employment and pension savings in LAC.

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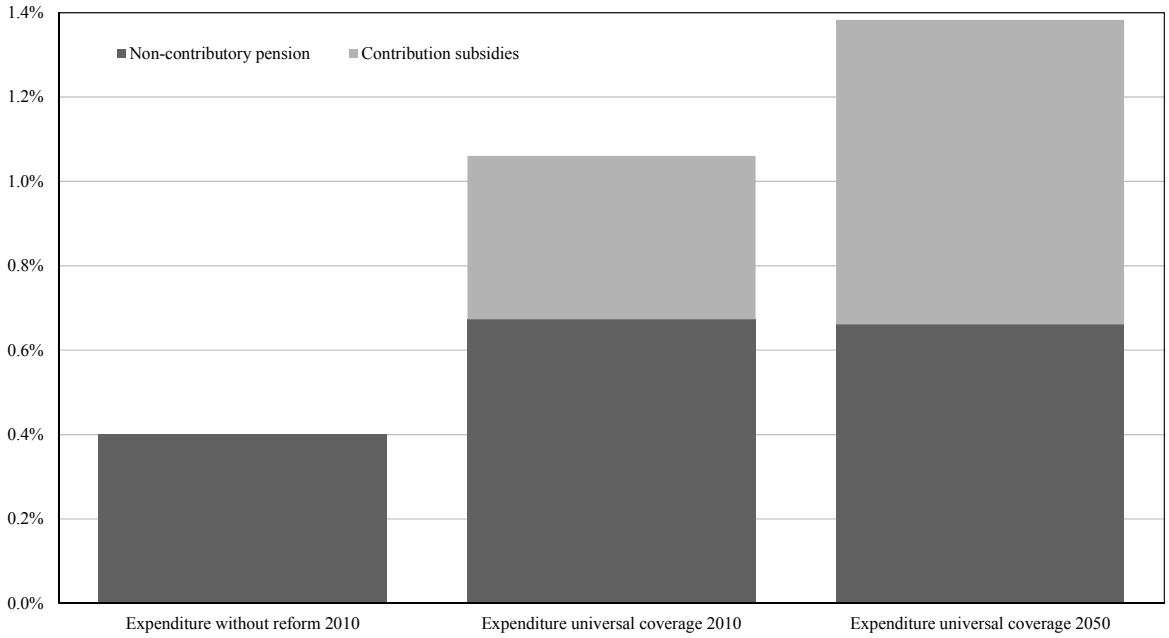
[7] A number of experiences considering subsidies and matching contributions for low-, middle- and high-income countries have been summarized in Hinz *et al.* (2012).

[8] Hastings and Mitchell (2011) and Hastings *et al.* (2010) show how financial literacy can enhance pension savings.

Figure 6

Cost of Pension Reform,
Compared with Current Spending on Non-contributory Pensions in LAC-19



Source: Authors' calculations
Note: LAC-19 refers to the simple average

To illustrate this proposal and its budgetary implications of reforms, on average in the region, a pension that provides an income of 10 per cent of per capita GDP for all those aged 65 and older in 2010 costs annually an average of 0.7 per cent of GDP (ranging from 0.4 per cent in Guatemala and Jamaica to 1.4 per cent in Uruguay).[9] This level of spending would remain stable in terms of GDP if the pensions are adjusted for inflation. Measures to stimulate formal employment require additional resources. For instance, if the government subsidizes workers' (wage earners or not) pension contributions with an amount equivalent to 50 per cent of what a worker earning a minimum wage should contribute, the total cost (universal pension and subsidies) rises to 1.1 per cent of GDP in 2010 and 1.4 per cent in 2050[10] (Figure 6).

This implies that the reform would require an additional budgetary effort of around one percentage point of GDP per year more than the amount that the region is already allocating to non-contributory pensions, and would eradicate poverty among citizens aged 65 and older and significantly increase formal employment. These gains would be even greater if, parallel to the introduction of financial instruments, the contribution channels and supervision were improved.

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[9] This benefit corresponds to a daily monetary transfer of 4 to 8 USD in PPP in Argentina, Chile o Uruguay, and between 1 and 2 USD PPP in Bolivia, Guatemala and Honduras.

[10] In the central reform scenario, we assume that a 10 per cent subsidy increases the elasticity of the share of workers contributing to their pensions with respect to per capita GDP from 0.1 (base scenario) to 0.14. This is within the bounds obtained by Heckman and Pages (2008), Kugler and Kugler (2009) and Madrian (2012). We also depicted conservative and optimistic scenarios, with 0.12 and 0.18 formality to per capita GDP growth elasticities. GDP per capita grows in all countries 2.5 per cent annually and contribution rates are set at 10 per cent of total wages. In the reform scenarios, we assume that formality only increases in deciles 3 to 10, which roughly correspond with the wage range where formal jobs are concentrated. The social contributions' subsidy (for employees or firms) is set at 50 per cent of the wage of decile 3, which for LAC-19 represents approximately the minimum wage.

The expansion of non-contributory programs could substantially reduce poverty in old age, consolidating the advances that the region has made over the last decade (Lustig and López-Calva, 2012). But perhaps more importantly, if the measures proposed here are able to shift labor from informal to formal jobs, there would be an expansion in coverage in other social insurance elements that are packaged together with pensions, for example health, disability and life insurance. Furthermore, improvements in productivity and growth will be expected to follow in the medium run as firms become more formal (Busso *et al.*, 2012).

Even so, it is worth emphasizing that there is no single formula for universal coverage of pensions. Depending on their initial coverage conditions, social preferences, institutional capacity, and availability of resources, countries can implement different reforms within this framework of principles and instruments. In particular, countries with very low pension coverage levels may consider extending their non-contributory pillars, paying particular attention to the institutional design to avoid lowering incentives to contribute, and ensure fiscal sustainability in the future. Other countries with relatively high coverage with well-developed and relatively generous non-contributory programs such as Uruguay, Brazil, and Argentina, could advance on the integration of contributory and non-contributory programs to enhance incentives to contribute. All countries would benefit in increasing formality levels using a combination of the tools presented here to close the gap with the OECD average. In particular, countries with high combined non-wage labor costs should consider shifting taxation away from payroll taxes to increase formal employment.

The set of reforms proposed here is not a substitute for parametric reforms (increasing retirement age, reducing benefits or increasing contributions) that are necessary in some defined benefit systems that are projected to be impacted from the rapid demographic change that the region will experience over the next few decades. In fact, increasing coverage can put additional pressures on these systems.

6 On the political economy of pension and tax reform

LAC is experiencing a good demographic, economic, and fiscal period. These factors provide a real opportunity for initiating bold reforms to move toward universal pension coverage. Demographically, the region is still young. Only Argentina, Brazil, Chile, Costa Rica, Cuba, and Uruguay show an advanced stage of demographic transition. However, this window of opportunity, which now facilitates political approval of the reforms, will gradually close as the population ages, and the reforms will become more urgent and costly.

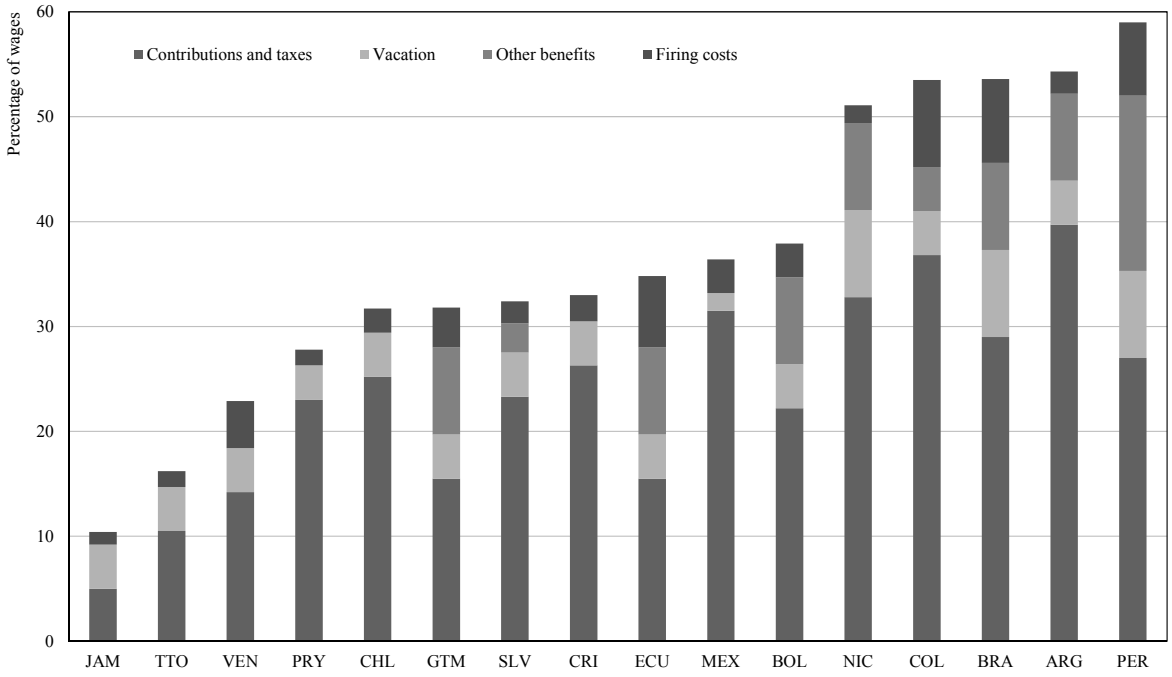
In economic terms, reforming pension systems, especially in relation to improved functioning of the labor market, is a key element in a strategy to boost productivity and potential growth, and is considered a motivation shared by all economies in the region (Pagés, 2010). Some simulations show that if all countries in the region implemented appropriate reforms, including labor and pensions, the region's potential growth could increase by up to two percentage points per year, overcoming the so-called 'middle-income trap' (Powell, 2013).

Finally, the pension reforms aimed at expanding coverage, especially those implemented during the working life of citizens, could improve the fiscal situation in the medium and long term. In the absence of changes in pension systems, the size of the population unprotected during old age in LAC will increase significantly. As a result, social pressure on governments to establish and/or expand non-contributory pension programs will intensify.

However, recognition of the importance of pension reform and the favorable moment are not enough; challenges related to funding and the political economy must be overcome. The funding of pension reform, at least in the short term, requires an increase in the resources allocated to these

Figure 7

Non-wage Costs in LAC



Source: Pages (2010).
Note: The 2012 tax reform in Colombia may have reduced non-labor cost 13.5 percentage points, down to 40 per cent of wages.

policies, a not insignificant challenge in the region in technical and political terms (Corbacho *et al.*, 2013). A central recommendation would be to limit the heavy charges on formal employment, or at least not add additional burdens, because of their negative effects on formal employment. It is important to note that it is plausible to have low fiscal pressure (over GDP) but high non-wage costs on formal workers. In fact, countries with large informal sectors tend to have higher non-wage costs and less taxation revenues (e.g. Colombia, Mexico and Peru) (Figure 7). In this respect, initiatives have appeared that aim to allocate, in a formal way, part of the collection of value-added tax (VAT) or natural-resource taxes to fund the non-contributory pillar.

The funding challenges are compounded by the fact that, perhaps because of the young population, pensions are not social or economic priorities of citizens of LAC. Pensions do not appear in the top 20 main priorities/concerns of the Latin American population. The *Social Protection Survey* in Chile and similar surveys conducted by the IDB (IDB, 2008) show that a great majority of citizens have never thought how they will finance their old age, even those close to the retirement age. This lack of concern about future pensions, in principle, limits the set of potential contributors and reduces governments' priority for moving forward in this area.

However, these citizens themselves expressed two aspirations that are intrinsically related to pension reform as proposed in this study: reduction of poverty and unemployment. They are even willing to pay more taxes to fund quality public services in health, education, and security (Daude and Melguizo, 2010). These demands from the population could be capitalized in favor of the reforms.

Access to formal job facilitates access to the middle class, and has even been considered a necessary condition. The reality in Latin America and the Caribbean is that the region's new middle classes are still largely informal and exposed to great vulnerability if economic conditions are no longer favorable (OECD, 2010 names them *middle sectors*; Ferreira *et al.*, 2012 the *strugglers*). In this context, the emerging middle classes of LAC could act as triggers for a series of ambitious pension changes, in line with the contents of the proposed reform, leading to an expansion of formal employment for people with low and medium incomes.

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COMMENT TO "BETTER PENSIONS BETTER JOBS: STATUS AND ALTERNATIVES TOWARD UNIVERSAL PENSION COVERAGE IN LATIN AMERICA AND THE CARIBBEAN" BY MARIANO BOSCH, ÁNGEL MELGUIZO AND CARMEN PAGES

Renee Philip[*]

1 Introduction

I would like to thank the organisers for the invitation to the workshop and the opportunity to comment on this interesting paper. Although pension policy in New Zealand is quite different to that in many Latin America and Caribbean (LAC) countries, New Zealand also faces challenges related to pensions, in particular, the growing cost of pensions arising from an ageing population, and so pension reform is an area of interest.

2 Main messages of the paper

The focus of the paper is on options for future pension reform in Latin America and the Caribbean (LAC). This includes options that can not only eliminate poverty in old age, but can contribute to boosting formal employment.

During the 1980s and 1990s, pension reform in many Latin American countries involved shifting from state-run, pay as you go social security systems to privately managed individual accounts. These reforms were in response to a range of problems including an uneven distribution of benefits, low coverage, and difficulty financing the benefits.

These reforms have been widely studied. This paper focuses on coverage. It summarises the current state of pension coverage in many LAC countries, which shows that low coverage remains a problem even after recent expansions of many non-contributory pensions. Only 6 out of 10 older adults receive a pension. In addition, low pension levels raise concerns about both old age poverty and inability to maintain an adequate standard of living for workers once they stop working. These policy issues are likely to become more of a problem in the future. Although the population in many countries in the region is relatively young, it will experience an ageing population, in common with many advanced economies.

The paper also summarises participation in contributory schemes, which is also low, particularly among low and middle income earners. The paper argues that this low participation is due to the large informal job sector and the focus of contributory pension systems on formal jobs.

The paper argues that coverage is not expected to increase significantly in the absence of further reform, particularly for women and low and middle income earners.

Therefore the paper outlines two main ways to increase pension coverage:

1) Grant pensions to those reaching retirement age who do not have social insurance coverage, through increasing non-contributory pensions. This would help to reduce old-age poverty.

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The views expressed are those of the author and do not necessarily reflect the views of the New Zealand Treasury.

2) Increasing formal jobs to increase the numbers of workers in the labour market who are saving for their future i.e. increasing contributions to contributory pensions. This would help workers to maintain their standard of living in retirement.

There are some tensions and trade-offs between these two objectives, which the paper explains. For example, expanding non-contributory pensions:

- Could reduce incentives to participate in the labour market – for example, if these are funded by a social security tax, and
- Could reduce incentives to contribute to contributory systems.

3 Some evidence from New Zealand

Although the context in New Zealand is very different, some of our experience would tend to support some of these risks that can arise with a non-contributory pension. New Zealand has a public non-contributory system – known as New Zealand Superannuation – which is a universal, flat-rate benefit paid from age 65 subject to a residency requirement. Not surprisingly, this is generally considered effective in preventing old age poverty. However, the costs of such a scheme are expected to increase as the population ages – from around 4.5 per cent of GDP now to around 8 per cent of GDP in 2050.

What lessons from NZ are relevant for these proposals?

- First, on labour market participation. The New Zealand system has strong incentives for older people to stay working: no legal retirement age, no income or work tests. However, there is evidence that labour market participation falls sharply at the age of eligibility (although New Zealand's labour market participation is relatively high in lower age groups). It would be useful if the paper could distinguish between concerns about labour force participation at retirement vs. earlier ages.
- Second, on contributions to private pensions. Workplace-based private pensions declined in New Zealand from 23 per cent of workers in 1990 to 14 per cent of workers in 2006, as without any tax incentives and with a large non-contributory pension, there was little incentive to contribute to individual accounts. This does not mean, however, that people weren't saving for their retirement in other ways. But it does suggest a need to carefully consider how the introduction of a non-contributory scheme would affect incentives to contribute to a contributory scheme.

On the second option of increasing contributions to contributory pensions, the paper notes two main pathways to achieve this:

- increasing formal employment, and
- using innovations in how the state or private schemes communicate with citizens, such as text message reminders, to increase savings.

On the first, increasing formal sector jobs is a bigger challenge for the region than can be solved by pension policy alone. The paper notes some of the policy options in this area, such as tax reform to reduce formal labour costs. It also points to the need to ensure that any expansion of non-contributory pensions does not lead to higher costs on formal labour which could reduce formal jobs. I agree that increasing formal jobs is important in its own right and would also help to increase coverage. However, given the scope of the challenge, for the purpose of pension policy it would seem more pragmatic to take as given the presence of informal labour markets and consider how pension schemes can be designed to best work in these circumstances.

In terms of mechanisms to increase participation in private pensions, again I'd like to share some experience from New Zealand. In 2007, New Zealand introduced a new scheme with privately-managed individual accounts (KiwiSaver). The scheme is voluntary, employees are automatically enrolled when they start a new job but can opt out. It is open to all citizens under age 65. Workers who contribute will also receive a contribution from their employer, and there are some government subsidies tied to individual contributions (including for those of working age who are not currently working).

Enrolment in KiwiSaver has grown by an average of 20 per cent per annum over the last six years – around half of the total population have enrolled to date, with around 60 per cent of members opting in and around 40 per cent who were automatically enrolled when they started a new job. Many of the design features have aimed to make it as simple as possible for non-informed citizens to begin saving and encourage this to become a habit. It is too early to know how much this will increase retirement income over the long term, particularly because contribution levels are relatively low, but research suggests around one third of private contributions to KiwiSaver represent savings that would not otherwise have been made.

4 Suggestions for the paper

In terms of suggested improvements to the paper, I have four suggestions. First, it would be nice to see more discussion about the estimates of fiscal costs and the risks to the estimates of fiscal cost of expanding non-contributory pensions. The paper argues that moving toward universal coverage under certain conditions is affordable and can be achieved at a cost of around 1 percentage point of GDP, a level which would provide a pension of 10 per cent of per capita GDP. However, there are likely to be risks to this estimate. For example, a higher proportion of elderly in the population may lead to pressures to increase the level of the pension, which would increase the future cost by more than the estimates in the paper.

Second, there is little discussion around the choices between expanding non-contributory schemes for the current generation of retirees, compared with future generations. While it is possible to fund an expansion of non-contributory pensions for future retirees through a save as you go mechanism, this isn't possible for the current generation of retirees. The choice between SAYGO and PAYGO funding has implications for long run tax rates, intergenerational equity, capital accumulation, saving and risk sharing that it would be interesting to see considered further.

Third, in terms of non-financial instruments, the paper talks about examples such as providing information and financial education. While these mechanisms are important, decisions around pensions are complex and better information on its own may not be sufficient. The behavioural economics literature has much to say about non-financial mechanisms to increase saving, such as automatic enrolment, and it would be good to see some examples from countries that have tried some of these approaches and discussion about how these could be made to work in LAC countries, in the context of large informal labour markets.

Finally, the LAC region consists of a range of countries that have differing circumstances, and there is no one policy that will be suitable for all. Although the paper acknowledged this, overall I found that the paper was not clear about what specific policies could achieve the ambitious aims set out in the paper.

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CHOOSING FISCAL CONSOLIDATION INSTRUMENTS COMPATIBLE WITH GROWTH AND EQUITY

Boris Cournède,[*] Antoine Goujard[*] and Álvaro Pina[*]

Despite sustained efforts made in recent years to rein in budget deficits, a majority of OECD countries still face substantial public finance consolidation needs moving forward, owing to the legacy of debt accumulation before the crisis, and to the role played by fiscal policy in rescuing the banking system and supporting aggregate demand in the aftermath of the recession. Further budget consolidation is also needed over a much longer horizon to face long-term public spending pressures, in particular from pensions and health care.

Fiscal consolidation complicates the task of achieving other policy goals. In most cases, it weighs on demand in the short term. And, if too little attention is paid to the mix of instruments used to achieve consolidation, it can slow the process of global rebalancing, undermine long-term growth and exacerbate income inequality. It is therefore important for governments to adopt consolidation strategies that minimise these adverse side-effects. The analysis assesses the near and long-term consolidation needs for OECD countries and proposes consolidation strategies that take into account other policy goals as well as country-specific circumstances and preferences. To do so, increases in particular taxes and cuts in specific spending areas are assessed for their effects on short- and long-term growth, income distribution and external accounts. The results of detailed simulations indicate that a significant number of OECD countries may have to raise harmful taxes or cut valuable spending areas to deliver sufficient consolidation, underscoring the need for structural reforms to counteract these side-effects.

1 Introduction

Despite considerable progress in recent years, at the end of 2012 many OECD countries were still facing sizeable fiscal consolidation needs to bring back, or keep, public debt within manageable levels. Building on previous work by OECD and others, the present study presents a structured approach to the design of fiscal consolidation strategies to meet these needs while minimising adverse side-effects on growth and equity in the short and the long term, as well as on current-account balances. The paper subsequently goes on to provide some illustrative applications of the approach.

In a preliminary step, to serve as an input for the subsequent analysis of ways to minimise the side-effects of consolidation, the study provides estimates of consolidation needs in the short to medium term as well as the long term (Section 2). It then moves to its core subject and discusses the definition of growth, equity and current account objectives before presenting the list of potential consolidation instruments, evaluating their effects on these three objectives and proposing a generic illustrative hierarchy of instruments (Section 3). On that basis, Section 4 proposes a

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This is an abridged version of Cournède, B., A. Goujard and Á. Pina (2014), "Reconciling Fiscal Consolidation with Growth and Equity", *OECD Journal: Economic Studies*, Vol. 2013/1, available at: http://dx.doi.org/10.1787/eco_studies-2013-5jzb44vzbkhd

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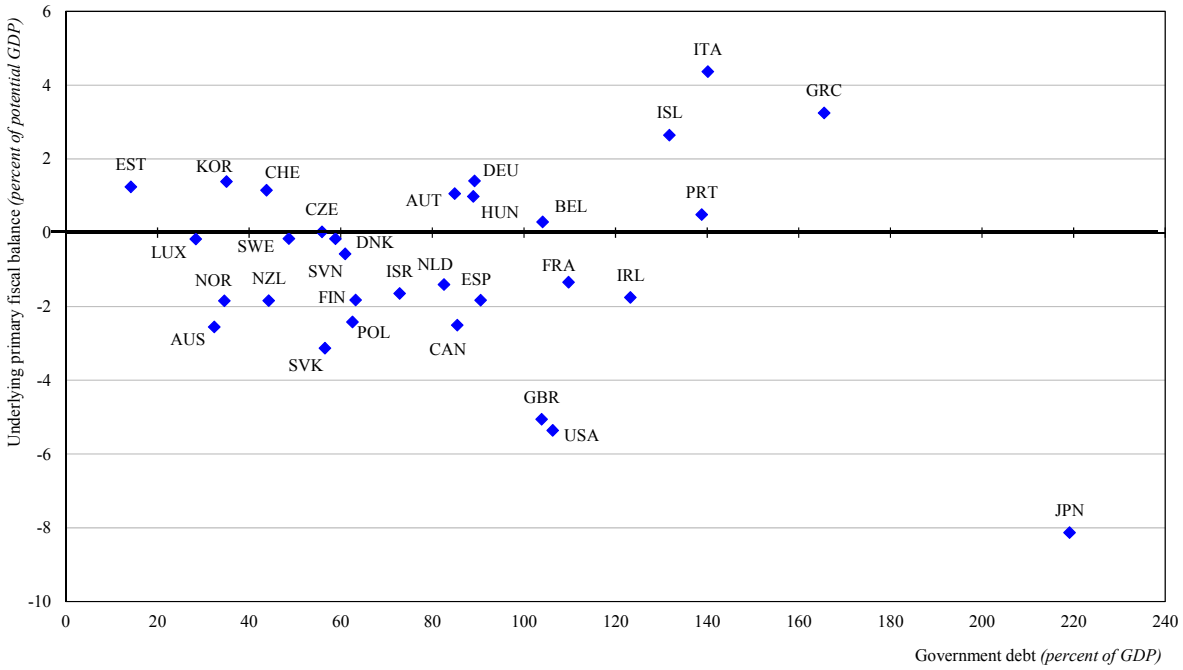
Figure 1

Debt and Underlying Primary Balances in 2012



method for developing differentiated hierarchies of instruments taking into account country specificities, in particular as regards vulnerabilities to the persistence of high unemployment. The study proceeds with an illustrative evaluation of how far down each country has to go on its list from more to less welcome instruments to meet its consolidation objectives without departing too much from its revealed preferences about government spending and revenue items and checks the robustness of the findings (Section 5). The results underscore the need for structural changes to be part of fiscal adjustment and for institutions to play a supportive role (Section 6). Section 7 concludes.

2 Estimated consolidation needs

The legacy of the financial crisis and earlier fiscal imbalances has burdened many OECD governments, with high debt levels, often accompanied by still significant structural deficits (Figure 1) which call for large consolidation efforts to reduce debt to more prudent levels. As a necessary preliminary step to permit a quantitative analysis of the composition of consolidation strategies, this section presents estimates of consolidation needs at the end of 2012 for both the short to medium term and the long term. The calculations assume a gradual consolidation effort, embodied in smooth time paths for the structural primary budget balance. The methodology is presented in full detail in Section 2 and Appendix 2 of Cournède, Goujard and Pina (2013). This approach ensures that the debt ratio is on a stable trajectory at the end of the consolidation horizon (2060). Second, in order to ensure that by 2060 the debt ratio not only stabilises but does so at the desired target level (set at 60 per cent of GDP), it differentiates short- from long-term consolidation needs, as explained in greater detail below. As developed in Box 1, this approach differs in purpose and methodology from the consolidation requirements reported in OECD's *Economic Outlook of May 2013* (OECD, 2013a).

BOX 1
SHORT- *VS.* LONG-TERM CONSOLIDATION NEEDS AND AVERAGE REQUIREMENTS

The estimated consolidation needs presented here differ from the average consolidation requirements reported in OECD (2013a) as they serve different purposes and therefore use different assumptions. The present set of consolidation needs forms a basis for the subsequent quantitative analysis of detailed consolidation packages that minimise side effects. The focus is firstly on how far these packages need to go in the short to medium term to bring debt under control and secondly on what has to be done to keep debt stable in the very long term, that is to say in 2060 and beyond. This differs from the objective of the requirements reported in OECD (2013a) which was to show how much effort beyond that already built into the near-term projection is needed *on average* from 2015 to 2030. From these different purposes and perspectives result different methodological choices with the main differences summarised as follows:

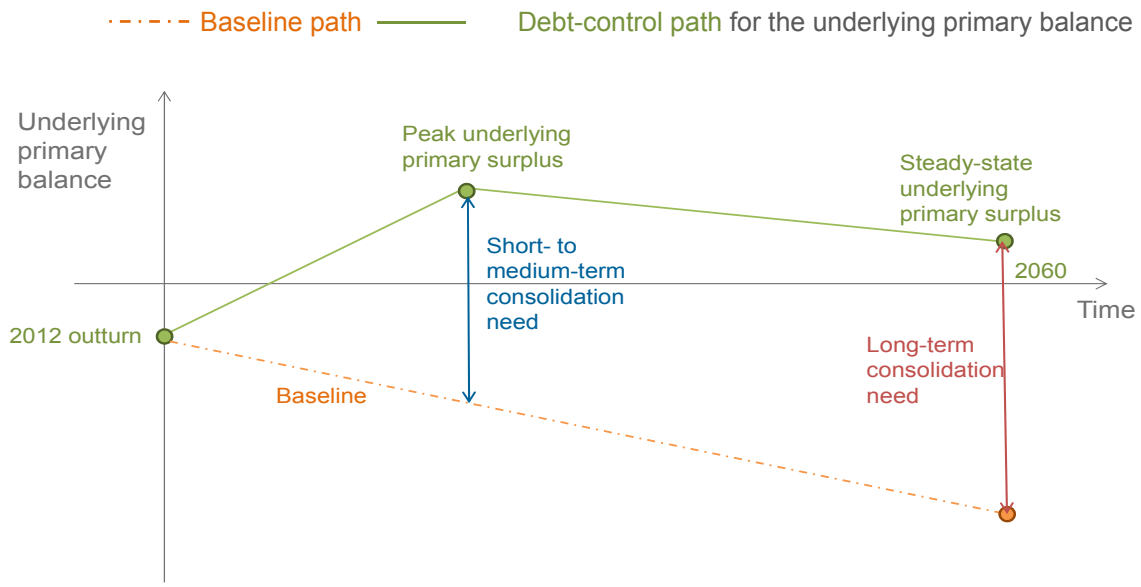
- The reference point for comparisons is 2012 in the current study, so that needed changes in individual areas of tax and spending can be compared to the latest historical point (or estimate). The reference point in OECD (2013a) is fiscal projections to 2014 to provide an idea of how much remains to be done in aggregate after the expected consolidation to 2014.
- The present estimates refer to the peak effort needed in the short- to medium-term and in 2060 whereas the requirements reported in OECD (2013a) relate to the average effort over 2015-2030. The former is needed for the present exercise as the point to assess how far, at the peak, instruments have to be used, and whether these instruments have to be maintained or can be partly reversed afterwards. To assess the size of aggregate consolidation efforts in an extended medium-term perspective as is the case in OECD (2013a), however, the average offers a more robust measure given that many different paths with many different peaks can be imagined for moving to debt stabilisation.
- In order to allow more realistic estimates of consolidation needs in the very long run (2060), the present estimated needs are calculated over a baseline where government expenditure on health and long-term care increases gradually over time. The baseline for comparisons in OECD (2013a) does not incorporate such cost pressures which have a lesser impact when looking at average effort over 2015-30.
- For the sake of comparability of consolidation packages and in line with the long-term focus of the study, the present set of estimates assumes that all countries reach 60 per cent gross debt-GDP ratios by 2060. In OECD (2013a), in line with the extended medium-term focus, the time horizon is 2030 but, to avoid too abrupt changes, some countries are allowed to reach their 60 per cent target after 2030.

Despite the differences of purposes and method, the cross-country correlation between the present set of short- to medium-term consolidation needs and the requirements presented in OECD (2013a) is very strong with a coefficient of 96 per cent.

Source: OECD (2013a), *OECD Economic Outlook*, May 2013.

Figure 2

Defining Short- to Medium-term and Long-term Consolidation Needs



The short- to medium-term consolidation need is defined as the difference between a baseline and the peak of a trajectory for the underlying primary balance that brings gross general government debt to 60 per cent of GDP by 2060. Evidently, different consolidation paths can be taken to attain the 60 per cent target, each leading to a different profile for the underlying primary balance (see Box 4.5 in OECD, 2013). For the purpose of this exercise, and although some countries have plans to adjust faster, the underlying primary balance is assumed to improve from its 2012 level at a rate of one per cent of potential GDP each year for as long as necessary to put debt on a trajectory toward the target. After that initial phase of consolidation, the length of which varies considerably across countries, the underlying primary balance is assumed to converge very gradually to the 2060 level which stabilises debt at 60 per cent of GDP (see Figure 1). With a starting point of high debt and deficit ratios, shared by many countries, initial improvement in the underlying primary balance at the annual pace of one per cent (1½ per cent in Japan) helps to ensure that debt is put on a downward path in a not-too-distant future (see Cournède, Goujard and Pina, 2013 for charts depicting all simulated trajectories).[1]

Both short- to medium-term and long-term consolidation needs compare the "debt-control" underlying primary balance with the baseline at the relevant point in projection period (Figure 2). The baseline corresponds to a policy scenario where sufficient reforms are introduced for public pension spending to remain constant relative to potential GDP and for government expenditure on health and long-term care to grow at a contained pace. Other tax and expenditure components are assumed to be unchanged from their 2012 levels relative to GDP except for cyclical effects associated with the projected closure of output gaps.

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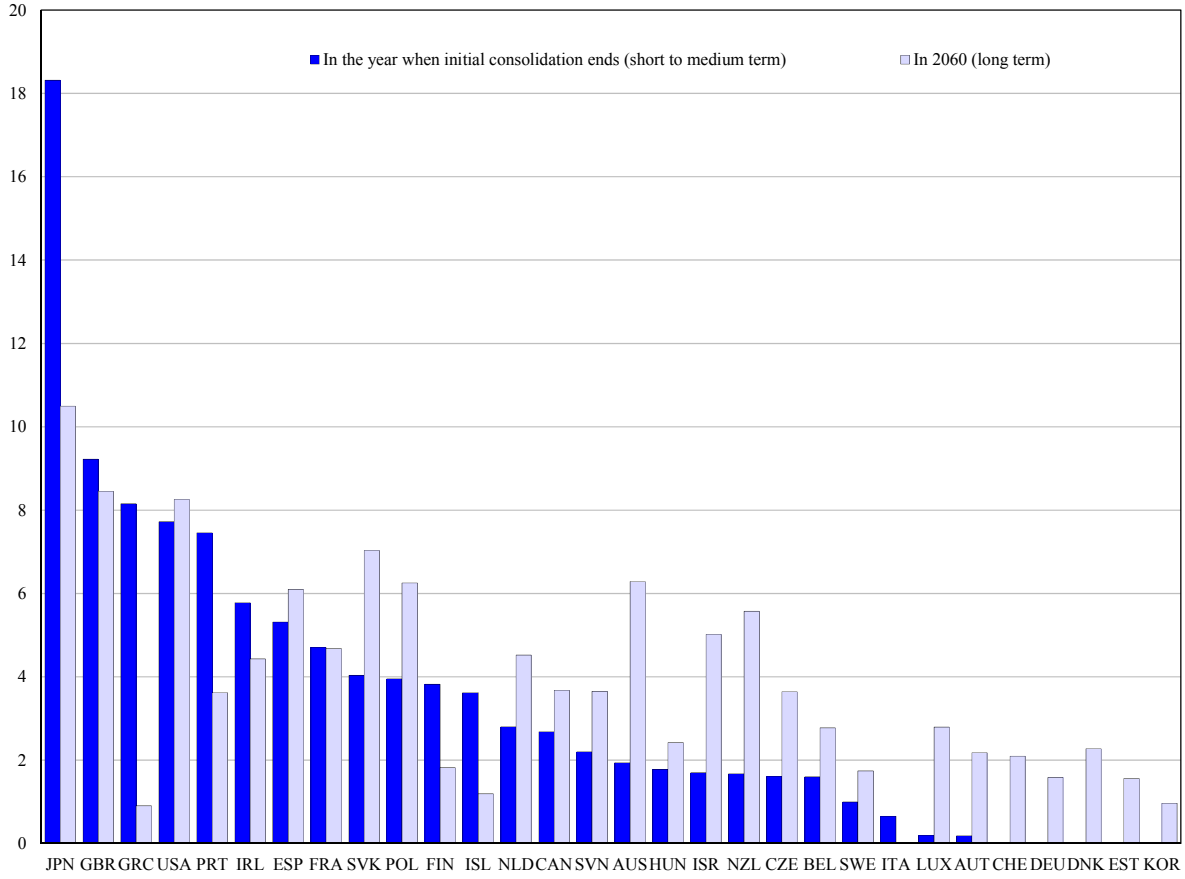
[1] This initial improvement at a fast pace, which generates a peak in the trajectory for the underlying primary balance, is needed in most but not all countries. Countries with a better starting fiscal position do not need such a peak. Nevertheless, the time path for the underlying primary balance always exhibits a kink (often, but not always, a peak), which provides the point where short- to medium-term consolidation needs are calculated.

Figure 3

Estimated Consolidation Needs at Different Time Horizons
(difference between debt-control and baseline underlying primary surplus, percent of potential GDP)



Source: *OECD Economic Outlook* of May 2013 long-term database and OECD calculations.

Estimates based on the approach described above suggest that in Greece, Japan, Portugal, Spain, United Kingdom and the United States, a short- to medium-term consolidation in excess of 5 per cent of potential GDP is required to reduce debt to 60 per cent of GDP by 2060 (Figure 3). This is the result of currently high debt levels (Greece, Ireland, Portugal, Spain) or their combination with large initial underlying primary deficits (Japan, United Kingdom, United States). To bring debt to the same level, another group needs short- to medium-term consolidation by more than 3 per cent of GDP — though less than 5 per cent — because of high debt levels (France, Iceland) or a significant underlying primary deficit (Finland, Poland, Slovak Republic). Other countries, including in particular Italy and Germany, face little or no short- to medium-term structural consolidation needs, though high debt in the former makes this conclusion vulnerable to interest rate changes. When needed, consolidation is in most cases relatively brief in the simulations: three out of four countries that require short- to medium-term consolidation complete it in four years or less. Many countries have made consolidation plans that go a long way toward meeting these consolidation needs (see OECD, 2013, for country-by-country projections of consolidation efforts in 2013 and 2014).

Consolidation needs are larger in the long than the short term for the majority of countries, with the difference particularly large in countries where short-term needs are limited thanks to low initial debt levels. The high estimated level of long-term consolidation needs reflects the large expected spending increases on health and long-term care. That said, since the cross-country variation in projected increases in government health spending is limited, it does not account for much of the differences in estimated long-term consolidation needs. The latter are primarily due to the starting point for the underlying primary surplus in 2012. Another significant source of differences is that the OECD long-term growth scenarios project interest rates rising well above nominal GDP growth rates by 2060, which leaves governments holding large amounts of financial assets with substantial capital income to service their debt. This effect reduces the estimated long-term consolidation needs of Canada, Finland, Japan, Korea and Norway by 2½ per cent of GDP or more compared with a situation where these countries' governments had no financial assets.

Estimates of consolidation needs are fraught with uncertainty and sensitive to the assumptions made and targets chosen. Cournède, Goujard and Pina (2013, Section 2) discuss sources of uncertainty and provide alternative estimates of consolidation needs, which can be summarised as follows:

- The estimated long-term consolidation needs are sensitive to the assumption that pension reforms keep government spending constant as a share of GDP in this area in the baseline. If instead public pension spending were assumed to increase in line with projections based on unchanged policies, long-term consolidation needs would be estimated to be much larger in many countries.
- Hypotheses regarding the use or not of government financial assets can influence estimated consolidation needs. A number of countries have large holdings of financial assets which can be sold to facilitate progress toward any gross debt targets, reducing estimated short- to medium-term consolidation needs. Asset draw-down strategies of this nature however come at the cost of increasing long-term consolidation needs as in the long run they leave governments with reduced recurring financial income.
- Estimates of consolidation needs are sensitive to the chosen level of the debt target. Aiming for instance at gross debt-GDP ratios of 100 per cent (instead of 60 per cent) by 2060 would reduce estimated to medium-term needs substantially. However, such a change in the debt target raises long-term consolidation needs significantly as governments would have to generate higher primary surpluses in order to ensure the stability of a larger stock of debt.

3 The effects of consolidation instruments on other policy objectives

3.1 Other policy objectives

While the point of fiscal consolidation is to reduce debt, it cannot ignore other policy objectives. The present study looks at the extent to which fiscal consolidation can proceed while minimising adverse effects on short-term growth, preserving long-term prosperity, avoiding exacerbating income inequality in the short and long term and contributing to global rebalancing. In addition to being an objective in its own right, equity may influence the sustainability of fiscal adjustment programmes. Consolidation strategies perceived as inequitable are more likely to be reversed and to fail to reduce debt.

The distinction made here between short- and long-term effects does not relate to specific time spans but to adjustment processes. Short-term effects correspond to the direct impact of measures as they are implemented. Long-term effects describe their consequences when cyclical adjustment has run its course and behaviour has responded fully to the measures.

Table 1

Instruments of Consolidation

Expenditure Cuts	Revenue Increases
Public consumption: education	Personal income taxes
Public consumption: health	Social security contributions
Public consumption: other (except family)	Corporate income taxes
Cash transfers: pensions	Environmental taxes
Cash transfers: unemployment benefits	Consumption taxes (non-environmental)
Cash transfers: sickness and disability	Recurrent taxes on immovable property
Public consumption and cash transfers: family	Other property taxes
Subsidies	Sales of goods and services
Public investment	

Source: Cournède, Goujard and Pina (2013).

3.2 Instruments

The instruments considered are policies that permanently affect government underlying primary spending and revenues. Government underlying primary spending is broken into ten categories, including four consumption items, three transfer items, subsidies, public investment (Table 1) and a residual item which is not considered as an instrument of consolidation. The expenditure breakdown broadly follows national accounts classifications with the difference that user charges are not netted out from government consumption. Instead, user charges are included among the eight consolidation instruments considered on the revenue side (Table 1). Cutting tax expenditures, a potentially large and attractive source of revenue, is nevertheless not included as an instrument because of the lack of sufficiently reliable and internationally comparable data across countries. Section 6 however discusses how reductions in tax expenditures can contribute to policy strategies that combine fiscal consolidation with structural reform.[2]

3.3 The effects of instruments on objectives

An attempt is made at evaluating the effect of revenue increases and expenditure cuts on growth, equity and global rebalancing objectives. The effects of instruments on the current account are also evaluated because consolidation strategies should take into account coordinated efforts in multilateral settings such as the G20 to achieve balanced growth at the global level. For the purpose of this exercise, the instruments are assessed on their own, without considering how their side-effects on long-term growth and equity could be minimised through structural reforms in the

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[2] In Section 2 of Appendix 2, Cournède, Goujard and Pina (2013) provide details on the definition of the categories, on the sources used and on the methods employed to gather data from different sources in a way that adds up to government primary spending as recorded in national accounts.

tax or spending area under consideration, other structural reforms, or redistributive policies. The distinction between purely fiscal changes and structural reform is obviously not so clear cut in practice.[3] Still, it is useful insofar as it allows for an assessment of the side-effects that some consolidation instruments can imply for other policy objectives (this section) before discussing the benefits of joint policy strategies that combine consolidation with structural reform (Section 6).

The present assessment builds on previous work by the OECD and the wider literature complemented by new estimates presented in Cournède and Barbiero (2013). Table 2 summarises this assessment, and the main points are discussed below while additional details about the evaluation of individual instruments are described in Cournède, Goujard and Pina (2013, Appendix 2, Section 3). Besides showing the estimated direction of the effect, some crude indications of the relative strength are also provided, based on empirical evidence.

3.3.1 Long-term growth effects

A number of fiscal consolidation instruments can enhance the long-term level of output. Evidence suggests that, in advanced economies in general, reducing the size of government up to a point increases long-term output although there is clearly no consensus on what constitutes the optimal size of the public sector even from a strict efficiency point of view. This output-enhancing effect of reducing government spending is likely to be stronger in areas such as subsidies[4] where public expenditure frequently distorts the allocation of resources in the economy. Similarly, cuts in public spending that can prompt a positive response of labour utilisation, such as in pensions, are likely to have a particularly favourable effect on the long-term level of output per capita. Reductions in public spending on unemployment benefits can also boost employment and output per capita insofar as they do not bring unemployment insurance down to a level prompting inefficient employee-job matches that could curb productivity. Cuts in disability payments can boost labour utilisation (Hagemann, 2012) although this effect will arise only insofar as workers with significant residual capacity are receiving disability assistance.

Some revenue measures can also contribute positively to long-term output when they promote more efficient use or allocation of services or resources that were previously inadequately priced. To the extent that their current levels correspond to under-pricing, higher user charges reduce the waste of economic resources, thereby boosting productivity and output (de Serres *et al.*, 2010). Better pricing the use of environmental services through taxation can also lead to welfare gains through improved environmental amenities that are not measured in GDP.

In contrast, other consolidation instruments can reduce the productive potential of economies. At a general level, raising the tax burden tends to reduce factor supply and long-term output (OECD, 2003; Bouis *et al.*, 2011). Evidence on the impact of the tax structure (Johansson *et al.*, 2008; Bouis *et al.*, 2011) indicates that taxes on mobile or adjustable production factors affect aggregate supply with particular severity. In the present classification of instruments, personal income taxes, social security contributions and corporate income taxes fall into this category. Other taxes such as value-added or consumption taxes have proven to exert still meaningful but less strong distortionary effects (Johansson *et al.*, 2008).

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[3] On the spending side, for instance, cuts in education spending achieved through reduced service provision can be described as pure budgetary measures whereas efficiency gains that can maintain a similar level of service for lower costs represents structural reform. On the revenue side, one example where the distinction is clear is indirect taxation where an increase in the standard VAT rate can be seen as a pure fiscal change while measures such as reducing the reliance on reduced rates and exemptions are part of structural tax reform. One example where the distinction is difficult to make is unemployment insurance where almost any form of reduction in benefits will amount to a change in structural policy settings.

[4] Some categories of subsidies, however, can work in the direction of raising growth potential. In particular, government subsidies can encourage business research and development activities where the social rate of return exceeds the private rate of return because of cross-company spillovers (Jaumotte and Pain, 2005).

Table 2

Summary Assessment of Growth and Equity Effects of Fiscal Consolidation Instruments

	Growth		Equity		Current Account[(a)]
	Short-term	**Long-term**	**Short-term**	**Long-term**	**Short- to Medium-term**
Spending cuts					
Education	--	--	-	--	+
Health services provided in kind	--	-	-	-	++
Other government consumption (excluding family policy)	--	+	-		+
Pensions		++			++
Sickness and disability payments	-	+	--	-	++
Unemployment benefits	-	+	-		++
Family	-	-	--	--	+
Subsidies	-	++	+	+	+
Public investment	--	--			++
Revenue increases					
Personal income taxes	-	--	+	+	+
Social security contributions	-	--	-	-	
Corporate income taxes	-	--	+	+	++
Environmental taxes	-	+[(b)]	-		+
Consumption taxes (other than environmental)	-	-	-		++
Recurrent taxes on immovable property	-				+
Other property taxes	-		++	+	+
Sales of goods and services	-	+	-	-	+

Note: (a) Current-account effects refer to a deficit country, and would switch sign in the case of a surplus country. (b) This + sign reflects positive welfare effects as the long-term impact on output narrowly defined as GDP may be ambiguous.
Source: see main text and Section 3 of Appendix 2 in Cournède, Goujard and Pina (2013).

Spending reductions can entail potentially large long-term losses in output when they cut into areas where governments provide particularly valuable public goods or growth-enhancing services that are insufficiently produced by market forces. Empirical evidence (OECD, 2003; Sutherland and Price, 2007) suggests that cuts in public investment or government spending on education broadly fall into this category. As developed in Section 6, cuts in government investment or education that respectively focus on low-externality projects or are accompanied by education reform can have more limited, or even favourable, growth effects. However, as mentioned earlier, the simple assessment summarised in Table 2 is concerned only with plain fiscal changes without structural reform, implying a lower provision of public goods and services. Cuts in health care can also reduce output per capita by reducing labour supply and productivity. When controlling for taxes, public health spending appears to have a positive, albeit moderate, effect on output per capita (Barbiero and Cournède, 2013).[5] Through its contribution to well-being, health spending is most likely to have additional positive welfare effects that are not measured in GDP.

Cuts in childcare can reduce output per capita primarily by depressing labour force participation (OECD, 2007). Reductions in family benefits have a more ambiguous effect on output per capita through two channels that work in opposite directions. Firstly, they can prompt greater labour market participation, boosting output per capita. Secondly, such cuts can increase child poverty (Whiteford and Adema, 2007), hampering the formation of human capital and resulting in durably lower long-term output per capita. Overall, the net effect of cuts in the aggregate of childcare and family benefits on long-term output per capita is likely to be negative. Some consolidation instruments are likely to have neutral or very weak long-run effects on output. Such is the case of taxes with relatively low distortive effects, such as property taxes (Johansson *et al.*, 2008).

3.3.2 Short-term growth effects

Most fiscal consolidation instruments are harmful for growth in the short run, but there are differences among them and a few exceptions. Although the vast literature on fiscal multipliers has not achieved consensus, international experience suggests by and large that they are highest for public investment and government consumption and substantial but smaller for transfers and taxes (Figure 4; OECD, 2009; Barrell *et al*, 2012). The main reason behind this difference is that changes in government investment and consumption affect activity directly while the effects of changes in taxes and transfers transit through the accounts of households and firms, offering greater possibilities for offset from saving behaviour. Consistent with this ranking, empirical evidence indicates that private-sector offsets from changes in government balances depend on their composition and are strongest for revenues, intermediate for spending and weakest for investment (Röhn, 2010).

The short-term output effects of instruments will depend on their design. In most cases, this design dependence does not preclude a broad assessment of their effect, but as far as cuts in pension spending are concerned, even the direction of the impact can change depending on how they are implemented. If cuts fall on current pensioners, they correspond to a reduction in transfers and are likely to affect output with a similar multiplier. In contrast, if pension spending is cut by raising the retirement age including for workers close to this age when the change is implemented, some positive demand effects are possible (Kerdrain *et al.*, 2010) at the same time as supply expands, with an ambiguous net effect on the degree of economic slack.

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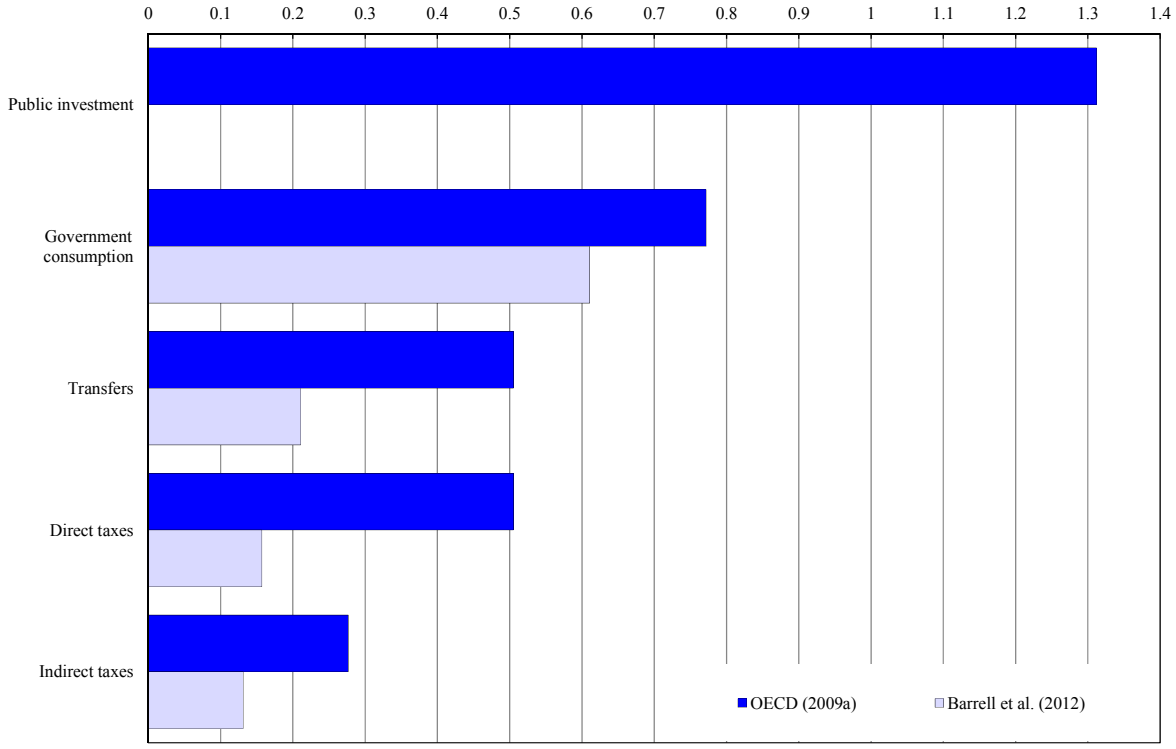
[5] Although part of the empirical literature finds a negative effect of public health spending on GDP per capita, this appears to be related to the output cost of the associated taxes which the present study considers separately (see for instance Box 6.1 in OECD, 2011a).

Figure 4

Estimates of Short-term Fiscal Multipliers for Different Consolidation Instruments

(GDP contraction from a permanent 1 percentage-point increase in the underlying primary balance, percent)



Note: the effects plotted in the chart are unweighted averages of country estimates reported in the quoted documents. The effect is averaged over the first and second years of consolidation for OECD(2009) estimates and refers to the first year for Barrell *et al*.'s (2012) estimates. The simulations underlying Barrell *et al*.'s (2012) multipliers assume unchanged monetary policy in the year of the fiscal shock, but they incorporate the positive output effect of a fall in long-term interest rates resulting from the anticipation of a more accommodative monetary-policy path in the years following the shock. No multiplier estimate is available for public investment in Barrell *et al.* (2012).

In countries that are experiencing confidence crises because of their fiscal positions, the estimated multipliers reported above, which are calculated as historical averages, may not apply to their current circumstances. In fiscal-crisis countries, the absence of consolidation could translate into a massive loss of confidence triggering economic collapse. If it helps avoiding such extreme counterfactual scenarios, consolidation may be highly expansionary. There is also a possibility that, in such circumstances, different instruments may have different expansionary effects, notably by signalling the degree of determination of public authorities and thereby the likelihood that consolidation may be maintained. In particular, cuts in spending areas that raise serious political-economy challenges, such as subsidies, has been found to increase the probability of large consolidations to be successful (Molnar, 2012). There is however no consensus on the existence of these potential expansionary effects of consolidation, on their strength, on measuring when they may apply and how they may differ across instruments at a disaggregated level. For these reasons, these potential expansionary effects are not integrated in the assessment but should be seen as caveats regarding the extent to which the summary assessment presented in Table 2 applies to actual or potential crisis countries.

3.3.3 *Effects on equity*[6]

Many consolidation instruments work in the direction of aggravating income inequality (Table 2). Transfers in particular have strong redistributive power so that cuts in benefits are generally regressive, perhaps with the exception of public pensions where the equity effect is likely to be muted in countries where they are based on earned income and close to actuarial neutrality. Reducing the provision of public services likewise contributes to increasing inequality in effective consumption (OECD, 2011b).[7] Also, a number of taxes fall more heavily on lower-income households, with the implication that increasing them would raise disposable income inequality.

Some fiscal consolidation instruments, on the other hand, can reduce income or wealth inequality. Such is particularly the case of hikes in inheritance and capital gains taxes, which the classification used in the present study includes among "other property taxes".[8] Increasing taxes that are typically designed to be progressive, such as personal income taxes, also goes in the direction of reducing disposable income inequality. The same holds for hikes in revenue instruments that are concentrated on capital income such as corporate income taxes (although some of their burden also falls on labour).

The equity implications of fiscal consolidation instruments can also evolve as behaviour responds to fiscal changes. Cuts in unemployment insurance payments, disability benefits or other social assistance programmes that are partly used as a way of withdrawing from the labour market can over time foster greater labour force participation. Since labour income tends to be greater than benefit payments, the supply response will work over time to reduce the regressive impact of cuts. On the tax side, environmental taxes, although they tend to be regressive in the short term, provide benefits that accrue in priority to low-income groups as those are more exposed to environmental degradation (Serret and Johnstone, 2006). Some of these effects, such as better health allowing greater labour supply, are reflected in higher measured income. Other often lagged effects such as improved well-being from better environmental conditions are not reflected in income distribution data. Consumption taxes, which are regressive in the short term because low-income households save a smaller share of their income than better-off ones, are neutral in a lifetime perspective taking into account the period when former savers spend what they previously accumulated. Finally, the redistributive benefits of some consolidation measures can wane over time as individuals put in place effective avoidance strategies as appears to be the case for inheritance taxes (Kopczuk, 2007).

3.3.4 *Short- to medium-term effects on the current account*

At a broad level fiscal consolidation works to push the current account towards a surplus over the short to medium term, but different instruments can have different effects depending on how they shape private saving and investment decisions. The impacts of individual consolidation instruments over and above the general macro-economic effect are assessed based on the results

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[6] The assessment of the effect of instruments on income inequality draws largely on OECD (2012) and Rawdanowicz *et al.* (2013). Supporting material for the broad assessment summarised here is provided in Appendix 2, Section 3 of Cournède, Goujard and Pina (2013).

[7] The study however incorporates no assessment of the impact of public investment on inequality. At a conceptual level, the effect is ambiguous. By providing the basis for public capital services that are consumed without relation to income, public investment should promote equality in effective consumption. On the other hand, inasmuch as public capital is complementary to private capital and boosts returns on capital, it could work in the direction of exacerbating income inequality because of the concentration of control over private capital. While there is evidence in favour of net equality-enhancing effects of public investment in developing countries, there are no comparable findings for OECD countries.

[8] No positive or negative assessment is included for real estate taxes because of a lack of clear evidence. In most OECD countries, lower-income households pay a higher share of their income in recurring property taxes than higher income taxes, so that on this count recurring property taxes might be described as regressive. However, this situation largely reflects larger home ownership among retirees, implying that recurring property taxation is not necessarily regressive in a dynamic perspective, and may even be progressive if adjusting income fully for the market value of owner-occupied housing services.

reported in Kerdrain *et al.* (2010). Reductions in health care spending and in unemployment or disability benefits are likely to strengthen the current account through increased precautionary saving, whereas cutting pension benefits should lead to higher saving by the working-age population to smooth consumption over the life cycle. An increase in corporate taxation could improve the current account through lower investment (Schwellnus and Arnold, 2008; Vartia, 2008). Higher consumption taxes tend to penalise imports relative to exports, and thus may temporarily strengthen the current account, while the opposite holds for social security contributions.

3.4 A generic hierarchy of instruments

Based on the estimated impacts reported above, a generic hierarchy of consolidation instruments can be established (Figure 5). This is done simply by putting the same weight on each objective, assigning numerical values to the pluses and minuses and using the resulting scores to rank the instruments. The generic hierarchy puts no weight on the current-account because the pursuit of global rebalancing operates in opposite ways depending on the sign of the imbalance and not at all in countries that have broadly balanced positions. Instead, current-account effects enter at a more country-specific level (see further below).

A long-term variant of the generic hierarchy can also be established for the purposes of looking solely at very long-term consolidation strategies by considering only to long-term growth and equity effects. In this long-term variant, the instruments follow this ranking: 1) Subsidies, 2) Pensions, 3) Other government consumption, Unemployment benefits, Environmental taxes and Other property taxes, 7) Sickness and disability payments, Recurrent taxes on immovable property and Sales of goods and services; 10) Consumption, Personal income and Corporate income taxes; 13) Public Investment, Health services; 15) Family policy and Social security contributions; 17) Education.

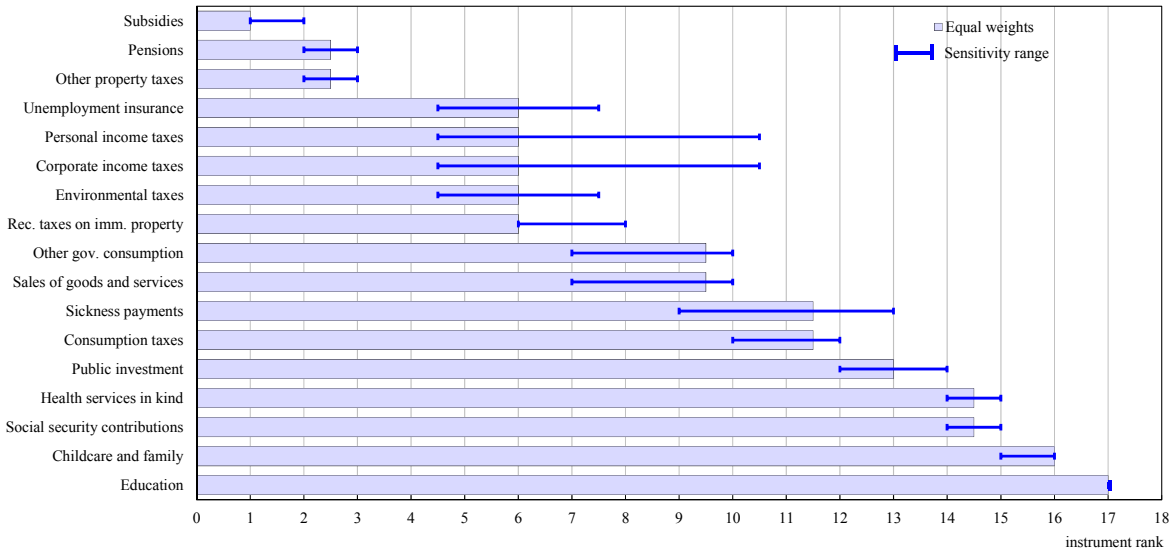
Figure 5 also illustrates the sensitivity of instrument rankings to different weighting schemes and to uncertainty about the assessment of effects. A certain degree of sensitivity is indeed observed as instruments score differently across objectives, but the ranking of most instruments remains broadly stable in particular at both ends of the spectrum (Figure 9). Reductions in subsidies and in pension spending as well as increases in other property taxes come out robustly as preferred consolidation instruments. At the lower end, spending cuts in the areas of education, health care and family policy, as well as hikes in social security contributions, appear as particularly unfavourable in terms of generating adverse side effects for growth and equity. In contrast, the middle part of the ranking is more fluid. Hikes in corporate and personal income taxes can take different places in the ranking depending on the weights given to objectives, reflecting that they raise severe trade-offs between output and equity considerations.

In addition to the arbitrary nature of the scoring and weighting scheme, considerable caveats surround the rankings above. They are based on an assessment of equity and growth effects of consolidation instruments which is drawn primarily from studies that estimate average effects in historical experience across countries. In practice, however, the growth and equity effects of instruments vary across countries: for instance, cutting investment in new roads in a country where highway density is already high should be less harmful to long-term growth than in a country with severe infrastructure gaps. Taking this cross-country variation into account is beyond the scope of this study, but it nonetheless goes beyond a pure one-size-fits-all approach. More specifically, the economic and social situation of countries in need of consolidation is taken into account by changing the weight of the different objectives, as is developed below. Also, the way in which the room for manoeuvre is evaluated for each instrument takes into account whether or not the level of taxation or spending in this area is particularly high in the country under consideration.

Figure 5

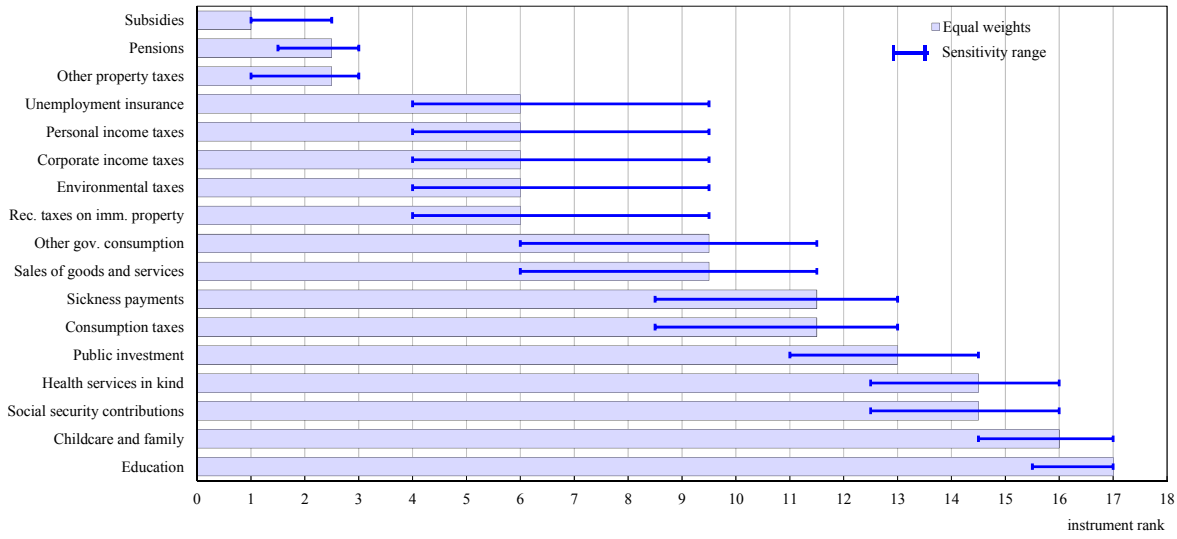
A Possible Generic Hierarchy of Consolidation Instruments and Its Sensitivity to Assumptions

A) Sensitivity to Uncertainty About the Weights Given to Objectives



Note: The rankings are based on the assessment in Table 2. Scores of +1 and -1 are given to each + and- signs respectively, each objective (except the current account) is given a weight, and the resulting indicator is used to rank instruments. For deriving ranges, weights ranging each from 0.15 to 0.55 and summing to unity have been given to each objective in 10,000 random draws. Weights have been restricted to no smaller than 0.15 because each objective is considered important. The sensitivity range displays the 10th and 90th percentiles of the instrument rankings.

B) Sensitivity to Uncertainty about the Assessment of Instruments (Pluses and Minuses) in Table 2



Note: The rankings are based on Table 2. Scores of +1 and -1 are given to each + and- signs respectively, each objective (except the current account) is given a weight of one quarter, and the resulting indicator is used to rank instruments. For deriving ranges, each individual instrument score along each objective shown in Table 2 is kept with a probability of ¾ or increased by +1 with a probability of ⅛ or reduced by -1 with a probability of ⅛ using in 10,000 random draws. The sensitivity range displays the 10th and 90th percentiles of the instrument rankings.

4 Adjusting instrument rankings for country-specific circumstances over the short to medium term

The generic hierarchy is adapted to country-specific circumstances by adjusting the weights put on growth, equity and global rebalancing objectives. Summary indicators are defined for each of the growth, equity and current account dimensions, and then used to compare country situations and form country groups. This makes it possible to derive a set of weights for each group and therefore a hierarchy of instruments for each group. While technically feasible, a country-specific ranking of instruments would give a false impression of accuracy with respect to country-specific instrument impacts and risk obscuring the substantial uncertainties and error margins of the exercise.

The group-specific rankings derived here will guide the choice of instruments for short- to medium-term consolidation in the illustrative simulations. In the long run, however, a single hierarchy of instruments (presented in Section 3) is assumed to apply. As further addressed below, this is because some of the dimensions taken on board to form country groups lose relevance as the time horizon expands (e.g., short-run growth and current account imbalances) while a solid basis is absent for giving differentiated weights to long-run growth impacts.

4.1 Characterising country circumstances

4.1.1 Short-run growth

This study attaches different weights to the short-run growth impacts of fiscal retrenchment depending on the degree of cyclical weakness faced by countries and their vulnerability to hysteresis.[9] A deeper negative output gap makes any short-run output losses from consolidation more painful, especially if fiscal multipliers of the Keynesian kind have become larger under such circumstances. Indeed, some recent studies find multipliers to be larger in recessions than expansions (Auerbach and Gorodnichenko, 2012; Baum *et al.*, 2012), particularly in a context of financial crisis with monetary policy constrained by the zero nominal interest rate bound (IMF, 2010; Christiano *et al.*, 2011; Corsetti *et al.*, 2012). In turn, hysteresis effects could translate short-run slack into permanently lower levels of potential output through channels such as higher structural unemployment and a smaller capital stock (Bouis *et al.*, 2012). The degree of trade openness influences multipliers and could be invoked as an argument for a lower weight on short-run activity in more open economies. However, this consideration is not allowed to affect rankings to avoid a beggar-thy-neighbour approach to consolidation, given that fiscal adjustment involves strong cross-country spillovers (Goujard, 2013).[10] Box 2 presents the indicator used to measure country circumstances.

4.1.2 Long-term growth

Assessing for which countries fiscal policy needs to be more supportive of long-run growth, with a concomitantly larger weight given to this objective, would be a hazardous task. Using weaker growth prospects as an argument for a larger weight runs into the difficulty that long-term growth projections are inevitably fraught with uncertainty and depend to a significant degree on policy assumptions in a wide range of areas, such as education, retirement age or product market

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[9] Besides affecting the choice of fiscal instruments, short-run growth impacts also have important implications for the optimal pace and timing of consolidation (Rawdanowicz, 2012), an issue from which this paper largely abstracts.

[10] Nevertheless, the generic ranking to some extent reflects whether activity impacts occur domestically or abroad because one of the reasons why multipliers vary across instruments is that they have different import propensities.

Box 2
Indicators Used to Characterise Country Circumstances

The following indicators are used to characterise country circumstances:

- Short-run growth: The average of two variables, the output gap in 2012 and the 2007-12 percentage point change in the long-term unemployment rate, is used as a synthetic indicator. The run-up in long-term unemployment is used as proxy of vulnerability to hysteresis, since it is a key variable in the transmission of short-run labour market slack to structural unemployment (Guichard and Rusticelli, 2010). While in principle levels would also provide an indication of the degree of hysteresis risk, the change is used in order to focus on impacts from the current crisis rather than pre-existing structural characteristics. The latter are better addressed through structural reforms in labour markets as well as in product markets and tax and welfare systems.
- The summary indicator used to capture inequality is the average of two statistics: the Gini coefficient and the relative poverty rate (defined as the share of the population with income below 60 per cent of the median). While the Gini coefficient encapsulates the whole income distribution, the relative poverty rate focuses on the lower tail. These two indicators are computed after taxes and cash transfers.
- External imbalances are assessed using Ollivaud and Schwellnus (2013) estimates of cyclically-adjusted current account balances, which correct headline balances for the difference in output gaps between countries: a country facing a deeper downturn than its trading partners will temporarily tend to post a headline current account stronger than the adjusted one, as imports become more depressed than exports. The summary indicator used is the average of two variables: the adjusted current account balance in 2012 as a percentage of both national GDP, and the same balance as a percentage of OECD GDP. The ratio of the cyclically adjusted current-account balance to OECD GDP, which captures the absolute size of imbalances, serves a proxy for their global implications which countries are assumed to internalise as part of the global rebalancing agenda.

To ensure comparability and avoid scale effects, the variables entering the indicators are normalised by subtracting their average and dividing the result by the standard deviation.

Source: Cournède, Goujard and Pina (2013).

and trade regulations (Johansson *et al.*, 2013). The long-term growth impacts of fiscal consolidation instruments are therefore deemed equally important for all countries.

4.1.3 Income distribution

The impacts of fiscal instruments on income distribution arguably gain increased prominence in more unequal countries. The links between inequality, growth and welfare are admittedly complex, and, to some extent, inequality differences across countries are rooted in social preferences, so that strong opposition to regressive changes might arise at comparatively low levels of inequality in strongly egalitarian societies. Still, beyond certain levels, inequality, and particularly poverty, may be bad for growth. Channels of transmission of inequality's detrimental effects include hampered investment in human capital, an area where inequalities can be self-perpetuating (Causa and Johansson, 2009; Hoeller *et al.*, 2012).

4.1.4 Current account balances

Addressing significant external imbalances is also a widely shared objective of economic policy (G20, 2009), which calls for taking account of the current account impacts of different budget items when designing consolidation strategies. Imbalances carry risks for the individual countries concerned (the prospect of a hard landing for debtors, or growing credit risk for surplus countries), all the more so when they are particularly large, but also for the global economy (OECD, 2012a).

4.2 Hierarchies of instruments for groups of countries

A cluster analysis has been performed to identify groups of countries that share similar characteristics regarding short-term growth, equity and external imbalances (see Box 3 in Cournède, Goujard and Pina, 2013 for details about the clustering technique employed). Based on the summary indicators discussed above, five clusters have been identified:

1) The first cluster is formed by eleven geographically dispersed countries (Australia, Canada, Estonia, Israel, Italy, Japan, Korea, New Zealand, Poland, Portugal and the United Kingdom), which mainly have in common above-average levels of inequality. Short-term growth risks are generally moderate (Italy and Portugal being exceptions) and current account positions, though with considerable heterogeneity, do not include cases of extreme imbalances and are on average fairly close to balance.
2) The United States finds itself alone in the second cluster, as the sheer absolute size of its current account deficit places it at a considerable distance even from other deficit countries. Inequality is high and cyclical developments carry potentially substantial hysteresis risks although the materialisation of these risks would run counter to historical experience.
3) The third cluster comprises three euro area members from the geographical periphery (Greece, Ireland and Spain) sharing very high cyclical slack and hysteresis risks. Greece and Spain (but not Ireland) also display above-average inequality and large underlying external deficits.
4) A fourth cluster is formed by eleven European countries: Austria, Belgium, the Czech Republic, Denmark, Finland, France, Hungary, Iceland, Norway, Slovakia and Slovenia. It is the most egalitarian cluster. As in the first group of countries, current account imbalances are on average small, though with significant intra-group heterogeneity,[11] and short-term growth risks are generally moderate.
5) The fifth and final cluster comprises five countries, Germany, Luxembourg, the Netherlands, Sweden and Switzerland, all with large current account surpluses. Inequality levels are below-average and short-term growth vulnerability risks are among the lowest in the OECD.

For each of these clusters, specific weights are calculated for the short-term growth, equity and current-account objectives (Table 3). The weights depend on the degree to which each objective is relevant for the cluster as a whole in comparison with the other objectives (but do not compare the importance of each objective across different clusters of countries). For instance, short-run growth will attract a strong weight in groups of countries where cyclical weakness and hysteresis risks – whether very high in themselves (cluster no. 3) or only moderate (cluster no. 4) – are clearly a more important concern than equity or current account issues. Similarly, the high weight attached to the current account objective in cluster no. 5 stems from the contrast between

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[11] As is well known, Norway has a huge current account surplus (at an estimated 17 per cent of 2012 GDP in cyclically adjusted terms). However, unlike the other surplus countries covered by this study, this large positive current-account balance is largely due to the exploitation of finite natural resources (oil and gas). As the Norwegian external position reflects exceptional circumstances, it has not been taken into account when forming clusters.

Table 3

Weights Put on the Growth, Equity and Current Account Dimensions Across Groups of Countries

Cluster	Countries	Growth		Equity		Current Account
		Short Term	Long Term	Short Term	Long Term	Short Term
1	Australia, Canada, Estonia, Israel, Italy, Japan, Korea, New Zealand, Poland, Portugal, United Kingdom	0.13	0.25	0.30	0.30	0.01
2	United States	0.13	0.25	0.21	0.21	0.20
3	Greece, Ireland, Spain	0.29	0.25	0.18	0.18	0.10
4	Austria, Belgium, Czech Republic, Denmark, Finland, France, Hungary, Iceland, Norway, Slovak Republic, Slovenia	0.47	0.25	0.14	0.14	0.00
5	Germany, Luxembourg, Netherlands, Sweden, Switzerland	0.12	0.25	0.15	0.15	0.33

large surpluses and mostly benign short-term growth and equity outlooks. As mentioned above, the same weight (25 per cent) is given to long-term growth in all clusters. These cluster-specific weights are used to aggregate the pluses and minuses reported on Table 2 and give score to instruments and rank them.

Table 4 displays the ensuing cluster-specific instrument rankings. Rank variation across country groups is smallest for those instruments that have similar impacts on virtually all objectives, such as education, subsidies or property taxes, and widest for instruments with the sharpest trade-offs between growth, equity and the current account. For instance, personal and corporate income taxes come out as good candidate instruments for cluster 1, where equity objectives carry a high weight, but much less so for groups of countries such as those forming clusters 4 and 5 where relatively equal income distribution is assumed to lead to less emphasis on outcomes in this area.

5 How far down instrument rankings do countries need to go? Some illustrative simulations

In this section simulations are performed to investigate how far down instrument rankings countries will need to go in order to meet their consolidation needs. Countries are assumed to implement budget tightening according to the relevant instrument ranking, i.e., to start by adjusting the most beneficial (or least detrimental) instrument and only proceed down the list after exhausting the estimated room for manoeuvre available in the preceding instrument. In practice, implementing this approach would raise political-economy challenges: the top ranking instruments tend to be either streams of spending accruing to politically powerful constituencies, such as subsidies or pensions, or forms of taxation where planned increases often meet with strong resistance, such as property taxes. Nonetheless, it may still provide a useful benchmark for considering a consolidation strategy.

Table 4

Possible Hierarchies of Consolidation Instruments for Groups of Countries

Instruments	Generic Ranking	Cluster-specific Ranking					Long-term Ranking
		1	2	3	4	5	
Subsidies	1	1	1	2	2	1	1
Pensions	2-3	3	2	1	1	3	2
Other property taxes	2-3	2	3	3	3	2	3-6
Unemployment benefits	4-8	7	4	4	4	9	3-6
Personal income taxes	4-8	5	8	9	9-10	8	10-12
Corporate income taxes	4-8	4	5	7	9-10	12	10-12
Environmental taxes	4-8	8	6	5	4	4	3-6
Recurrent taxes on immovable property	4-8	6	7	6	6	5	7-9
Other government in kind consumption	9-10	9	9	11	11	6	3-6
Sales of goods and services	9-10	10	10	8	7	7	7-9
Sickness and disability payments	11-12	13	11	10	8	11	7-9
Consumption taxes (other than environmental)	11-12	11	12	12	12	13	10-12
Public investment	13	12	13	13	15	15	13-14
Health services provided in kind	14-15	14	14	14	16	16	13-14
Social security contributions	14-15	15	16	15	13	10	15-16
Family	16	16	15	16	14	14	15-16
Education	17	17	17	17	17	17	17

Note: The rankings are based on the assessments in Table 2 with scores of +1 and -1 given to each + and – signs, respectively, and weights resulting from the cluster analysis (see Cournède, Goujard and Pina, 2013). The current account scores of Table 2 switch sign for surplus clusters. The long-term ranking in the final column is based on equal weights given to impacts on long-term growth and equity. Cluster 1 regroups Australia, Canada, Estonia, Israel, Italy, Japan, Korea, New Zealand, Poland, Portugal and the United Kingdom. Cluster 2 includes only the United States. Cluster 3 comprises Greece, Ireland and Spain. Cluster 4 is formed by Austria, Belgium, the Czech Republic, Denmark, Finland, France, Hungary, Iceland, Norway, Slovakia and Slovenia. Cluster 5 is made up by Germany, Luxembourg, the Netherlands, Sweden and Switzerland.

The analysis is conducted separately for the short to medium term and for the long term, and requires three building blocks, themselves differentiated according to the respective time dimension: *i)* estimated consolidation needs for both horizons, as presented in Section 2; *ii)* a hierarchy of instruments, which is common to all countries in the long-run simulation (as presented in section 3) but varies across clusters in the short to medium term (Table 4 and Section 4); *iii)* estimates of the available margin for adjustment in each instrument, which is discussed next.

5.1 Room for manoeuvre in instruments[12]

Although it is an important building block when drawing up an illustrative consolidation plan, estimating the room for manoeuvre for each policy instrument – or, put differently, the margin of feasible adjustment – is necessarily judgemental. As such, it can only be done in an indicative and approximate way that is to some degree arbitrary. In a cross-country setting, it is impossible to fully account for the economic circumstances, social preferences and institutions which, in each country, shape the relative size of budget items. At one extreme, it could be assumed that the current structure of budgets already equalises the marginal costs and benefits of adjusting the different instruments (whose growth and equity impacts vary across countries, as acknowledged above), and is therefore optimal. If so, consolidation should be pursued, at least at the beginning, through a proportional adjustment of budget items. At another extreme, the budget structure status quo, hard to change as it may be, could be viewed as the suboptimal outcome of political and institutional distortions, the correction of which would require sweeping changes. For instance, it could be the case that property taxes should be increased further even in countries where they are already high by international comparison.

This exercise attempts to strike a balance between the above considerations by assuming that there is some margin, albeit limited, to scale back expenditure items that are large relative to a significant number of other OECD countries and similarly to increase revenue streams that are relatively low. One reason for not pushing adjustment along each individual item too far is that the positive and negative assessments underpinning the rankings can be expected to be most reliable in relatively standard situations. The effects may change if adjustment along one item takes a country to a more extreme situation. For instance, up to a point reducing spending on unemployment benefits improves incentives to take up a new job and boosts long-term output through higher employment, but if cuts are pushed too far they can impair the quality of labour market matches and harm output through lower productivity while also resulting in insufficient macroeconomic stabilisation. On the tax side, marginal rate increases from a high starting point are more distortive than from a low-rate baseline. At the same time, social preference and political feasibility considerations call for putting an upper bound on the amount of change to any spending cuts (tax hikes) in a given item, no matter how high (low) the departure point is.

In operational terms, two constraints are imposed on instrument use. First, the simulations assume that a spending instrument can be used up until the point where the country would join the group of the ten covered OECD countries where governments spend least, relative to GDP, in the area under consideration. Similarly, a revenue-side instrument can be used by hiking taxes or raising user charges until it would make the country one of the top-ten OECD countries in terms of revenue raised from this particular tax or charge relative to GDP. This constraint implies that each instrument is unavailable to one third of the covered countries. Secondly, an additional constraint is imposed on the room for manoeuvre by stipulating that a change in an instrument cannot exceed the standard deviation of the cross-country distribution of the GDP share of the instrument. This

[12] More detailed information on the assumptions and methodology used to define the room for manoeuvre for individual instruments is found in Box 4 of Cournède, Goujard and Pina (2013).

BOX 3
DEFINING THE ROOM FOR MANOEUVRE FOR EACH INSTRUMENT

Simulations assume that room for manoeuvre exists in a revenue instrument if a country does not belong to the group of ten OECD countries with the highest ratio of receipts from this tax to GDP. In technical terms, room for manoeuvre is available if the country is below the 66th percentile in the cross-country distribution of cyclically-adjusted receipts from this instrument as a share of potential GDP. Similarly, room for manoeuvre on the spending side exists if a country is above the 33rd percentile in the cross-country distribution of cyclically-adjusted spending on this instrument as a share of potential GDP. The room for manoeuvre is given by *i)* the gap between the value in the country under consideration and the 66th or 33rd percentile or by *ii)* the standard deviation of the cross-country distribution of the instrument at hand, whichever is smallest. It turns out that this simulation design imposes only a moderate degree of convergence in budget structures across countries.

A few additional adjustments have been made to makes the simulations more realistic:

- Spending on pensions, education and unemployment benefits as a share of potential GDP has been corrected for the number of potential beneficiaries, defined in terms of age cohorts or labour market status. For instance, this acknowledges that, all else equal, a higher NAIRU implies a smaller room for manoeuvre in reducing the unemployment benefits bill.
- Further to the above correction, a special adjustment is made to reduce the available room for cuts in pension spending to acknowledge that the baseline already incorporates significant effort. More specifically, the reform effort already incorporated into the baseline is deducted from the room for manoeuvre in this area. In addition, in the short to medium term, the room for manoeuvre is set at a quarter of its long-run value, as the budget savings from most measures in this area (e.g., raising the retirement age, or lowering the replacement rate for new retirees) will only accrue gradually over time.
- Leeway for raising personal income tax and social security contributions is assessed by looking at these two revenue sources jointly because of their strong substitutability. For instance, a country that raises very low amounts of social contributions may nevertheless have little room for manoeuvre along this instrument if it has very high personal income taxation, as is the case in Denmark.

Cournède, Goujard and Pina (2013) provide additional detail about the calculation of the room for manoeuvre.

constraint is aimed at avoiding too radical shifts in budget composition that may be interpreted as conflicting with social preferences as reflected in existing budget structures. Box 3 provides more information about the way in which the room for manoeuvre is estimated while Cournède, Goujard and Pina (2013) present the methodology in full.

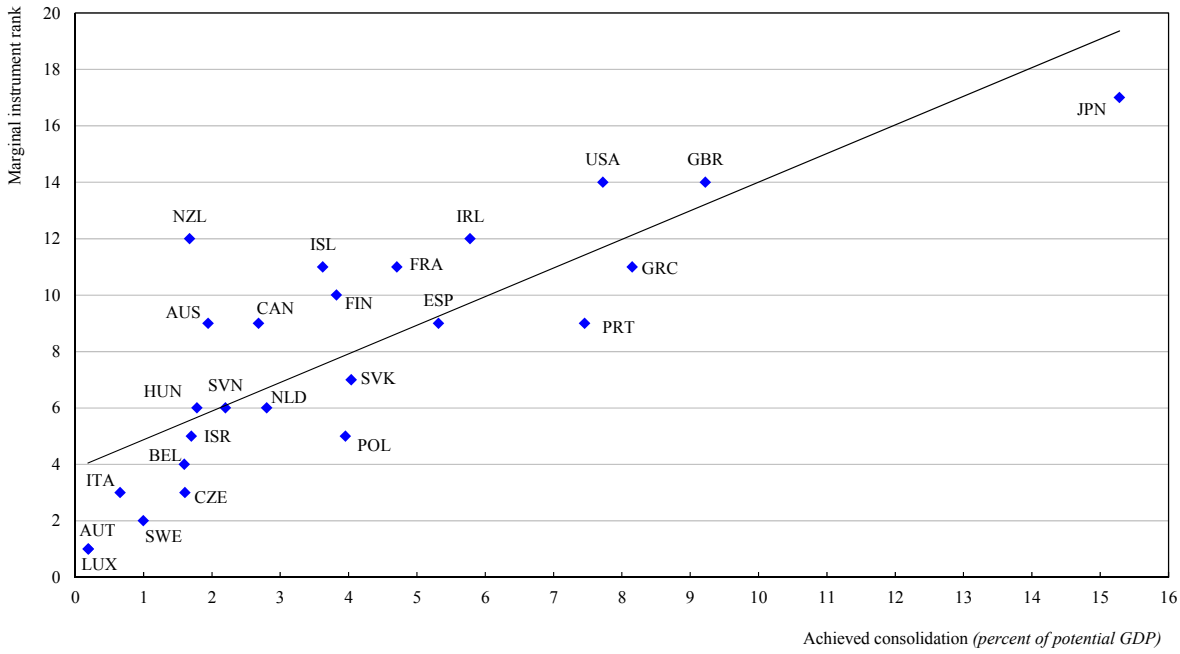
5.2 Meeting consolidation needs

5.2.1 Short- to medium-term consolidation needs

Under the simulation design outlined above, almost all countries have scope to meet their short- to medium-term consolidation needs within the constraints put on instrument use. The only

Figure 6

Marginal Instrument Rank and Achieved Short- to Medium-term Consolidation



exception is Japan where the constraints imposed by the chosen simulation design limit consolidation to 15 per cent of GDP against an estimated need of 18.5 per cent. This discrepancy implies that, in practice, the constraints imposed on instrument use would have to be eased.

However, even when fully meeting consolidation needs, several countries are forced to resort to a significant degree to instruments which lie towards the bottom of their respective instrument hierarchies (Table 4), and thus generally have an overall detrimental impact on objectives. On the basis of the marginal (*i.e.*, worst) instrument used (Figure 6), as well as the full consolidation packages pursued (Tables 7 to 11 in the Appendix), three groups of countries can be identified:

- Sixteen countries (Australia, Austria, Belgium, Canada, Czech Republic, Hungary, Israel, Italy, Luxembourg, Netherlands, Poland, Portugal, the Slovak Republic, Slovenia, Spain and Sweden) only need to use instruments featuring in the top half (first nine places) of their respective cluster-specific rankings. All these countries have short- to medium-term consolidation needs which do not exceed 3 percentage points of potential GDP. Though the simulated adjustment is not without economic costs, these will be mainly of a Keynesian nature, while negative impacts on equity or on long-term growth will be absent or, at worst, limited.
- Six countries (Finland, France, Greece, Iceland, Ireland, and New Zealand) use marginal instruments placed in the lower half of the respective cluster-specific hierarchies (ranked 10th or worse), but manage to implement consolidation packages where more than 50 per cent of the adjustment comes from instruments in the upper half. While the use of detrimental instruments remains moderate, fiscal tightening will entail costs which go beyond short-run aggregate demand, raising concerns about impacts on equity and long-term growth.
- Three countries (Japan, United Kingdom and the United States) have to resort to marginal instruments ranked 14th or worst, with more than 50 per cent of pursued consolidation packages consisting in the use of instruments placed in the lower half of rankings. Short- to medium-term

consolidation therefore presents considerable challenges for these countries as it appears difficult to avoid potentially strong detrimental effects on both growth and equity.

Among the countries covered in this study, six do not need any short- to medium-term fiscal tightening (Denmark, Estonia, Germany, Korea, Norway and Switzerland) so that no packages have been simulated for them.

5.2.2 Long-term needs

Despite generally larger consolidation needs in the long run, all countries can meet them fully while complying with the constraints imposed by the simulation design. However, as with short- to medium-term consolidation packages, there is a risk of significant negative impacts on equity and long-term growth for some countries. As above, one can identify three groups of countries according to their marginal instrument (Figure 7) and full consolidation packages (Appendix, Table 12):

- Twenty countries (Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Korea, Luxembourg, Netherlands, Poland, Portugal, Slovenia, Sweden and Switzerland) with low or moderate consolidation needs enjoy the favourable position of only having to use instruments in the upper half (top nine places) of the uniform long-run hierarchy, of which the overall impact on long-run growth and equity can be deemed mostly beneficial or fairly neutral.[13]
- Six countries (Ireland, Israel, Japan, Slovak Republic, Spain and the United Kingdom) resort to marginal instruments in the lower half of the ranking (10^{th} to 17^{th} places), which may entail more detrimental consequences for growth and equity objectives. However, these countries have consolidation packages where more than half (and in some cases virtually all) of the adjustment comes from better instruments (those in the upper half of the hierarchy).
- Three countries (Australia, New Zealand and the United States) with large long-term consolidation needs face the unpleasant prospect of both employing low-quality marginal instruments and letting poor instruments (those in the lower half of the ranking) account for more than half of the total fiscal adjustment. Therefore this group faces a substantial risk of overall negative impacts of consolidation on growth and equity.

With the assumptions outlined above, Italy and Norway have no estimated long-term consolidation needs and therefore no simulated packages at that horizon.

Despite estimated consolidation needs being generally larger in the long than the short run, more countries rely fully on well ranked instruments in their simulated long-term packages than in the short- to medium term ones. One reason is that other government consumption, an area with substantial consolidation potential in many countries, is much better ranked in the long term when demand effects are no longer taken into account. Another reason is that the simulations are designed to offer more room for adjustment in public pension spending in the long than the short term, reflecting that expenditure savings in general accrue gradually in this area. Finally, more countries are estimated to face positive consolidation needs in the long than the short term.

At either simulation horizon, countries facing the unpleasant prospect of having to resort on a large scale to low-ranking instruments have two non-mutually exclusive options. The first, further

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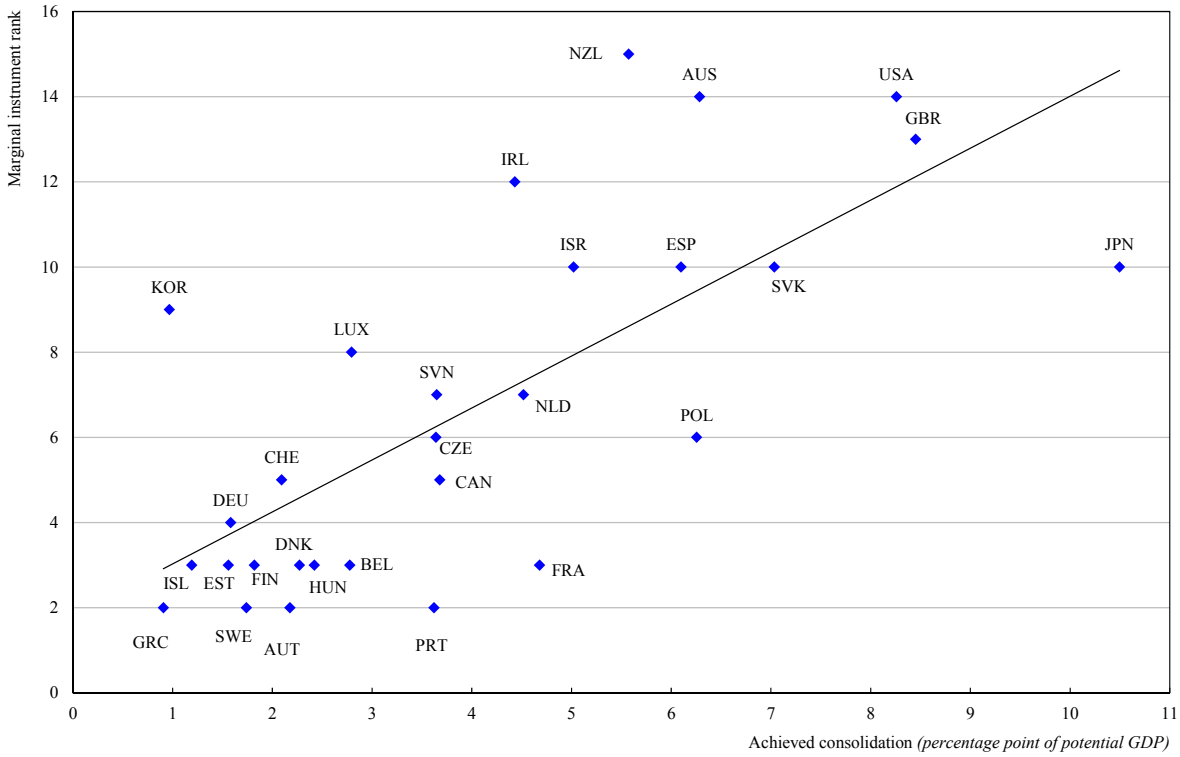
[13] The top nine instruments have either (*i)* beneficial impacts on both long-term growth and long-term equity (Table 2), as is the case of subsidy reduction, (*ii*) impacts which are beneficial on one objective and fairly neutral on the other, as it happens with other government consumption, or (*iii*) opposite impacts on long-term growth and long-term equity which can somehow be regarded as compensating each other, sickness and disability payments being an example, Implicit in this "compensation" argument is the use of +1 and –1 scores for each + and – sign in Table 2, which is admittedly a simplifying assumption, rather than an attempt to calibrate a social welfare function.

Figure 7

Marginal Instrument Rank and Achieved Long-term Consolidation



discussed in Section 6, is to supplement the use of such instruments by structural changes that make them more growth- or equity-friendly. The second option is to use the best instruments more intensively than implied by the somewhat arbitrary constraints. The simulation design implies that countries such as Australia, New Zealand and the United States which start out with an above-average use of the least detrimental forms of taxation or below-average spending in the least effective areas tend to lack room for manoeuvre in the best budget instruments. If the constraint that adjustment cannot take a country into the group of the ten OECD countries that tax most or spend least in the area of under consideration is relaxed by moving from ten- to five-country reference groups, then New Zealand and the United States achieve close to half of their simulated long-term consolidation with well ranked instruments while this proportion rises to almost three quarters in Australia.

5.3 Patterns of instrument use in simulated short- and long-term consolidation packages

The sequential nature of instrument use in the simulations, based on hierarchies which have strong resemblances across groups of countries (in the short to medium term) or are even common to all countries (in the long run), results in some instruments featuring much more often than others in consolidation packages. As a consequence, revenue and expenditure structures evolve and undergo some convergence across countries. While this subsection discusses general trends across countries, Tables 7-12 in the Appendix provide detailed information by country about the illustrative consolidation packages.

In the short to medium term, subsidy reduction and hikes of other property taxes are the most widely used instruments (Table 5). Spending reductions on unemployment benefits and pensions as well as increases in environmental taxes, corporate and personal income taxes, and recurring property taxes come next in frequency of use. Cuts in the areas of health, education and family policy are very rare in simulated packages, as are increases in social security contributions, reflecting their negative side-effects across the growth and equity dimensions.

The simulated long-term consolidation packages exhibit some differences from their short- to medium-term counterparts for two main reasons:

- Firstly, instruments resulting in cuts to public expenditure move up the ranking in the long term as their larger Keynesian demand effects are no longer taken into account. Cuts in other government consumption as a result play a much more important role in long- than in short-term simulated packages.
- Secondly, more room for manoeuvre is assumed to be available in the area of pensions (over and above the effort implicit in the baseline) in a 2060 perspective than over the medium term. Consequently, pensions are used more intensively to meet consolidation needs in the long than the short term.

These two factors result in a number of policy reversals, that is to say cases where a given country makes a larger use of a given instrument in the short to medium term than in the long term. Such policy reversals mainly concern taxes, and in particular property and corporate income taxes (Table 4), which generally fall from the upper to the lower half of instrument hierarchies as the time horizon expands.

As a result from this shift in the use of consolidation tools, the average share of spending reductions across national consolidation packages rises from 41 per cent in the short to medium term to 65 per cent in the long term. At both simulation horizons, the share of spending is particularly high among countries with modest consolidation needs, which to a large extent can be fulfilled with instruments like subsidies or pensions, which occupy top places in most rankings. In contrast, countries with substantial consolidation gaps often need to use large tax items as well, leading to a more balanced revenue-expenditure split or even to revenue-side adjustment becoming predominant.

If implemented, the simulated consolidation packages would not fundamentally alter the size of government and the structure of public finances in covered OECD countries. On average, total primary spending, adjusted for the cycle, barely changes between 2012 and 2060 (Table 6). Given the projected increase in health and long-term care spending incorporated in the baseline, this overall long-term stability masks a significant reduction in government expenditure outside the health sector. The long-term increase in taxation is very limited at only about one per cent of GDP, but in the short to medium term, however, the need to purge excess debt leads to a temporary additional increase in taxation. Despite being anchored on the same assessment of the impacts of consolidation instruments, the simulations largely respect the cross-country diversity in government spending and revenue items. The standard deviations reported in Table 6 make apparent that the degree of convergence is very small for most instruments and quite modest for three instruments that show strongest long-term convergence (pensions, other government consumption and consumption taxes). Looking at the level of individual countries, the long-term simulations seldom use any instruments for more than 2 per cent of GDP: the only such instances are pensions in Japan, Poland and France, other government consumption in Canada, Israel, the Netherlands and the United Kingdom, and personal income taxes in Japan.

Table 5

Summary Indicators About Consolidation Packages

	Number of Countries Using Instrument		Average Use Among Countries Using Instrument *(percent of GDP)*		Number of Countries with Policy Reversals
	Short Term	**Long Term**	**Short Term**	**Long Term**	
Subsidies	14	15	0.6	0.6	0
Pensions	11	12	0.5	1.7	0
Other property taxes	16	11	0.4	0.4	8
Unemployment benefits	11	13	0.6	0.5	3
Personal income taxes	9	7	1.9	1	6
Corporate income taxes	11	5	0.5	0.2	10
Environmental taxes	13	11	0.6	0.5	6
Recurrent taxes on immovable property	9	4	0.8	0.7	6
Other government in kind consumption (excluding family policy)	8	14	1	1.4	4
Sales of goods and services	7	7	0.6	0.7	2
Sickness and disability payments	4	7	0.4	0.5	2
Consumption taxes (other than environmental)	4	8	1.9	1.3	2
Public investment	4	4	0.5	0.5	3
Health services provided in kind	3	4	1.4	0.6	0
Social security contributions	1	0	0.9	0	1
Family	0	1	0	0.5	0
Education	1	0	0.3	0	0

Note: Instruments are ranked as in Figure. 8. ST and LT denote respectively short to medium term and long term. All figures in the table refer to the 24 countries common to both simulation horizons. Average shares of instruments are computed across national consolidation packages (Tables 7-12 in the Appendix). Policy reversals (cases of stronger instrument use in ST than in LT) exclude cases solely due to a smaller room for manoeuvre (*i.e.* in both ST and LT instrument use exhausts the available room for manoeuvre, which is smaller in LT than in ST).

Table 6

Evolution of Expenditure and Revenue Structures
(percentage points of potential GDP)

	2012		2020		2060	
Expenditure	**Average**	**Standard Deviation**	**Average**	**Standard Deviation**	**Average**	**Standard Deviation**
Public investment	2.6	1.0	2.5	0.9	2.4	0.9
Education	5.3	1.1	5.2	1.1	5.3	1.1
Health services provided in kind	6.5	1.4	6.4	1.3	9.5	1.2
Other in kind consumption	8.4	2.4	8.2	2.4	7.7	2.0
Pensions	8.1	3.3	7.9	3.1	7.2	2.8
Sickness and disability payments	2.0	0.6	1.8	0.5	1.8	0.5
Unemployment benefits	1.1	0.9	0.8	0.7	0.9	0.7
Family policy	2.4	1.1	2.4	1.1	2.4	1.1
Subsidies	1.2	0.8	0.8	0.6	0.8	0.5
Residual	4.7	1.4	4.5	1.4	4.4	1.4
Total primary spending	42.2	5.5	40.5	5.5	42.3	5.4
Revenue						
Personal income taxes	8.6	3.3	9.2	3.0	8.6	3.3
Social security contributions	11.2	5.4	11.2	5.4	11.2	5.3
Corporate income taxes	2.9	0.9	3.2	0.7	2.9	0.9
Environmental taxes	2.3	0.7	2.6	0.5	2.7	0.4
Consumption taxes	9.0	2.4	9.3	2.0	9.6	1.8
Recurring property taxes	1.3	1.0	1.4	0.9	1.3	1.0
Other property taxes	0.7	0.6	1.0	0.5	0.8	0.5
Sales of goods and services	2.8	1.0	3.0	0.9	3.0	0.9
Residual	1.5	1.0	1.6	1.0	1.6	1.0
Total primary revenue	40.2	6.2	42.6	5.4	41.7	5.0

Note: The table reports the average size and cross-country standard deviation of spending and revenue areas among the 24 countries common to both short- and long-term simulation horizons. Figures for 2012 are adjusted for cyclical effects as detailed in Appendix 2 of Cournède, Goujard and Pina (2013). Figures for 2020 and 2060 reflect baseline developments in health spending as well as the consolidation packages implemented by each country in the short to medium term and in the long term, respectively. For simplicity (in particular to ensure that the averages and standard deviations are calculated using figures with baseline positions that are comparable across countries), the year 2020 is taken as the medium-term consolidation horizon, though the latter varies somewhat across countries.

5.4 Robustness of the simulated consolidation packages

Extensive checks have been performed to test the robustness of the findings to uncertainty about the assessments of the side-effects of consolidation instruments. A large number of alternative scenarios have been simulated: in each of these, one in every four assessments in Table 2 (the equivalent of a full column) is chosen randomly and modified by adding a plus or minus sign. For each random draw, cluster-specific and long-term rankings corresponding to the new assessment of impacts are calculated, and full consolidation packages are simulated for the short to medium term as well as the long term. Cournède, Goujard and Pina (2013) report detailed results showing how all the numerical results in the above tables are affected by such modelled uncertainty. The conclusions from this extensive robustness checking can be summarised as follows:

- The degree to which countries have to use poorly ranked instruments, or can avoid doing so, is robust to uncertainty about impact assessments. In particular, in the alternative scenarios, there is almost no shift from being able to achieve most of the consolidation with well ranked instruments to being forced to rely heavily on badly ranked instruments, neither is there significant movement in the opposite direction.
- The average use of each instrument is quite stable across alternative scenarios for both very well and very poorly ranked instruments. There is more variation for middle-ranked instruments.
- The finding that short- as well as long-term simulated consolidation packages very seldom involve cuts in the areas of health, education and family policy holds very strongly in the robustness checks.
- While the split between spending and tax adjustment shows sensitivity to uncertainty, especially at the country level, the findings that long-term packages rely more on spending reductions than tax increases and that short-term adjustment give a larger role to tax increases are very robust.
- Policy reversals show some sensitivity to uncertainty. The reason is that policy reversals occur mostly for instruments that feature in the middle of the generic ranking, which is the most unstable part of the ranking.

In addition, a variant of the short- to medium-term simulation of consolidation packages has been performed to check the sensitivity of the results to the weights put on objectives as a result of the clustering techniques. These alternative simulations replace the clustering analysis with three simple country groups (strongly positive, strongly negative and close-to-balance current account positions) and uniform weights. The results for this variant, which Cournède, Goujard and Pina (2013) report in full, are relatively close to the main set of short- to medium-term simulations and corroborate its main findings although they take country circumstances less well into account.

Finally, variants of the short- to medium-term and long-term simulations have been conducted to explore the influence of the constraints on instrument use. The constraint that a given instrument can be used until the country joins the group of the ten covered OECD countries with the highest levels of taxation (or lowest level of spending) in the area under consideration has been relaxed by narrowing these reference groups to a size of five countries. In the short- to medium-term as well as the long-term simulations, relaxing the constraint on instrument use in this manner makes it possible for countries to make much more of their adjustment with well ranked instruments (see Cournède, Goujard and Pina, 2013, for detailed results). At the other extreme, another possibility would be to constrain the room for manoeuvre at the median of OECD countries. In other words, for a tax instrument, the adjustment would be allowed only as long as a country does not raise more revenue with it, as a share of GDP, than half the OECD countries covered in the study. For a spending instrument, the limit on the room for manoeuvre would be to spend no less in this area than half the covered OECD countries. The asterisks appearing in the Tables 7-12 of the Appendix indicate all cases where the adjustment along one instrument crosses

the median. The large number of asterisks in these tables illustrate that crossing the median is common in the simulations. Consequently, constraining the adjustment to stop at the median would result in much greater use of poorly ranked instruments.

6 The case for combining structural reforms and fiscal adjustment

The consolidation strategies identified in the previous section were designed with no consideration given to the scope for achieving efficiency gains. Cuts in expenditures were assumed to entail corresponding reductions in the provisions of public services (or benefits in the case of transfers) and increases in revenues were assumed to come through higher tax rates. This section looks at the scope for potential efficiency gains in selected spending or tax areas where estimates are available. Some of the estimated gains reported below may indeed have been used already, not least as a response to the crisis (OECD, 2013b).

Structural reforms, while desirable in their own right, can also ease the trade-offs between consolidation, equity and long-term growth objectives. Compared with pure budgetary changes, structural reforms in the area where taxes are raised or spending reduced can alleviate negative side-effects. In the most favourable cases, structural reform can even eliminate trade-offs and bring fiscal improvements as well as progress along growth or equity goals. Consistent with this view, some studies find that structural reforms make fiscal consolidation more likely to succeed (Alesina and Ardagna, 2012; Mauro, 2011).

Structural reforms can also contribute to fiscal consolidation directly. Structural reforms that boost private-sector employment are likely to improve the budget balance permanently (OECD, 2013b). The improvement results from tax base extension and lower spending on unemployment benefits, although the reform itself can involve budgetary costs, some of a temporary nature to facilitate implementation, some permanent (such as for instance greater expenditure on active labour-market policies or childcare). Structural reforms that improve productivity in general cannot be expected to result in permanently improved budget balances as public-sector wages and transfers catch up with higher private-sector wages over time. Nevertheless, by providing a boost to the level or growth rate of GDP, productivity-enhancing structural reforms have the potential to improve public debt dynamics and thereby reduce consolidation needs.

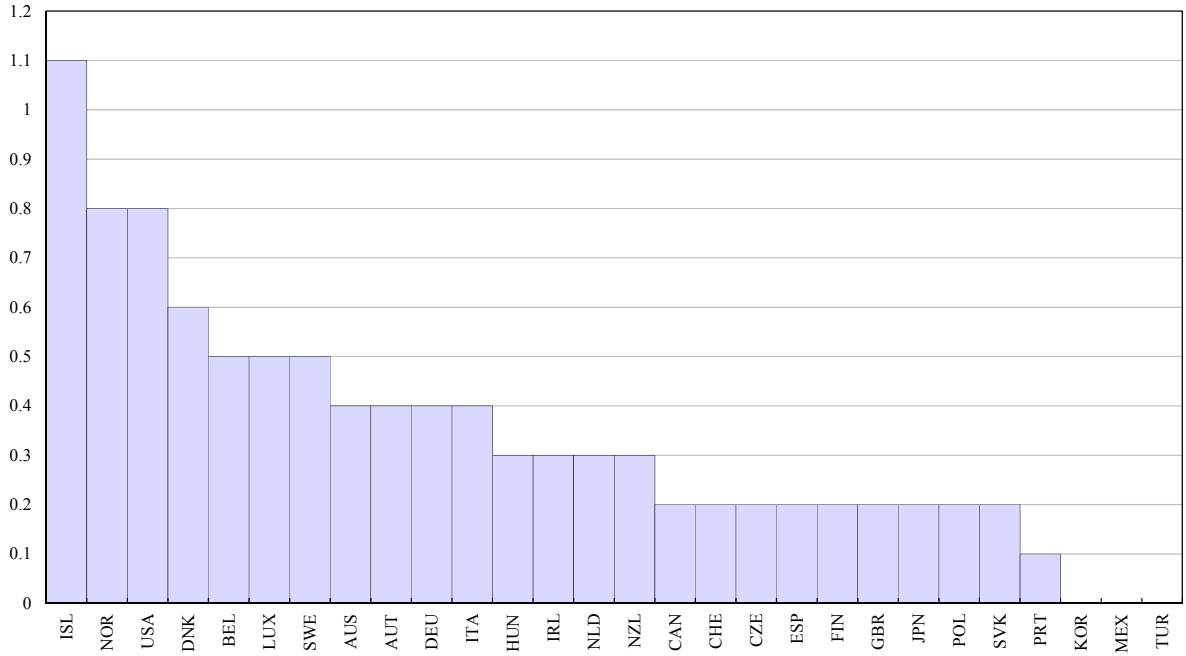
6.1 Structural reforms to accompany reductions in selected individual spending areas

At a general level, structural reforms that improve efficiency in the delivery of public services can reduce the adverse growth impact of spending cuts in productive areas of government spending. Similarly, the negative equity impact of spending cuts can be headed off by structural reforms that ensure a better targeting of public services and transfers and stimulate labour supply.

In **education**, structural reforms can bring benefits along all fiscal, growth and equity dimensions. For instance, introducing tuition fees in higher education coupled with means-tested grants or loan guarantees can improve public finances, possibly spur growth by encouraging tertiary schooling completion and educational investment in areas with greater economic potential and help to correct the regressive impact of public spending on tertiary education (Hagemann, 2012).

Figure 8

Potential Efficiency Gains in Primary and Secondary Education
(percent of GDP, 2007)



Note: Data-envelopment analysis (DEA) has been performed to estimate by how much, given students' socio-economic background, spending could be reduced while maintaining the same average level and dispersion of PISA scores. See Sutherland *et al.* (2007) for more details.
Source: Update of Sutherland *et al.* (2007) reported in Hagemann (2012).

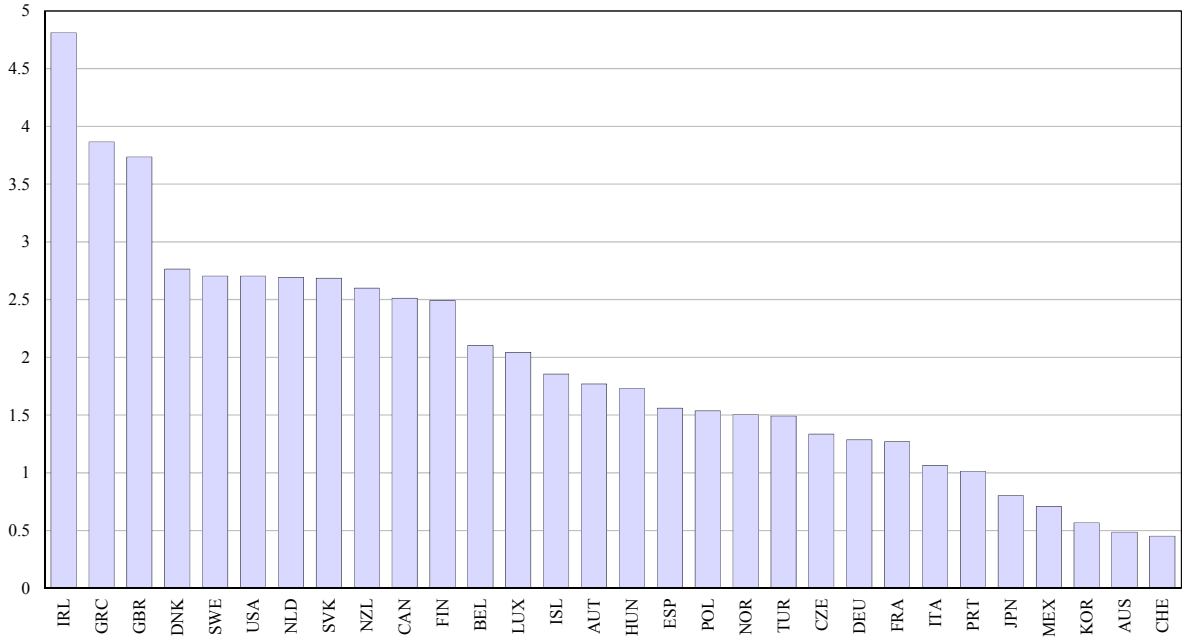
In primary and secondary education, a recent update of the analysis conducted by Sutherland *et al.* (2007) points to potentially sizeable efficiency gains in many OECD countries (Figure 8).[14] In tertiary education, European OECD countries can potentially obtain savings from efficiency gains worth around 0.4 per cent of GDP on average (St. Aubyn *et al.*, 2009). Earlier and more recent OECD work has suggested that more performance monitoring, more school autonomy and greater user choice is associated with greater efficiency in the public provision of primary and secondary schooling (Sutherland and Price, 2007, Blöchliger *et al.*, 2013). As it turns out, countries with the greatest potential for efficiency gains are generally not the ones with the largest consolidation needs, with the exception of the United States. However, in the United States, the need to address widening skill gaps identified in particular in the *2012 OECD Economic Survey* points to a case for allocating efficiency gains to providing more and better education rather than cutting expenditure (OECD, 2012b).

In **health care**, efficiency gains could also permit to improve or maintain service provision while containing cost to the public purse, therefore mitigating adverse growth and equity impacts (Hagemann, 2012). Although they are subject to considerable uncertainty, quantitative estimates

[14] This study uses data-envelopment analysis (DEA), a technique that relates outcomes with inputs and draws up an efficiency frontier based on the situation of the best performers. With a number of assumptions, countries can then be compared to this efficiency frontier to provide a rough indication of the extent to which they might achieve the same results with lower inputs. See Sutherland *et al.* (2007) for more details.

Figure 9

Potential Public-spending Savings from Efficiency Gains in Health Care
(percent of GDP, 2017)



Note: Potential savings represent the difference between a no-reform scenario and a scenario where countries would become as efficient as the best performing countries.
Source: Joumard *et al.* (2010).

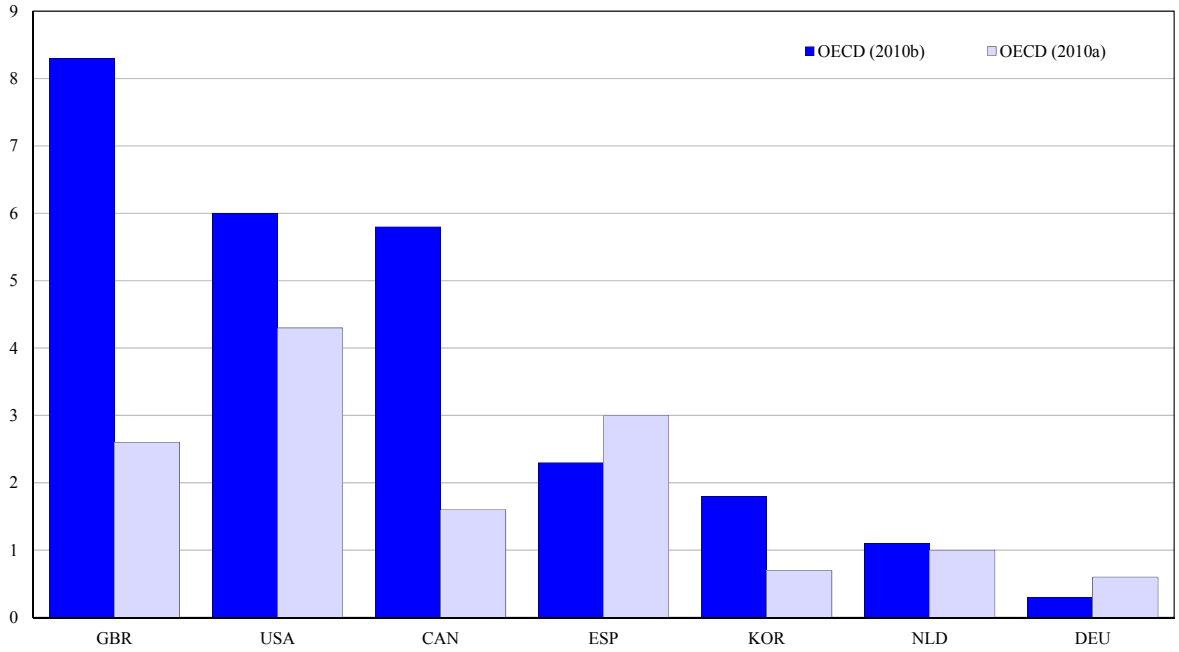
suggest that the scope for efficiency gains in the health sector can potentially be very large (Figure 9). Previous OECD work emphasised that, while structural reforms to realise potential efficiency gains vary depending on the structure of health systems, some apply to most countries. In particular, better priority setting, improved consistency in responsibility assignment across levels of government, and better user information on the quality and price of services would be reform options to consider in many OECD countries (Joumard *et al*, 2010).

6.2 Structural reforms to accompany revenue increases

On the tax side, the growth impact of hikes can be reduced through the closing of loopholes and base broadening (including by curbing fraud and evasion) rather than *via* rate increases. Hence, an important way of improving the trade-off between raising more revenue and preserving growth-friendly incentives is to cut back tax expenditures. As regards **personal and corporate income taxes**, tax expenditures often distort resource allocation and hamper productivity growth: some examples are the preferential tax treatment of owner-occupied housing or the dispersion of effective corporate tax rates. Figure 10 gives estimates from two different studies for corporate and personal income taxes. Despite the large margins of uncertainty surrounding the reported figures, in countries like Canada, Spain, United Kingdom or the United States even the smallest of the two estimates is very large, amounting to about one third to one half of short- to medium-term consolidation needs. Structural reforms in personal and corporate income taxes that curb tax expenditures will also in general lead to a more equal income distribution.

Figure 10

Tax Expenditures in Personal and Corporate Income Taxes
(different years between 2004 and 2008, percent of GDP)



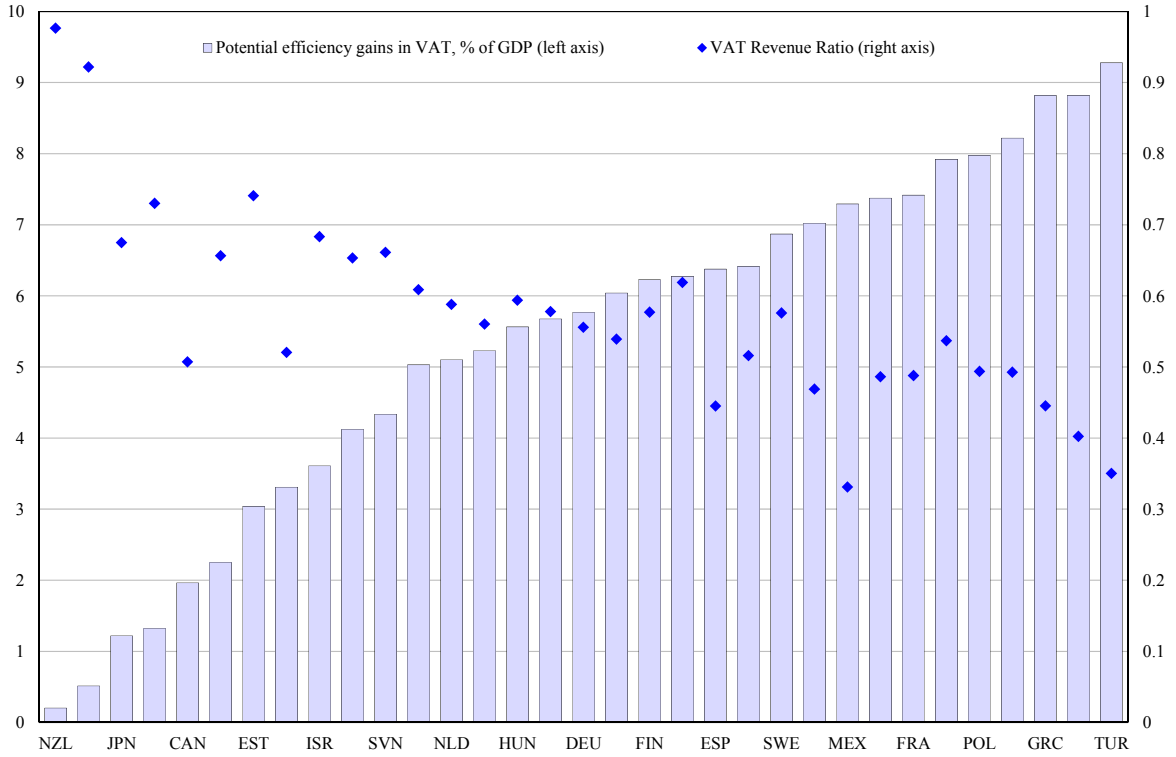
Note: international comparisons are subject to important limitations, as countries use different definitions of tax expenditures. For a given country, comparisons across studies are also hampered by factors like different years and inconsistencies in filling the questionnaires used to collect information (e.g., in OECD (2010) some countries reported only the 20 largest items, and others only those at central government level).

However, the recommendation of structural tax reform to eliminate tax breaks cannot be made across the board as some measures work to preserve productive potential or to alleviate poverty, or both. Such is the case of tax credits for low-income earners, which tackle poverty traps created by other parts of the tax and transfer system and help boost the employment of low-skill workers. Another important example are well-designed corporate income tax credits for research and development activities, which can provide remuneration for the growth-enhancing externalities from R&D (Jaumotte and Pain, 2005; Johansson *et al.*, 2008, Westmore, 2013).

In the area of **consumption taxes**, base-broadening reforms can bring in additional proceeds and reduce distortions detrimental to growth. If accompanied by targeted measures towards poorer households (for instance voucher programmes), abolishing reduced value-added or consumption tax rates may improve public finances without negative consequences for equity, at very low cost for growth (although targeted transfers involve a risk of contributing to poverty traps). Although crude and subject to important caveats (see note to Figure 11), the so-called VAT revenue ratio is the most readily available indicator to provide illustrative estimates, on a cross-country basis, of the scope for base-broadening. The ratio compares actual VAT revenue to the standard VAT rate multiplied by final consumption expenditure. The very high estimates shown in Figure 15 are uncertain and difficult to achieve in full including because the tax base would shrink in response to higher rates. Nevertheless, their sheer size suggests that, even after factoring in the costs of accompanying distributional measures, base broadening can yield substantial additional revenues while reducing cross-sector distortions.

Figure 11

VAT Revenue Ratio and Illustrative Potential Efficiency Gains in the VAT System



Note: The VAT revenue ratio (VRR) is calculated as total VAT receipts from *OECD revenue statistics* divided by an estimate of potential VAT revenues. This estimate is equal to the standard VAT rate multiplied by final consumption expenditure in national accounts (excluding VAT receipts). The estimates of potential efficiency gains shown in the chart are calculated strictly for illustrative purposes by assuming that the VRR can be raised to one. This simple calculation neglects that final consumption as calculated for national accounts purposes differs from the VAT tax base. For instance, imputed rents on owner-occupied housing and government services provided free of charge are included in final consumption but not the VAT tax base. In particular, making the government pay VAT to itself on the services it provides without charge would produce no net budget gain. On the other hand, final consumption does not include housing construction, which is subject to VAT in many countries.
Source: *OECD Consumption Tax Trends* (2012), average 2007-09, and OECD calculations.

As regards **property taxes**, broadening bases by regularly bringing real estate taxable values in line with market valuations could yield equity gains in addition to bringing in additional revenues and reducing distortions. In many countries cadastral values have become outdated, often by a large margin (by way of exemple, Austria, Belgium and France last carried out a housing valuation exercise three or four decades ago). Though the redistributive impact of updating is complex, being felt across individuals, generations and territorial units, it will tend to be progressive at least if account is taken of the distribution of wealth, and not merely of current income. Even on the basis of the latter, equity gains will ensue if those residing in buildings with more outdated values (often older buildings in city centres) tend to enjoy above-average income. Admittedly, updating cadastral values will raise difficulties for old people living on low pensions in large old houses, but this issue could be addressed by offering those taxpayers the option of paying this part of taxes in a deferred manner on their estate after their death. More generally, making the property tax structure more progressive would be an option to help offset harmful equity effects from other consolidation measures.

7 Concluding remarks

The present study proposed a structured way of looking at consolidation instruments in the light of their consequences on other economic objectives. While its aim is not to prescribe consolidation packages, some quantitative simulations have been provided for the sake of illustration as a way of gauging how deep adjustment in better instruments would have to go in order to avoid relying too much on more harmful instruments. While illustrative, these simulations cannot substitute for the analysis of country circumstances, and of interaction among instruments, that is required to design actual consolidation strategies.

APPENDIX
DETAILED COMPOSITION OF CONSOLIDATION PACKAGES

The present section provides detailed quantitative information about the illustrative consolidation packages presented in Section 5 of the main text. Tables 7 to 11 provide results about the illustrative short- to medium-term consolidation packages of countries with one table per cluster. Table 12 details the illustrative long-term consolidation packages for all covered countries. The instruments used are as described in Appendix 2, Section 2 of Cournède, Goujard and Pina (2013). The categories "used spending residual" and "used revenue residual" refer to the part of the adjustment that is achieved through residual items of primary expenditure and receipts which are not considered as instruments of consolidation as they have no direct economic interpretation. However, there is no reason to assume that they remain constant as a share of potential GDP when other budgetary items adjust, so the assumption is made that they remain fixed as shares of total primary spending or revenues (whichever is relevant).

Table 7

Instrument Use and Achieved Short- to Medium-term Consolidation *vs.* Needs in Cluster No. 1

(percentages of potential GDP except otherwise mentioned)

Description	AUS	CAN	GBR	ISR	ITA	JPN	NZL	POL	PRT
Subsidies	0.6*	0.3	0	0	0.3	0	0	0	0
Other property taxes	0	0.5*	0.2	0.2	0	0.4*	0.7*	0.7*	0.4*
Pensions	0	0	0.3	0.2	0.3	0.8	0	0.9	0.9
Corporate income taxes	0	0.2	0.4*	0	0	0	0	0.9*	0.2
Personal income taxes	0	0	0.5	1.3	0	4.6*	0	1.3	4.1*
Recurrent taxes on immovable property	0	0	0	0	0	0	0	0	0.8*
Unemployment benefits	0	0.2*	0	0	0	0.3	0	0	0.3
Environmental taxes	0.7*	0.7	0.2*	0	0	0.7	0.7	0	0.2
Other government in kind consumption (excluding family policy)	0.6	0.6	2.2*	0	0	0	0	0	0.2
Sales of goods and services	0	0	0.7*	0	0	1.0*	0	0	0
Consumption taxes (other than environmental)	0	0	1.4*	0	0	2.5	0	0	0
Public investment	0	0	0.3	0	0	1.1	0.2	0	0
Sickness and disability payments	0	0	0.7*	0	0	0	0	0	0
Health services provided in kind	0	0	1.5*	0	0	1.5*	0	0	0
Social security contributions	0	0	0	0	0	0.9*	0	0	0
Family	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0.3	0	0	0
Used spending residual	0.1	0.1	0.9	0	0	0.6	0	0.1	0.1
Used revenue residual	0	0	0.2	0	0	0.5	0.1	0.1	0.4
Share spending efforts	65	45	62	13	100	30	9	25	20
Achieved consolidation	1.9	2.7	9.2	1.7	0.7	15.3	1.7	4	7.5
Consolidation needs	1.9	2.7	9.2	1.7	0.7	18.3	1.7	4	7.5
Share top 9 instruments	100	100	45	100	100	48	90	100	100
Instruments crossing the median	2	2	7	0	0	5	1	2	3

Note: A star sign * denotes that the proposed instrument use takes the corresponding spending (tax) item moves from above to below (from below to above) the OECD median.

Table 8

Instrument Use and Achieved Short- to Medium-term Consolidation *vs.* Needs in Cluster No. 2

(percentages of potential GDP except otherwise mentioned)

Description	USA
Subsidies	0
Pensions	0.5
Other property taxes	0.7*
Unemployment benefits	0.2
Corporate income taxes	0.2
Environmental taxes	0.7
Recurrent taxes on immovable property	0
Personal income taxes	1
Other government in kind consumption (excluding family policy)	0
Sales of goods and services	0
Sickness and disability payments	0
Consumption taxes (other than environmental)	2.5
Public investment	0.3
Health services provided in kind	1.3*
Family	0
Social security contributions	0
Education	0
Used spending residual	0.2
Used revenue residual	0.2
Share spending efforts	31
Achieved consolidation	7.7
Consolidation needs	7.7
Share top 9 instruments	45
Instruments crossing the median	2

Note: See note to Table 7.

Table 9

Instrument Use and Achieved Short- to Medium-term Consolidation *vs.* Needs in Cluster No. 3
(percentages of potential GDP except otherwise mentioned)

Description	ESP	GRC	IRL
Pensions	0	0.6	0
Subsidies	0.2	0	0
Other property taxes	0	0	0
Unemployment benefits	1.6	0	1.1
Environmental taxes	0.7	0.2	0.3*
Recurrent taxes on immovable property	0.4	1.0*	1.0*
Corporate income taxes	0.9*	0.2	0.8*
Sales of goods and services	1	0.3	0.3*
Personal income taxes	0.3	3.4*	0.3
Sickness and disability payments	0	0	0.3*
Other government in kind consumption (excluding family policy)	0	1.9*	0
Consumption taxes (other than environmental)	0	0	1.4
Public investment	0	0	0
Health services provided in kind	0	0	0
Social security contributions	0	0	0
Family	0	0	0
Education	0	0	0
Used spending residual	0.1	0.1	0.2
Used revenue residual	0.1	0.4	0.2
Share spending efforts	36	33	27
Achieved consolidation	5.3	8.2	5.8
Consolidation needs	5.3	8.2	5.8
Share top 9 instruments	100	75	69
Instruments crossing the median	1	3	5

Note: See note to Table 7.

Table 10

Instrument Use and Achieved short- to Medium-term Consolidation *vs.* Needs in Cluster No. 4

(percentages of potential GDP except otherwise mentioned)

Description	AUT	BEL	CZE	FIN	FRA	HUN	ISL	SVK	SVN
Pensions	0.2	0	0.1	0	0.6	0.2	0	0	0
Subsidies	0	0.8	0.8	0.7*	0.7*	0.7*	0.8*	0.5*	0.5*
Other property taxes	0	0	0.6*	0.4*	0	0.2	0.3	0.7*	0.7*
Unemployment benefits	0	0.7	0	0.9	0.8*	0.2	0.6	0	0
Environmental taxes	0	0	0	0	0.7*	0	0.5*	0.7	0
Recurrent taxes on immovable property	0	0	0	0.8*	0	0.4*	0	1.0*	0.9*
Sales of goods and services	0	0	0	0	0	0	0.3	1	0
Sickness and disability payments	0	0	0	0.7	0	0	0.2	0	0
Personal income taxes	0	0	0	0	0	0	0	0	0
Corporate income taxes	0	0	0	0.1	0.5*	0	0.5*	0	0
Other government in kind consumption (excluding family policy)	0	0	0	0	1.2*	0	0.2	0	0
Consumption taxes (other than environmental)	0	0	0	0	0	0	0	0	0
Social security contributions	0	0	0	0	0	0	0	0	0
Family	0	0	0	0	0	0	0	0	0
Public investment	0	0	0	0	0	0	0	0	0
Health services provided in kind	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0
Used spending residual	0	0.1	0.1	0.2	0.2	0.1	0.2	0.1	0.1
Used revenue residual	0	0	0	0	0	0	0	0.1	0.1
Share spending efforts	100	100	64	65	73	67	56	13	23
Achieved consolidation	0.2	1.6	1.6	3.8	4.7	1.8	3.6	4	2.2
Consolidation needs	0.2	1.6	1.6	3.8	4.7	1.8	3.6	4	2.2
Share top 9 instruments	100	100	100	97	63	100	79	100	100
Instruments crossing the median	0	0	1	3	5	2	3	3	3

Note: See note to Table 7.

Table 11

Instrument Use and Achieved Short- to Medium-term Consolidation *vs.* Needs in Cluster No. 5

(percentages of potential GDP except otherwise mentioned)

Description	LUX	NLD	SWE
Subsidies	0.2	0.6*	0.7*
Other property taxes	0	0.2	0.2
Pensions	0	0	0
Environmental taxes	0	0	0
Recurrent taxes on immovable property	0	0.8*	0
Other government in kind consumption (excluding family policy)	0	1.1	0
Sales of goods and services	0	0	0
Personal income taxes	0	0	0
Unemployment benefits	0	0	0
Social security contributions	0	0	0
Sickness and disability payments	0	0	0
Corporate income taxes	0	0	0
Consumption taxes (other than environmental)	0	0	0
Family	0	0	0
Public investment	0	0	0
Health services provided in kind	0	0	0
Education	0	0	0
Used spending residual	0	0.1	0.1
Used revenue residual	0	0	0
Share spending efforts	100	65	85
Achieved consolidation	0.2	2.8	1
Consolidation needs	0.2	2.8	1
Share top 9 instruments	100	100	100
Instruments crossing the median	0	2	1

Note: See note to Table 7.

Table 12

Instrument Use and Achieved Long-term Consolidation *vs.* Needs
(percentages of potential GDP except otherwise mentioned)

Description	JPN	GBR	USA	SVK	AUS	POL	ESP	NZL
Subsidies	0	0	0	0.5*	0.6*	0	0.2	0
Pensions	3.2	1	1.9	0	0	3.7	0	0
Other government in kind consumption (excluding family policy)	0	2.2*	0	0	1	1.1	0.6	0
Unemployment benefits	0.3	0	0.2	0	0	0	1.4	0
Environmental taxes	0.7	0.2*	0.7	0.7	0.7*	0.6	0.7	0.7
Other property taxes	0.4*	0.2	0.7*	0.7*	0	0.6*	0	0.7*
Sickness and disability payments	0	0.7*	0	0	0	0	0.7*	0.7
Recurrent taxes on immovable property	0	0	0	1.0*	0	0	0.4	0
Sales of goods and services	1.0*	0.7*	0	1	0	0	1	0
Personal income taxes	2.8	0.5	1	1.8	0	0	0.4	0
Corporate income taxes	0	0.4*	0.2	0.2*	0	0	0.1	0
Consumption taxes (other than environmental)	1.5	1.4*	2.5	0.9	2.5	0	0.4	0
Public investment	0	0.1	0.1	0	0.8	0	0	1.1*
Health services provided in kind	0	0.2	0.3	0	0.4	0	0	1.3
Family	0	0	0	0	0	0	0	0.5
Social security contributions	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0
Used spending residual	0.4	0.8	0.6	0.1	0.2	0.3	0.1	0.4
Used revenue residual	0.1	0.2	0.2	0.2	0	0	0.1	0.1
Share spending efforts	37	59	36	8	49	80	49	73
Achieved consolidation	10.5	8.5	8.3	7	6.3	6.3	6.1	5.6
Consolidation needs	10.5	8.5	8.3	7	6.3	6.3	6.1	5.6
Share top 9 instruments	57	66	46	58	39	100	85	41
Instruments crossing the median	2	6	1	4	2	1	1	2

Note: See note to Table 7.

Table 12 (cont.)

Instrument Use and Achieved Long-term Consolidation *vs.* Needs
(percentage of potential GDP except otherwise mentioned)

Description	ISR	FRA	NLD	IRL	CAN	SVN	CZE	PRT
Subsidies	0	0.7*	0.6*	0	0.3	0.5*	0.8	0
Pensions	0.8	2.2	0	0	0	0	0.4	3.4
Other government in kind consumption (excluding family policy)	2.3	1.1*	2.3	0	2.3*	2.0*	1.4*	0
Unemployment benefits	0	0.4	0.5	0.9	0.2*	0	0.4*	0
Environmental taxes	0	0	0	0.3*	0.3	0	0	0
Other property taxes	0.2	0	0.2	0	0.2*	0.7*	0.3*	0
Sickness and disability payments	0.5*	0	0.6	0.3*	0	0.2*	0	0
Recurrent taxes on immovable property	0	0	0	1.0*	0	0	0	0
Sales of goods and services	0.5*	0	0	0.3*	0	0	0	0
Personal income taxes	0.2	0	0	0.1	0	0	0	0
Corporate income taxes	0	0	0	0.3	0	0	0	0
Consumption taxes (other than environmental)	0.1	0	0	1	0	0	0	0
Public investment	0	0	0	0	0	0	0	0
Health services provided in kind	0	0	0	0	0	0	0	0
Family	0	0	0	0	0	0	0	0
Social security contributions	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0
Used spending residual	0.4	0.3	0.3	0.1	0.3	0.3	0.3	0.2
Used revenue residual	0.1	0	0	0.2	0	0.1	0	0
Share spending efforts	80	100	95	29	87	80	92	100
Achieved consolidation	5	4.7	4.5	4.4	3.7	3.6	3.6	3.6
Consolidation needs	5	4.7	4.5	4.4	3.7	3.6	3.6	3.6
Share top 9 instruments	93	100	100	65	100	100	100	100
Instruments crossing the median	2	2	1	4	3	4	3	0

Note: See note to Table 7.

Table 12 (cont.)

Instrument Use and Achieved Long-term Consolidation vs. Needs
(percentage of potential GDP except otherwise mentioned)

Description	LUX	BEL	HUN	DNK	AUT	CHE	FIN	SWE
Subsidies	0.8*	0.8	0.7*	0.8	0.8	0.8	0.7*	0.7*
Pensions	0	0	0.6	0.7	1.2	0	0	0.9*
Other government in kind consumption (excluding family policy)	0	1.3*	0.9	0.4	0	0.6	0.8	0
Unemployment benefits	0.5*	0.6	0.1	0.1	0	0.2	0.3	0
Environmental taxes	0.2	0	0	0	0	0.3	0	0
Other property taxes	0	0	0	0	0	0	0	0
Sickness and disability payments	0	0	0	0	0	0	0	0
Recurrent taxes on immovable property	0.5	0	0	0	0	0	0	0
Sales of goods and services	0.5	0	0	0	0	0	0	0
Personal income taxes	0	0	0	0	0	0	0	0
Corporate income taxes	0	0	0	0	0	0	0	0
Consumption taxes (other than environmental)	0	0	0	0	0	0	0	0
Public investment	0	0	0	0	0	0	0	0
Health services provided in kind	0	0	0	0	0	0	0	0
Family	0	0	0	0	0	0	0	0
Social security contributions	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0
Used spending residual	0.2	0.1	0.1	0.2	0.1	0.2	0.1	0.1
Used revenue residual	0	0	0	0	0	0	0	0
Share spending efforts	58	100	100	100	100	86	100	100
Achieved consolidation	2.8	2.8	2.4	2.3	2.2	2.1	1.8	1.7
Consolidation needs	2.8	2.8	2.4	2.3	2.2	2.1	1.8	1.7
Share top 9 instruments	100	100	100	100	100	100	100	100
Instruments crossing the median	2	1	1	0	0	0	1	2

Note: See note to Table 7.

Table 12 (cont.)

Instrument Use and Achieved Long-term Consolidation vs. Needs
(percentage of potential GDP except otherwise mentioned)

Description	DEU	EST	ISL	KOR	GRC
Subsidies	0.3	0.3	0.8*	0	0
Pensions	0.8	0	0	0	0.9
Other government in kind consumption (excluding family policy)	0	1.3*	0.2	0	0
Unemployment benefits	0.4	0	0.1	0.1	0
Environmental taxes	0	0	0	0	0
Other property taxes	0	0	0	0	0
Sickness and disability payments	0	0	0	0	0
Recurrent taxes on immovable property	0	0	0	0.3	0
Sales of goods and services	0	0	0	0.5	0
Personal income taxes	0	0	0	0	0
Corporate income taxes	0	0	0	0	0
Consumption taxes (other than environmental)	0	0	0	0	0
Public investment	0	0	0	0	0
Health services provided in kind	0	0	0	0	0
Family	0	0	0	0	0
Social security contributions	0	0	0	0	0
Education	0	0	0	0	0
Used spending residual	0.1	0	0.1	0	0
Used revenue residual	0	0	0	0	0
Share spending efforts	100	100	100	12	100
Achieved consolidation	1.6	1.6	1.2	1	0.9
Consolidation needs	1.6	1.6	1.2	1	0.9
Share top 9 instruments	100	100	100	100	100
Instruments crossing the median	0	1	1	0	0

Note: See note to Table 7.

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COMMENT TO "CHOOSING FISCAL CONSOLIDATION INSTRUMENTS COMPATIBLE WITH GROWTH AND EQUITY" BY BORIS COURNÈDE, ANTOINE GOUJARD AND ÁLVARO PINA

Wolfgang Merz[*]

Introduction

The topic of the paper is a most relevant issue and therefore rightly to be addressed here. In times, where we have a pressing need to consolidate public finances it is of utmost importance to look at the side effects and to search for a well suited consolidation strategy.

The problem with conflicts in politics, however, cannot easily be solved. It can be better to pursue only one goal. According to Tinbergen it is the best to have a clear assignment of economic policy goals to the respective instruments. In any case, one should avoid too complex goals. One candidate for such a complex goal would be a balanced global growth, as mentioned in the paper.

Main thrust of the paper

- The paper is very comprehensive and well and intense elaborated. It is also a package of very good analyses and I can concur with many things which had been outlined. I will therefore focus on things where I have problems but this should not be misread as being overly critical. Turning to the origin, the rise of public deficit and debt levels is primarily attributed to the legacy of the financial crisis. But it should be noted that most European countries had already a too high debt burden before the crisis. The main reasons were the failure in application of the Stability and Growth Pact and a not symmetric application of the so-called Keynesian approach.
- The paper therefore also not addresses the failure of fiscal policy coordination in the past. This should also include an assessment if the enforced fiscal rules of this coordination work more efficient. If this is not the case it has also consequences for the topics raised. It should also be more questioned that Keynesian politics have not worked sufficient. There were always arguments in bad times for deficit spending but you always miss the point in good times to save enough. This feature should also be incorporated when designing a consolidation strategy.
- The paper addresses the confidence or expectation effects of consolidation, but it gives them no big weight. It is stated that there is "no consensus on the existence of these potential expansionary effects of consolidation". I know that in economic literature this is at the moment state of the art. But, was economic literature always right in the past? To give an example, there was over decades among most economists a sheer neglect of the role of financial markets and the banking sector for the real sector. For such a neglect we all had to pay a very high price, as the most recent severe crises have shown. I am therefore here more proactive because I think expectations really matters. The sentence "deeper consolidation would, through multiplier effects, reduce growth" should be therefore revisited in this context. Literature normally states that consolidation is far more efficient when it is triggered on the expenditure than on the revenue side. The paper would benefit from addressing this issue more thoroughly.

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Ranking of policy instruments

- This ranking is well-taken but the political process is normally heavily built and don't like such a fine tuned approach. It is therefore an imminent task how to sell all this to the politicians. I think the rational and empirical base for such a ranking should also be considered and the criteria for the rational base should be clearer. On the rational, it is obvious that subsidies and pensions are on the top because these are the normal candidates for a deeper consolidation. The top positions should also be held from expenditure items since the revenue side is normally not so efficient in consolidation.
- The further items in the list are then more or less revenue items such as property taxes and income taxes. However, consumption taxes are listed at the back. Why? Are they really so regressive? Isn't also a risk that the early recourse on income taxes have negative side effects for growth? It is justified to group public investment at the end although unfortunately they are often the first choice of municipalities when it comes to expenditure cuts. The same is true for health service, childcare, family and education since these positions are the cornerstones for the wellbeing of a society. On the empirical basis, I rely on the work of the OECD.

Comments in detail

- The paper states that the debt ratio should be stabilized at 60 per cent of GDP in 2060. Is this not too late, also in the context of the huge demographic challenges? In the following private-sector indebtedness is mentioned. Would it not prudent to explore more on this? Furthermore, the baseline scenario assumes that substantial pension reforms are implemented to reduce public pension expenditures. The debate in Germany, however, shows that even with done reforms there are always risks of reversals, especially in good times.
- It is also mentioned that "other countries, including in particular Italy and Germany, face little or no short- to medium-term structural consolidation needs". I am interested in hearing by which facts such a statement for Italy can be underpinned. There is also a discussion about a possible higher public debt to GDP ratio ceiling. It is obvious that the 60 per cent value has a certain smell of being artificial. But it should be common sense that all approaches towards the 100 per cent level will create debt sustainability problems even in the short term.

Way forward

To sum up, the critical points mentioned should not blur the clear perception that the paper addresses the topic in a thorough and substantial way. However, further research and rethinking is required which is certainly a crucial element for all macroeconomic studies and should therefore not be seen as a point of criticism. Examples:

- Works fiscal policy coordination in Europe well?
- How efficient is a Keynesian approach?
- What is with expectations, how much they matter?
- What is with a very detailed advice which is for politicians not easy to handle?
- Would it not be easier to follow fiscal rules?
- Or would be the reliance on independent bodies also a way out? Obviously not, since in our world independence is in a certain way also an artificial concept. The struggle in aiming at an so called "independent" macroeconomic forecast is a good example for that.

Session 2

FISCAL MULTIPLIERS AND BUDGETARY ADJUSTMENT

HARD WORK, AND FOREIGN HELP – HOW TO SUCCESSFULLY CONDUCT ADJUSTMENT WITH OFFICIAL ASSISTANCE

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What is needed for a country to successfully adjust after a crisis episode is a subject of much debate including in the euro area where four out of seventeen countries were in a full economic adjustment programme by end 2013. We identify adjustment needs by a country's decision to approach the IMF for official assistance. We then investigate the factors conducive to successful exit from official assistance during more than 170 adjustment episodes by means of a panel regression framework. We define success as a resumption of real GDP growth and a reduction of government debt. Our econometric results suggest hard work, i.e.*, policy action such as fiscal adjustment and decisive financial sector repair, play an important role for the probability of a successful exit. We also find that more stringent conditionality, especially in the structural area, increases the chances of success. Supportive external conditions enhance the prospects for a durable and successful exit. These results also hold up when success is instead defined as the ability of the country to finance itself on capital markets.*

1 Introduction

The global economic downturn that started in the summer of 2007 has been the most economically costly since the Great Depression. From its original epicentre in the U.S. financial sector, it quickly spread around the world, leaving plummeting growth and soaring unemployment in its wake. A large number of emerging markets requested financial assistance from the IMF and regional financing sources as market-based financing at affordable terms disappeared. A second wave of the crisis erupted in 2010 as concerns about debt sustainability in the euro area came to the forefront, exacerbated by fears of contagion in a monetary union and the associated detrimental knock-on effects on financial stability. By the end of 2013 four of at the time seventeen euro area countries were in full economic adjustment programmes,[1] an unprecedented situation among advanced economies.

Defining the right adjustment strategy for getting back to a sustainable path became the topic of a heated debate, which largely focused on whether the speed and scope of fiscal adjustment prescribed under the European programmes were excessive (see, in particular, Blanchard and Leigh, 2013). The strategy for repairing the financial sector after systemic banking problems was also heavily criticized, mainly for promoting excessive near-term deleveraging and adding to fiscal vulnerabilities through large recapitalizations with national public funds. The extensive support from the regional central bank was by some considered as a necessary component for preventing liquidity shortages in viable banks to become solvent, while others saw it as delaying necessary

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The views expressed in this paper are those of the authors and should not be attributed to the European Commission. We are grateful to Istvan P. Szekely for guidance and support throughout this project, to Uwe Boewer, Servaas Deroose, Zeno Enders, Juergen von Hagen, Paul van den Noord and Peter Pontuch for helpful comments and Salvador Barrios for access to his data set. Valuable suggestions by the participants of the 16th Banca d'Italia Public Finances Workshop in Perugia are also gratefully acknowledged. Jacek Szelozynski and Orhan Chiali provided excellent research assistance. This version: July, 2014.

[1] The 2012-2013 financial sector assistance programme for Spain had a more narrow objective and is not considered as an official crisis programme for the remainder of this paper. Financing arrangements which give access to official financing but are not monitored by means of ex-post conditionality, such as the IMF's Flexible Credit Line, are not included in the analysis as eligibility criteria for such instruments require lack of outright macroeconomic adjustment needs.

action. There were also dissenting views on how to adapt the situation to a lack of exchange rate flexibility in, e.g., Latvia and the euro area programmes.

Formulating an appropriate adjustment strategy always requires a thorough understanding of a country's particular characteristics and the particular environment in which it operates; idiosyncrasies matter. Moreover, euro area countries exhibit features that are very specific; most notably they are part of a monetary union where monetary policy is delegated to the ECB; the official financing made available through the recent EU-IMF supported programmes for euro area countries was much larger than the historical average; and some of the EU-IMF-supported programmes involved countries with very high government debt-to-GDP ratios. Nevertheless, learning some stylized facts from past crisis episodes and trying to build on past experiences is a valid strategy to improve policies going forward and to possibly assess the odds of success of ongoing or recently completed adjustment programmes.

To be useful, any analysis of factors conducive to successful adjustment after a crisis episode requires a systematic benchmark against which that success is evaluated. A first difficulty arises with how to identify a need for adjustment. Banking crises often, but not always, carry such economic costs that adjustment is needed. The same holds for both the speed and magnitude of fiscal adjustment, which might be very gradual if market or official financing continues to flow and debt levels are manageable. This paper makes the assumption that a country requesting an IMF programme is indicative of a significant adjustment need, as well as a certain urgency to advance the process to a considerable degree within a given time period. We consider the political costs of asking for official assistance to be sufficiently high that countries would not request it if adjustment needs were manageable otherwise. We acknowledge that the adjustment needs for countries under IMF programmes vary substantially, including the actual need for financing, and will aim to control for this in our estimations. This choice of sample could potentially bias the results, as countries availing themselves of official assistance might share certain characteristics likely to bias the results and ideally warranting the use of a control group not receiving financial assistance (Przeworski and Vreeland, 2000; Ghosh *et al.*, 2002; Hardoy, 2003; Hutchison, 2004; Atoyan and Conway, 2005; Barro and Lee, 2005; Bas and Stone, 2011). The economic situation might be worse, which would reduce the likelihood of a successful adjustment, but the reform commitment might also increase with the external policy scrutiny. However, we still believe that this is the most appropriate sufficiently large sample available.

A second issue regards how to formulate a benchmark against which the success of an adjustment episode was assessed. Some earlier literature finds that benchmark by using the stated aims of IMF financial assistance programmes, such as providing short-run macroeconomic stabilization while supporting the economic policies conducive to putting it on a more sustainable path in the medium term. "Success" has then been defined as a resumption of economic growth, as well as sustainable levels of the fiscal deficit, debt, current account and unemployment (Ghosh *et al.*, 2002; Dreher, 2006; Steinwand and Stone, 2008).

Our first contribution is to construct an indicator of successful adjustment that improves on existing ones. Instead of using absolute thresholds for all countries regardless of their economic characteristics as IMF (2012) our definition is formulated relative to countries' pre-crisis levels of growth and debt, as they were sufficiently favourable for the country to finance itself on the capital markets. We believe that this approach is warranted given the highly varying country characteristics in our sample. This indicator however still applies a country-specific measure of success, *i.e.*, does not measure the extent to which adjustment in a certain country helped the adjustment of another. We will later provide an alternative specification we hope partly internalizes the spillover effects of adjustment.

In a second step, we try to identify factors that predict successful adjustment according to the indicator by means of regression analysis with a larger sample and a more thorough delineation of factors that could be affected by certain policies – the hard work – *vis-à-vis* those outside the countries' control such as global growth or risk appetite – help from abroad. Our set of possible factors conducive to successful economic adjustment draws on previous literature, regardless of whether the adjustment took place under the aegis of an IMF-supported programme or not. Barrios and Langedijk (2010) find that large current account deficits can significantly impair the ability of countries to achieve successful fiscal consolidations, but that absence of nominal exchange rate adjustment need not be a major impediment. The negative effects on growth and fiscal sustainability from banking crises, especially if they are preceded by a credit boom and followed by a credit crunch, were already studied by Calvo *et al*. (2006) and Cerra and Saxena (2008) but naturally came to the forefront during the current crisis given its origins in the U.S. financial sector (IMF, 2009; Laeven and Valencia, 2012; and Abiad *et al*., 2011).

Our empirical strategy of regressing economic and policy variables on a binomial indicator of successful macroeconomic adjustment relies on an approach that is well-established in the economic literature. In particular, there is a link with the relatively rich literature on successful fiscal consolidation which developed since the mid-1990s (see, for instance, Alesina and Perotti, 1995; Alesina and Ardagna, 1998; von Hagen *et al*., 1998; von Hagen *et al*., 2001; von Hagen and Strauch, 2001; Guichard *et al.*, 2007; Larch and Turrini, 2011).

Our sample covers 176 IMF-supported programmes incepted during the years 1993-2010. Some euro area financial assistance programmes are still ongoing and drawing conclusions about their success would entail relying excessively on projections, which might be subject to bias. They are therefore not included in our sample, but we will discuss their future challenges by assessing their probability of success using the estimated coefficients from our regression and the variables forecasts for the coming years.

Our main findings are that among variables that can be affected by policy choices, faster fiscal adjustment, lower initial deficit and debt levels contribute significantly and positively to a successful adjustment episode. Decisive financial sector repair is also highly conducive to successful adjustment as lack of credit to the private sector significantly lowers the chances of success, while a systemic banking crisis per se need not be detrimental. The role of exchange rate flexibility is less clear cut, possibly due to different off-setting effects. The probability of successful adjustment is considerably higher if the global growth situation is favourable and risk appetite strong. Finally, while our primary aim is not to discuss the optimal design of IMF programmes, our results suggest that more official financing (which, conversely, is typically coupled with a more gradual fiscal adjustment) does not significantly contribute to success, while more stringent conditionality and especially in the structural area does appear to exert a significantly positive effect. Our findings turn out to be robust across a wide range of specifications and for controlled variations in the sample.

The rest of this paper is organized as follows. Section 2 presents stylized macroeconomic facts for the countries in our sample, and discusses how to construct an indicator of successful adjustment. Section 3 presents results from regression analysis of factors that increase the probability of successful adjustments, including alternative definitions thereof. It also discusses implications for the ongoing or recently completed programmes in Europe. Section 0 concludes by putting our main results in the context of policy recommendations and suggestions for future research.

2 Features of adjustment spells and measures of their success

2.1 Macroeconomic situation in countries receiving financial assistance

In this section we conduct a descriptive analysis of the sample and provide an overview of trends in key macroeconomic variables prior to, during and following economic adjustment programmes. The sample covers 176 completed or expired IMF General Resource Account (GRA) supported programmes extended to a total of 59 countries from 1993 and onwards.[2]

Among the 176 programmes in the sample 83 per cent were Stand-by-Agreements (SBA) and the remaining ones Extended Funding Facilities (EFF). On average a country had three programmes with the IMF, however there are countries which completed up to seven GRA-supported programmes. The average duration of an SBA amounted to 1.7 years with a maximum duration of 3 years, while EFFs were longer on average with a mean of 2.9 years and a maximum of 4 years. The average size of a GRA-supported programme reached 234 per cent of the country's quota with a standard deviation of 443 per cent. Countries which were considered to meet the IMF's Exceptional Access Criteria[3] in some cases reached above 3000 per cent of the country quota. Nearly 30 percent of programmes did not disburse any of the available official financing as countries could meet their financing needs through other sources. Countries drew on average 48 per cent of the funds approved under the programme, with the figure rising to 68 per cent when non-disbursing programmes are excluded.

A key decision for our analysis is to identify the horizon over which adjustment is assessed. In order to assess trends in key macroeconomic variables over the relevant horizon we define pre-programme, programme, and post-programme periods annually.[4] The year of programme start is denoted with T, the pre-programme period includes years T–2 and T–1, the programme period comprises the interval [T,T+2] and the post-programme period refers to T+3 and T+4. The appropriateness of the definition of the pre-programme and the programme period could be questioned as programmes can start at any time in the year. We will later try to control for this in our econometric analysis by varying the starting point depending on the date of programme inception. Moreover, policy measures tend to impact key macroeconomic aggregates with different lags. Decisively implemented measures aimed at improving the overall fiscal balance translate rather rapidly into fiscal headline figures, while structural reforms might impact real GDP growth with a delay of several years. Improvements in unemployment figures typically come only late in the recovery phase. Furthermore, using unemployment figures as an indicator for a revival of the labour market comes with disadvantages as a shrinking labour force (e.g., due to workers dropping out of the formal labour market) and falling employment might have offsetting effects on unemployment. However, unemployment remains the only labour market indicator available for a sufficiently large sample.

Another difficulty results from the fact that programmes tend to have different durations, depending, e.g., on the perceived time required for the needed adjustment. Average programme duration within the sample is approximately 1.9 years with a standard deviation of 0.9 years. Therefore, from this perspective the definition of the programme period as the time elapsed

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2 A complete list of programmes included in the sample is provided in Appendix C. There were more than 200 GRA-supported programmes put in place since 1993; our data sample shrank somewhat due to unavailability of data for some variables of interest for certain countries. The selection of GRA-supported programmes means that low-income-economies with no access to international financial markets were excluded from the sample. Programmes that started in 2011 or afterwards are excluded as we would have to partly rely on projected variables which could bias the results. Programmes not completed until end-August 2013 were excluded on corresponding grounds.

3 https://www.imf.org/external/pubs/ft/sd/index.asp?decision=14064-(08/18)

4 We are following the same approach as in IMF (2012).

between T and T+2 seems appropriate, while bearing in mind that plenty of programmes were shorter than two years. Some programmes were immediately followed by a successor agreement as further adjustment was needed, and the improvement achieved in the post-programme period might not be directly attributable to the original programme. A further issue arises when defining the end of an adjustment programme as programmes can also end at any time in the year.

Bearing in mind the above caveats, on average key macroeconomic indicators improve during an IMF supported economic adjustment programme (Figure 1). Countries seeking financial assistance recorded a slowdown of real GDP growth in the pre-programme period, though average growth was still positive. A significant part of the countries suffered a recession as shown by the 25 percentile trend line. Fiscal indicators exhibit a similar pattern: both overall fiscal balance and primary balance deteriorated pre-programme and general government debt increased. The current account recorded substantial deficits during the run-up to the programme but already improved just prior to the programme which could be attributable to the fact that capital often flows out from countries suffering from macroeconomic disturbances. The interpretation of current account developments is, however, not straightforward. In many countries, a high current account deficit prior to the adjustment episode might be one of the vulnerabilities – particularly if it is financed by a large share of short-term portfolio flows – prompting it to seek financial assistance when financing dries up, and a reduction of it then suggests a more sustainable position going forward. However, in a fast-growing and capital-poor country standard economic theory recommends running a current account deficit to finance investment needs, and a widening current account deficit might then mean that external funds to finance such projects is again forthcoming post-crisis. Inflation was typically high before programme start, but also influenced by outliers. Therefore, when assessing trends in inflation, it is more appropriate to take the 25 and 75 percentile lines as reference values. Real consumption growth was on a deteriorating path in the pre-programme period. Unemployment was constantly growing prior to programme start and real domestic credit growth - measured as the percentage growth in real credit advanced to the private sector - was rather sluggish and on a declining path. The currency typically underwent a marked depreciation against the US dollar during the first year of a programme. Competitiveness – measured as a depreciation of the real exchange rate – typically worsened before a programme and held steady thereafter.

In the year of the programme start, real GDP growth slightly improved with economic growth returning gradually in the years afterwards. Countries that suffered from a deep recession in the pre-programme period experienced an even stronger rebound as suggested by the 25 percentile line. Overall fiscal and primary balances also improved significantly in the start year and the adjustment continued under the programme, while general government debt entered a declining path. When the general government debt to GDP ratio ranged above 50 per cent at programme start the average decline was more significant.[5] The trend in the current account shows a rather mixed picture, while inflation returned to modest levels and was clearly on a declining path. Unemployment kept growing until T+1, in line with expectations of labour markets reacting with a lag to a rebound of the economy, but did not decline significantly later on and hence stabilized at a slightly higher level compared to pre-programme levels. Inflation moderated after the programme was put in place, furthermore real consumption growth accelerated and returned to a higher path compared with pre-programme. Real credit growth rebounded during the programme period and remained at a significantly higher level than prior to programme start. Both the real effective exchange rate and the nominal exchange rate versus the US dollar and currencies of the given countries' trading partners stabilized gradually under the programme.

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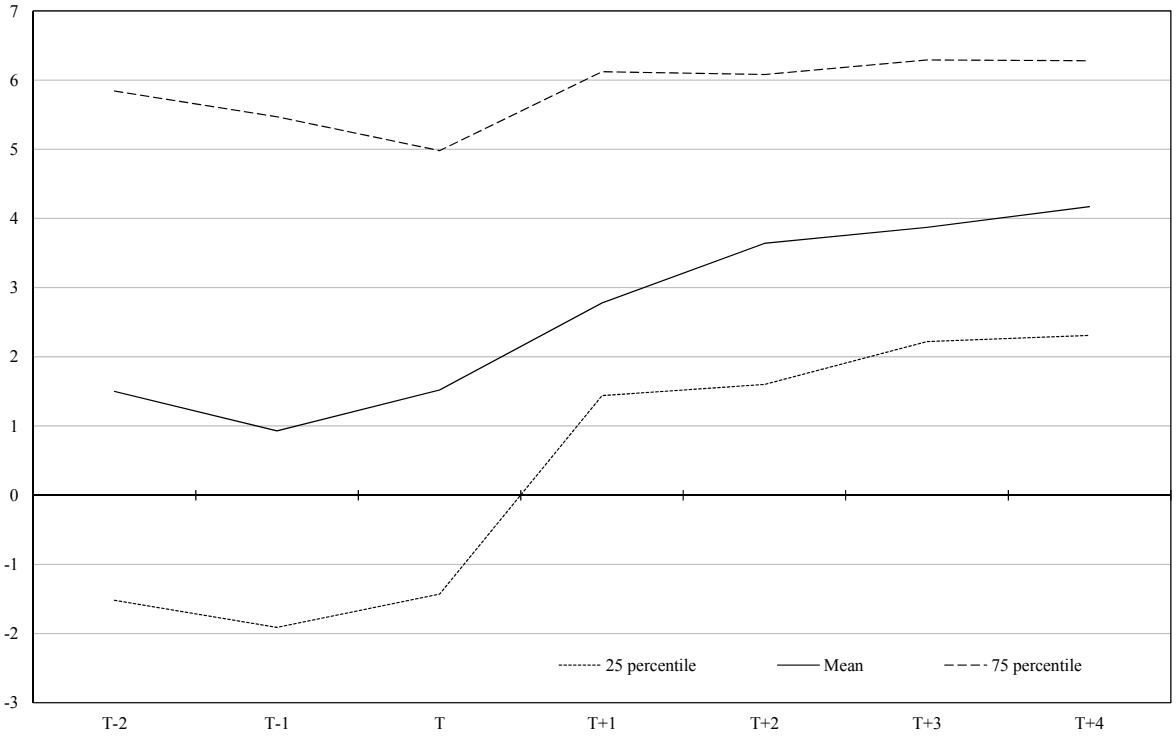
[5] In approximately 40 per cent of the sample the General Government Debt to GDP ratio ranged above 50 per cent at programme start and declined on average from above 85 per cent to below 75 per cent between T and T+4.

Figure 1

Macroeconomic Situation in Countries under Economic Adjustment Programmes
Real GDP Growth
(percent)



General Government Debt to GDP

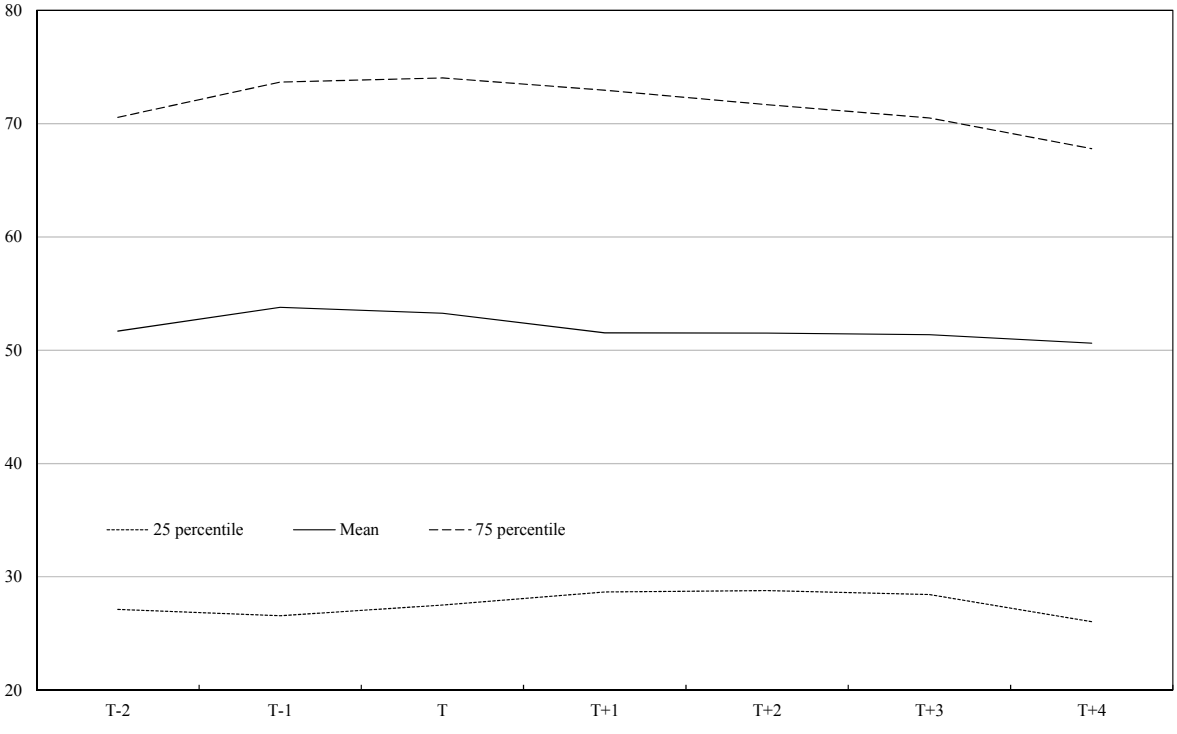
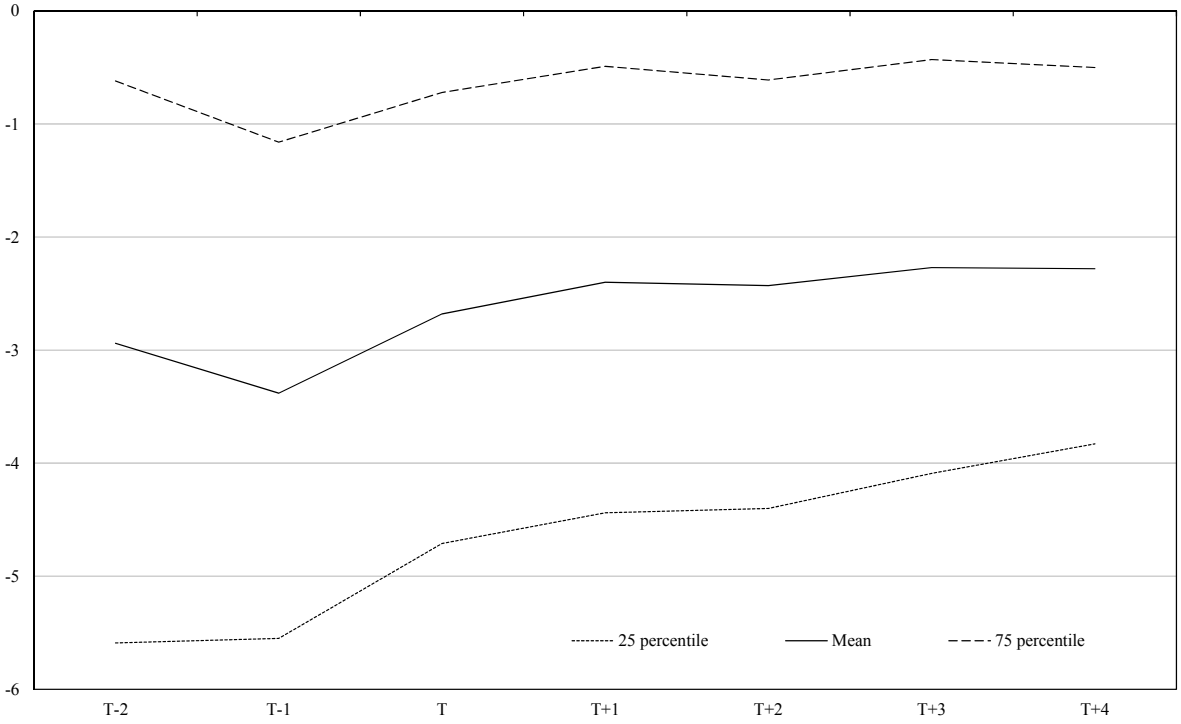


Figure 1 ***(continued)***

Macroeconomic Situation in Countries under Economic Adjustment Programmes



Primary Balance

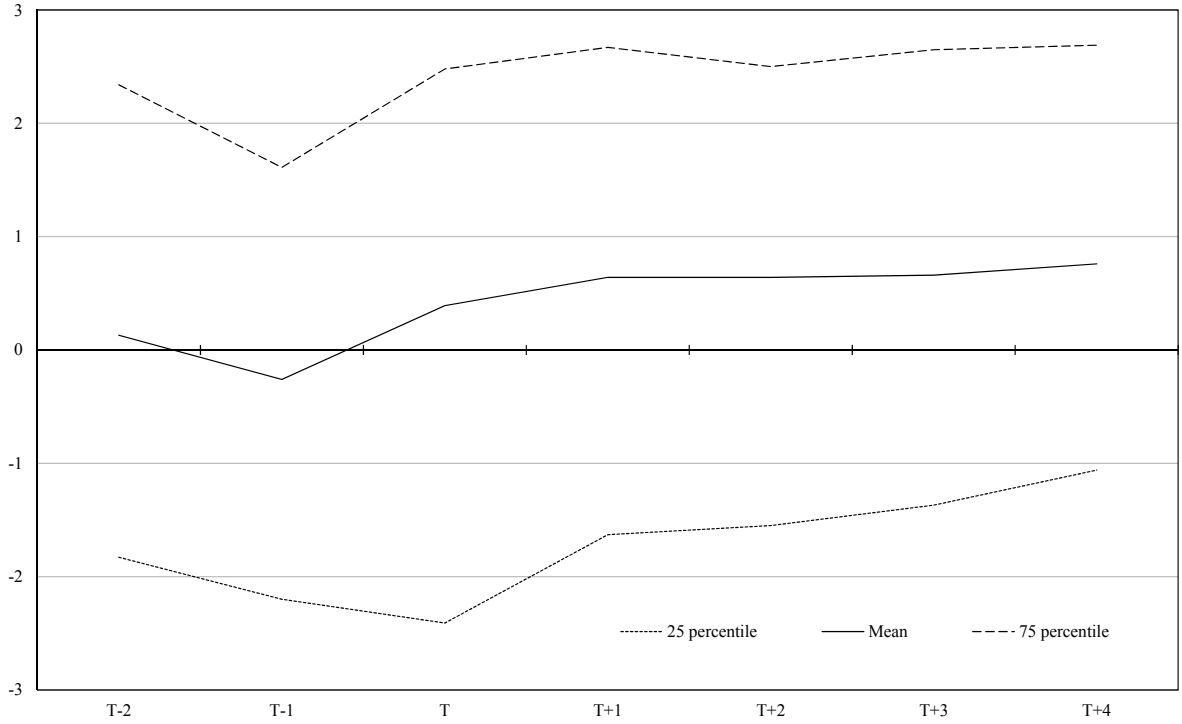
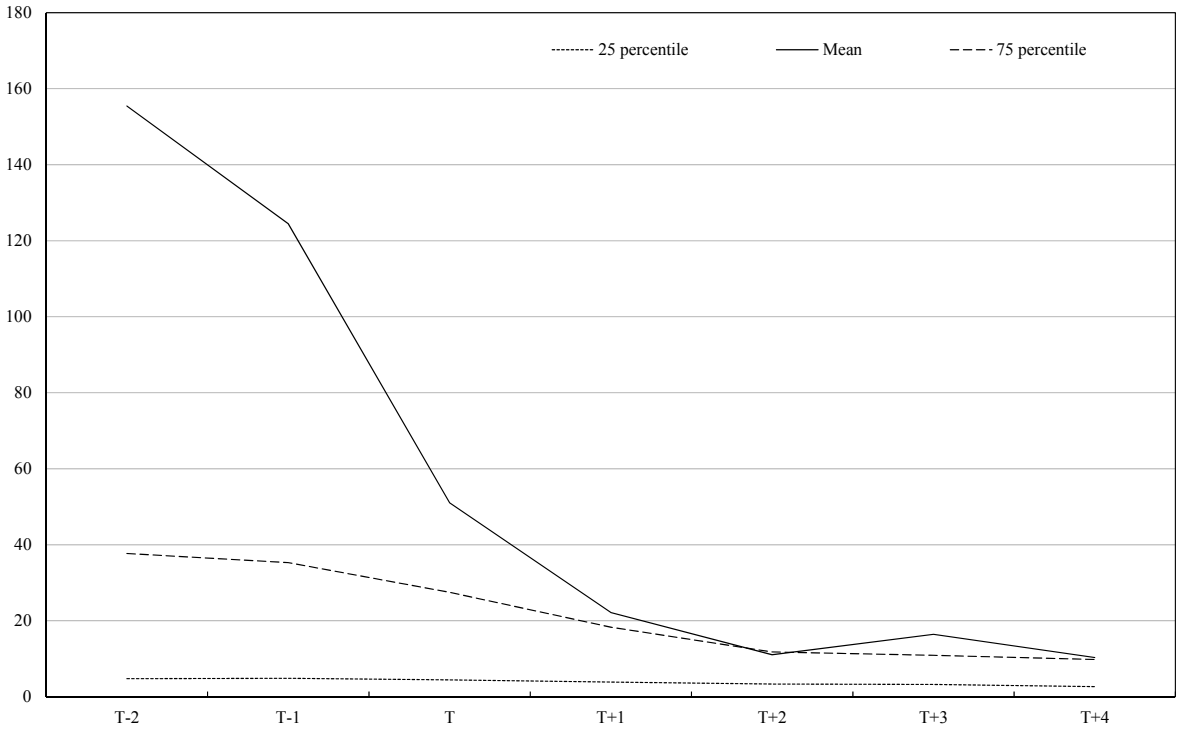


Figure 1 *(continued)*

Macroeconomic Situation in Countries under Economic Adjustment Programmes
Consumer Price Index Percent Change



Consumption Growth

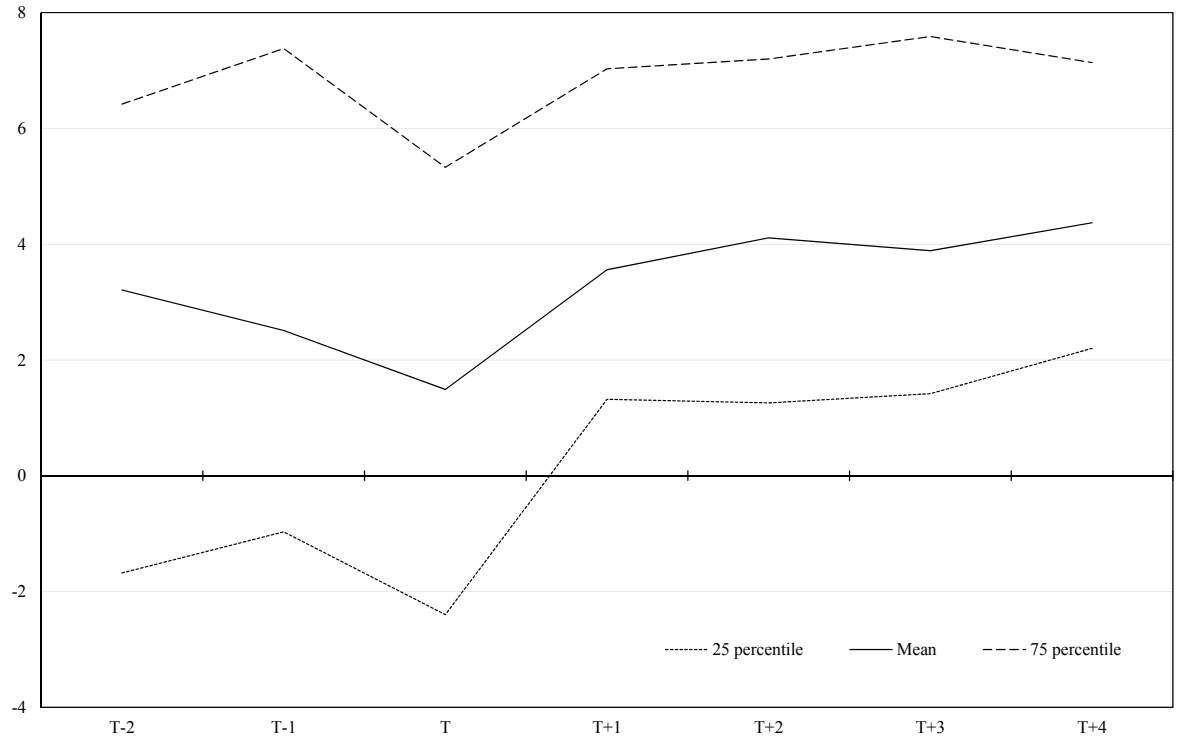
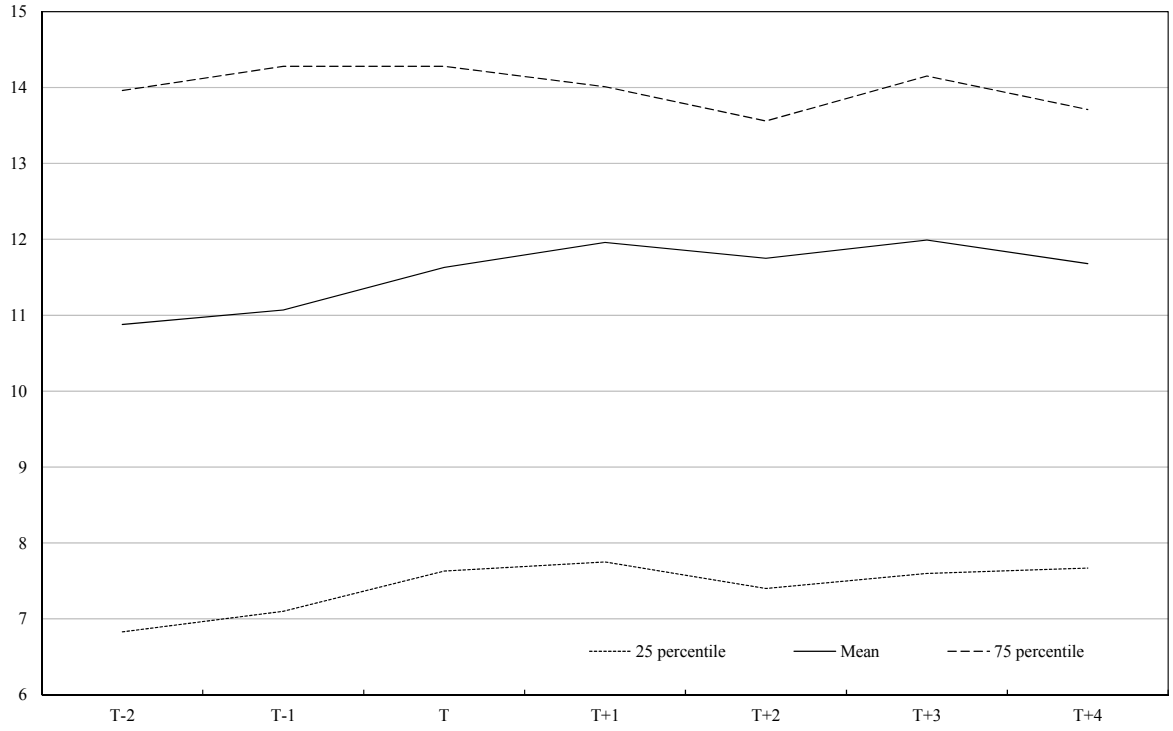


Figure 1 ***(continued)***

Macroeconomic Situation in Countries under Economic Adjustment Programmes
Unemployment



Real Credit Growth

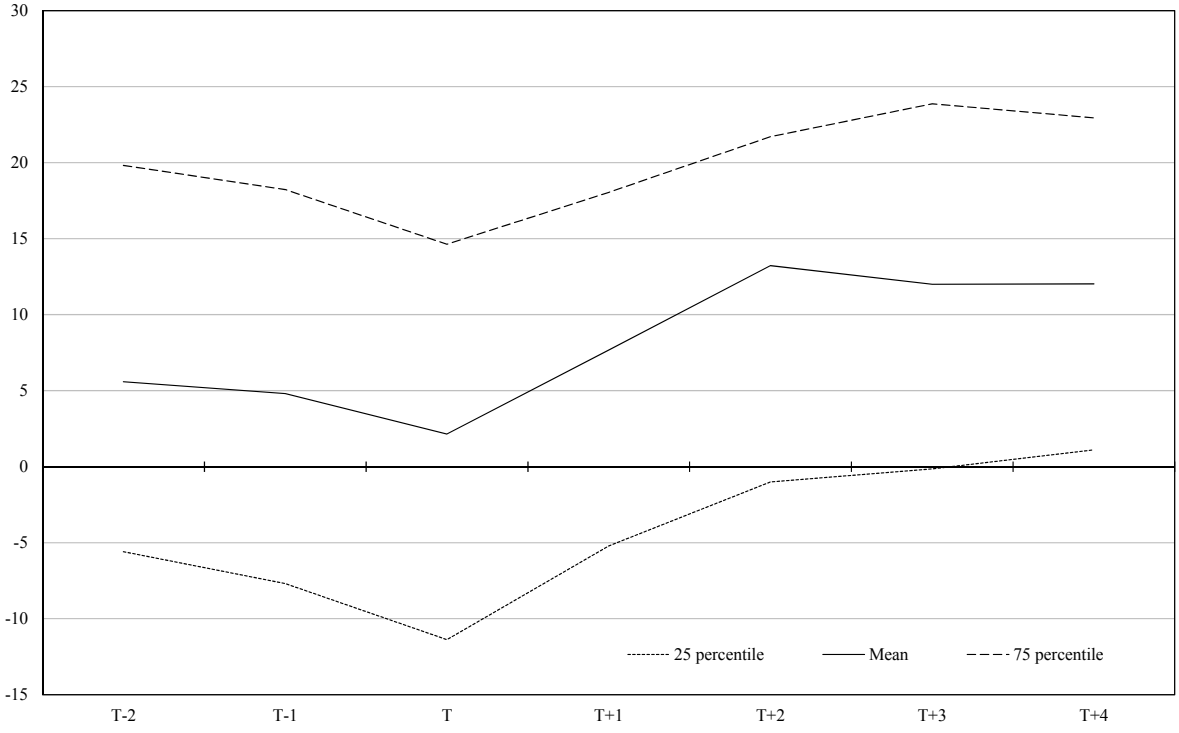
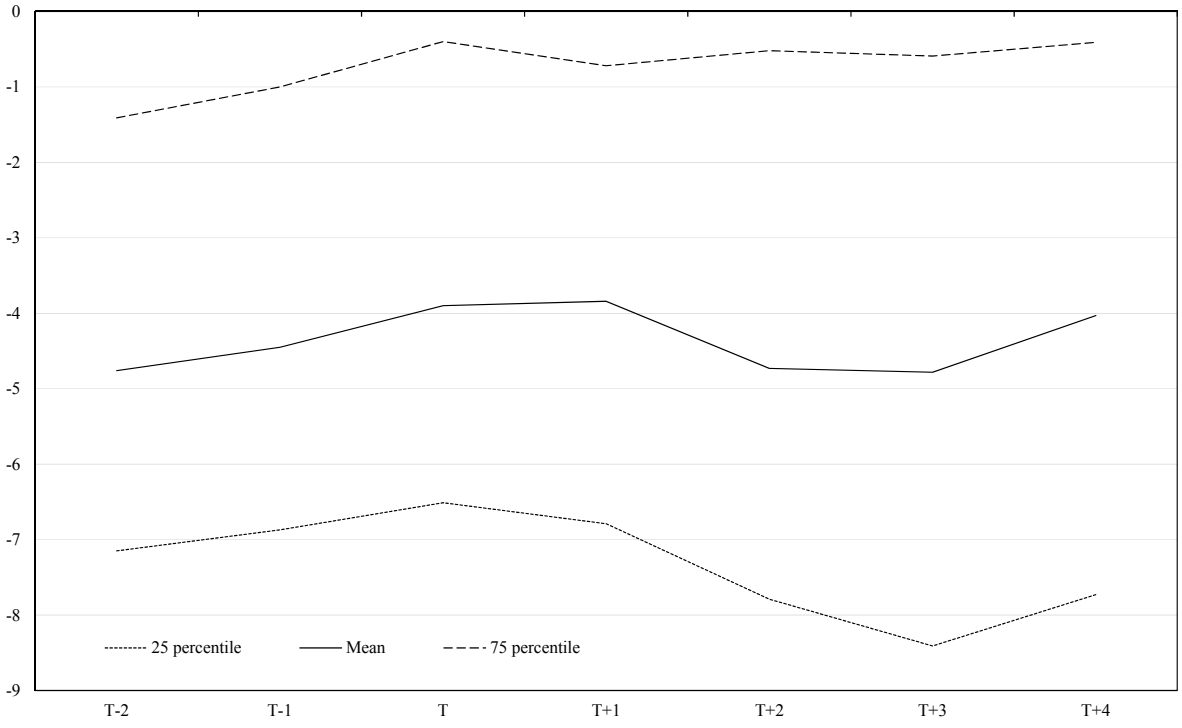


Figure 1 *(continued)*

Macroeconomic Situation in Countries under Economic Adjustment Programmes
Current Account Balance



Nominal Exchange Rate vs USD

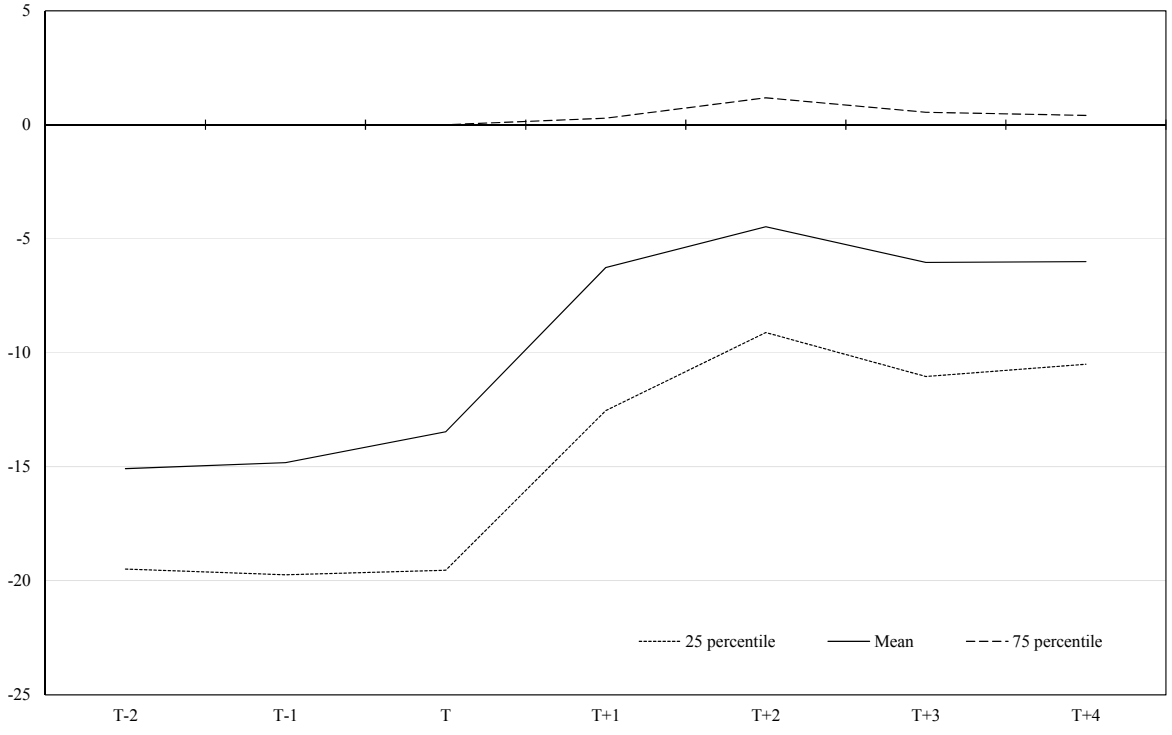
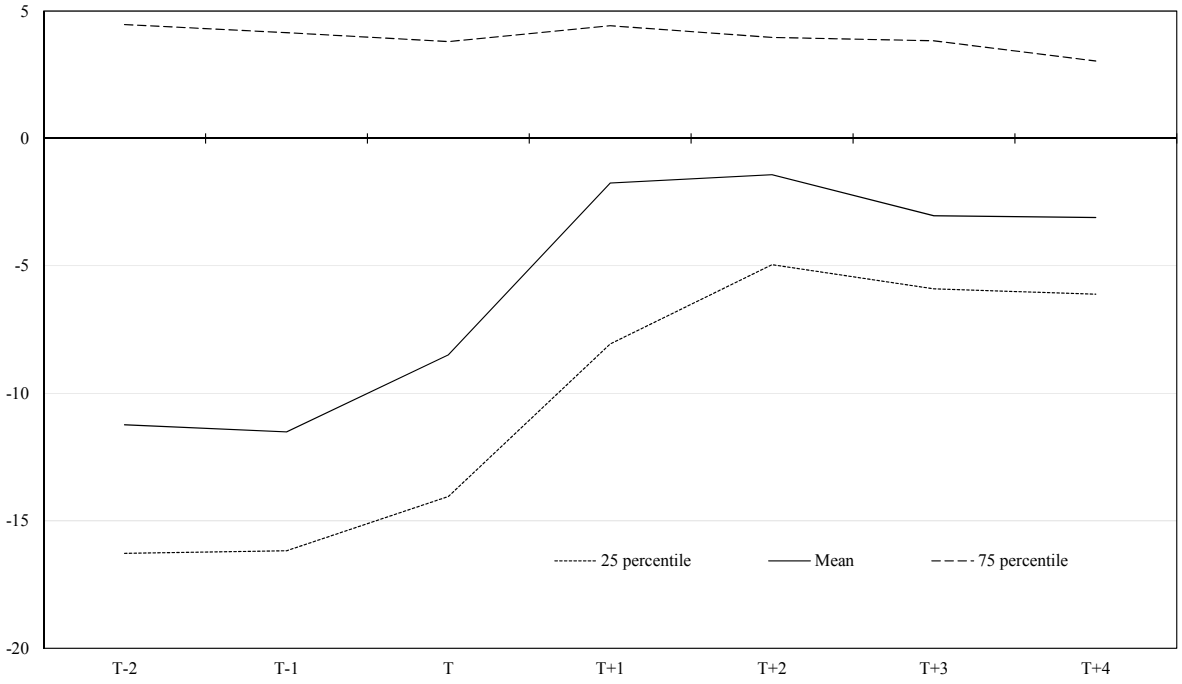
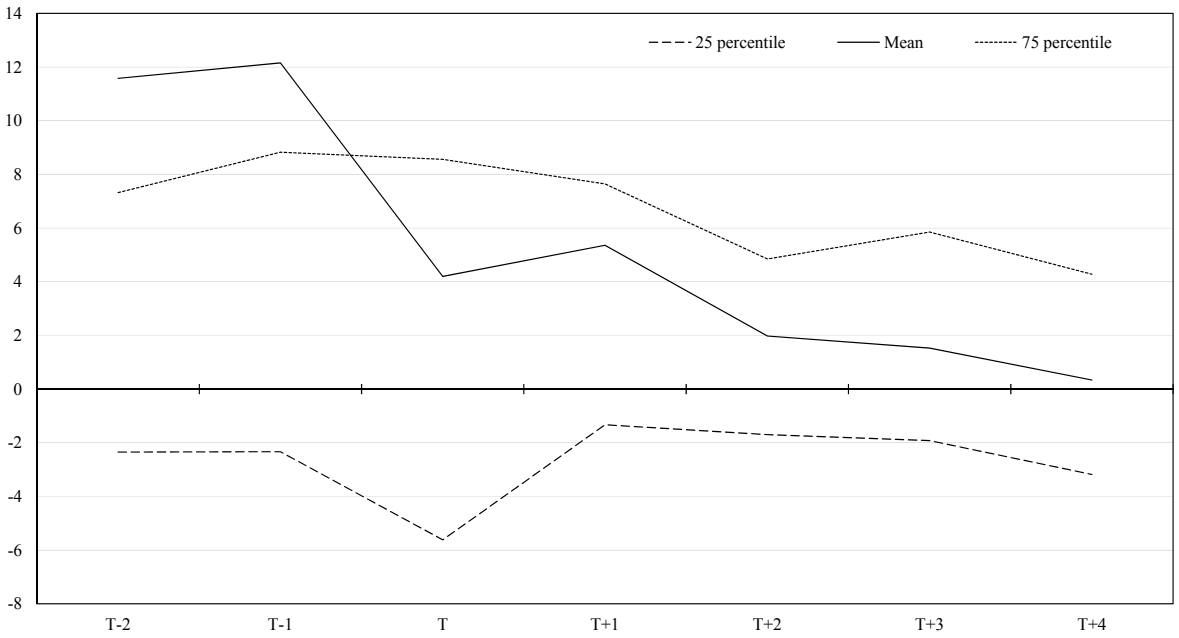


Figure 1 ***(continued)***

Macroeconomic Situation in Countries under Economic Adjustment Programmes
Nominal Effective Exchange Rate



Real Effective Exchange Rate



Source: IMF World Economic Outlook Database, IMF reports, IMF International Financial Statistics, Darvas (2012), World Bank and other sources. For a detailed description of the data sources see Appendix A; authors' calculations. Real credit growth, real effective exchange rate and nominal exchange rate vs. the USD are year-on-year percentage changes. The real effective exchange rate, the nominal exchange rate vs the USD and the nominal effective exchange rate are measured as the foreign currency price of one unit of domestic currency (indirect quotation). The mean of the change in the consumer price index is influenced by countries suffering from hyperinflation of above 1000 per cent per year.

Overall, on average key macroeconomic indicators appear to improve measurably during the programme period and continue to evolve favourably after its end. Real GDP growth accelerated, the general government debt to GDP ratio declined, both the overall fiscal and primary balance improved, real consumption growth rebounded and the currency stabilized.

2.2 How to measure successful adjustment

This section sets the basis for our econometric analysis aimed at identifying factors which influence the outcome of an adjustment programme. Prior to a more formal regression analysis we need a benchmark against which to evaluate success in order to identify factors enhancing the probability of successful exit from a macroeconomic adjustment programme, that is, we need to construct the dependent variable.

There are at least three conceivable ways of defining success: i) an "accounting" definition according to which a programme is considered a success if compliance with the policy conditions agreed under the programme is high; ii) a "market-based" definition that looks at whether market access is regained during or at the end of the programme; and iii) a more "macroeconomic" definition which is centred on the economic performance of the country during the years following the completion of the programme. Ideally, the three definitions should be complementary in the sense that success should manifest itself via a consistent compliance with policy conditions, combined with a return to market financing and a favourable macroeconomic performance after the end of the programme. In practice, however, things are likely to be more complex. Specifically, not all policy conditions may be equally relevant and market confidence has shown to be volatile and not always forward-looking. For these reasons, we concentrate on the sustainability dimension and gauge the success of an economic adjustment programme as a resumption of economic activity and improvements in the general government debt position.

In particular, we compare the average real GDP growth in five years after programme start with average growth in the five years prior to programme start to judge whether real GDP growth returned to the country's own benchmark level following the start of the adjustment programme. In addition, we investigate whether general government debt entered a declining path within five years following programme start. This differs from IMF (2012) and Barrios and Langedijk (2010) which both use absolute thresholds regardless of a country's own growth performance and ability to finance a certain debt level from market sources prior to the crisis. We believe this approach is warranted given that what could be considered a favourable growth and debt performance differ markedly within our sample due to the large variation in country characteristics, as well as differing market perceptions over time. Hence, those programmes are deemed to be successful which recorded *both* favourable economic growth and declining public debt according to the following criteria:

I Post-adjustment real GDP growth rate to reach 3/4 of pre-crisis one

- If average real GDP growth in [T–5,T–1] was <= 3 per cent then growth has to be above 2.25 per cent to succeed.
- If average growth in [T–5,T–1] was between 3 per cent and 6 per cent then the average growth in [T+1,T+5] has to reach at least 3/4 of the growth in [T–5,T–1].
- If average growth in [T–5,T–1] was higher than 6 per cent, then above 4.5 per cent average growth in [T+1,T+5] is necessary to succeed.

II General Government Debt to GDP ratio to decline by 5 per cent

- If average general government debt to GDP in [T+1,T+5] was below 25 per cent, then the trends in public debt are considered to be irrelevant from outcome perspective.

- If average general government debt to GDP in [T+1,T+5] was above 25 per cent, then if general government debt peaked between T and T+5 and declined by at least 5 per cent compared to the peak value, then the programme is deemed to be successful as regards the evolution of general government debt.
- The country does not default on its debt in [T+1,T+3].

2.2.1 Growth criterion

Our rationale for choosing simple five-year averages for real GDP growth as opposed to, e.g., measures of potential output is mainly to increase robustness. Lack of sufficient data for many countries precludes the use of, e.g., a production function methodology for calculation of potential growth. A more readily available approach such as the Hodrick-Prescott (HP) filter on the other hand suffers from the well-known end point problem (Mise *et al.*, 2005).[6] Another valid criticism is that for measuring the performance of an economy over the long-term, five years might be short at first sight. Here again we are trying to strike a balance between the availability of GDP data on the one hand, and, on the other hand, that policy measures implemented in the post-programme period or afterwards could affect economic growth.

Our decision to use a three-pronged definition of success, is motivated by both technical and economic concerns. Several countries in our sample were suffering from negative average real GDP growth prior to the programme; and even for countries suffering from low, but still positive average growth, maintaining it cannot be considered meeting the key objective of putting the economy on a dynamic and sustainable growth path. Consequently, for the low-growth cases (below 3 per cent average growth before programmes start) at least an average growth of 2.25 per cent in [T+1,T+5] (3/4 of 3 per cent) is required to succeed. A similar sustainability argument can be made for choosing an absolute cut-off point for countries recording high growth before programme start, *i.e.*, above 6 per cent. The pre-crisis growth rates for these countries might simply have been symptoms of overheating, and as such it should not be considered a failure if they are not reached after the programme. Therefore, for the high-growth cases the adjustment episode is deemed to be successful, if average real GDP growth reaches above 4.5 per cent in [T+1,T+5], which is again 3/4 of 6 per cent.[7] A graphic illustration of the growth criterion is provided in Figure 2.

On the basis of our criterion for real GDP growth nearly 65 per cent of adjustment episodes in our sample can be classified as successes. When we lower the bar so that only 2/3 of the average growth prior to the programme is required to be reached after programme start, the success rate increases only marginally to 68 per cent. We therefore consider our definition to be fairly robust with respect to the cut-off points. To address outstanding concerns regarding the effect of borderline cases, we will later rerun the regressions using the modified criterion for growth to see whether results from the regression still hold. We also calculated the number of programmes successful in restoring growth when modifying the required percentage of average real GDP growth in [T–5,T–1] necessary to be reached in [T+1,T+5] from 0 to 100 per cent in 10 per cent

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6 In addition, several successor states of the former Soviet Union or of the former Socialist Federal Republic of Yugoslavia, did not even exist before the programme was agreed and for some countries the real GDP series is far too volatile.

7 Moreover, a continuous measure would have clashed with the relatively large share of countries transitioning from planned to market economies during the 1990s, as they quite frequently experienced years of extremely high or low growth. Another minor problem, partly addressed already above, arises from the fact that for 13 programmes real GDP growth is available only for a slightly shorter period than five years before programme start. However, since all these countries suffered from negative average real GDP growth rates during the year, it seems plausible to allocate them to the lowest growth criterion bar. The sole exception is Bosnia and Herzegovina which recorded immense economic growth after the end of the civil war, therefore we will assume that average prior to the programme was above 6 per cent, leading to a growth criterion of 4.5 per cent on average after programme start.

Figure 2

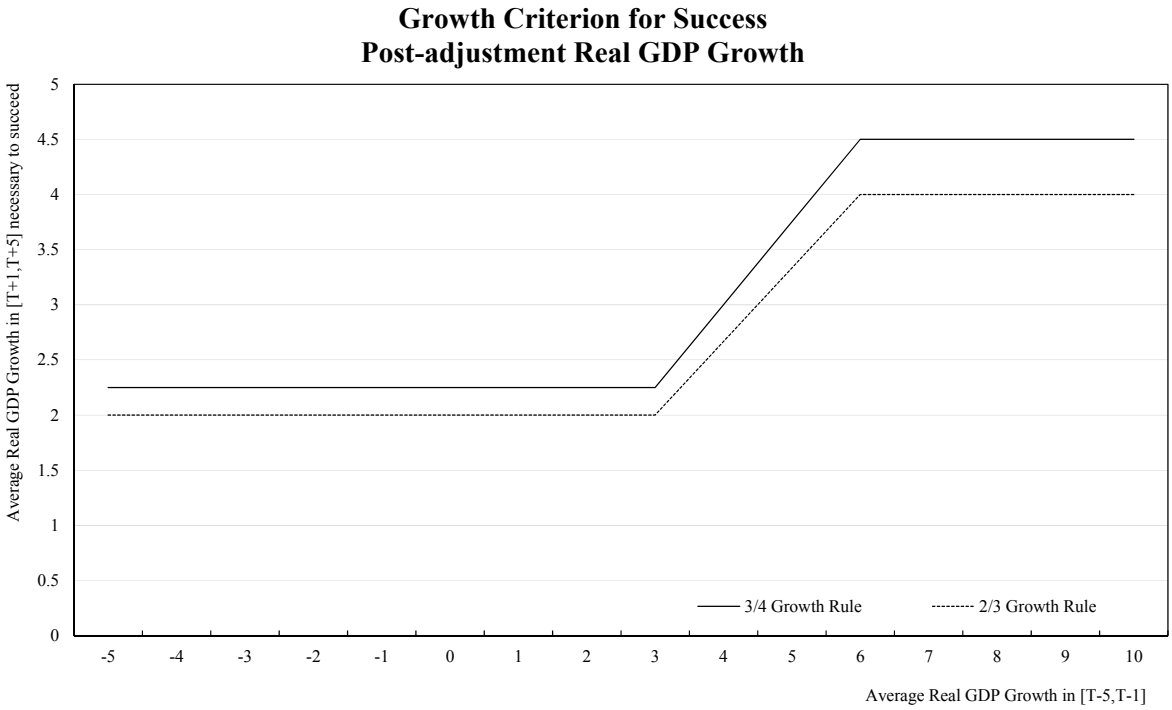
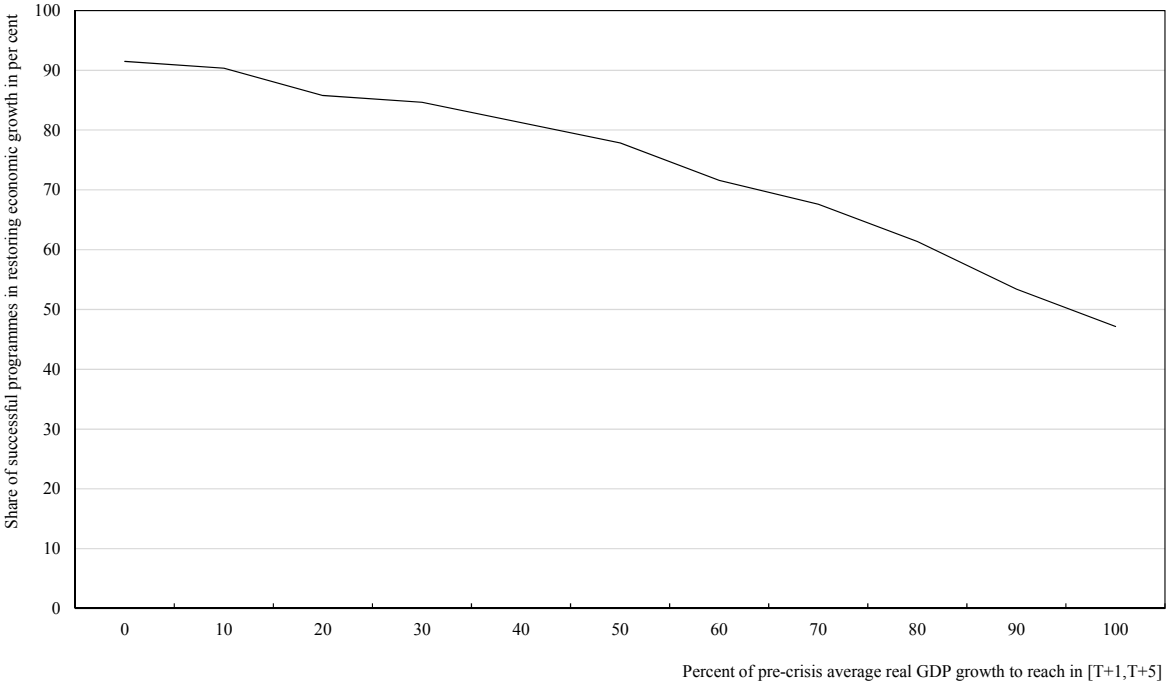


Figure 3



Source: Authors' calculations.

steps (Figure 3). From the figure it is evident that the lower bound for the indicator would be achieving about 50 per cent of the pre-crisis average growth otherwise a far too high share of the adjustment episodes is judged as success. In addition, there is no sudden change in the slope of the line above.

2.2.2 Debt criterion

The aim of the debt criterion was to ensure a return to sustainable public finances, thus enabling continued market financing. We take a peaking of general government debt-to-GDP ratio and a reversal in the trend to be the key signal of sustainability. The literature and policy prescriptions for how much debt needs to be reduced to be considered sustainable are inconclusive (Reinhart and Rogoff, 2010; Herndon *et al*., 2013; as well as, e.g., the Maastricht criterion for EU countries). We take an agnostic view and consider an attempt at restoring fiscal sustainability as successful if it lowers the general government debt-to-GDP ratio by at least five per cent in [T+1,T+5] compared with the peak value it reaches in [T,T+5]. Requiring a reduction of the debt-to-GDP ratio by an absolute five percentage points independently from the level of the debt-to-GDP ratio would privilege countries with high debt-to-GDP ratios "consolidating" through growing nominal GDP (denominator effect). A reduction in the level of general government debt instead affects the debt-to-GDP ratio in the same way independently from the level of the debt-to-GDP ratio.

A reduction in the level of general government debt can, however, also be achieved by a restructuring of the public debt, disorderly or planned. To make sure that only the latter are considered successes, a criterion with respect to disorderly default on outstanding debt had to be included in our definition. Accordingly, a default in [T+1,T+3] on debt would be considered a failure. The period [T+1,T+3] was chosen particularly with the aim to exclude those cases where a restructuring or debt release was part of the IMF-supported adjustment programme, which was also cross-checked with programme documents.[8]

This definition of the fiscal sustainability leads to a success rate of over 78 per cent, *i.e.*, substantially above the success rate found for the 3/4 economic growth criterion. Again, we checked for robustness of the debt criterion by shortening the time available for a reduction of the debt-to-GDP ratio to four years instead of five years and prolonged the period in which no default or debt restructuring may occur by one year. This modified criterion lowered the success rate by about three percentage points, and as such the criterion can be argued robust from this perspective. The debt criterion was also tested for robustness with respect to the per cent value by which the debt-to-GDP ratio is required to decline compared to the peak value. The figure below suggests that the debt criterion is fairly robust regarding the variation in the per cent threshold as there is again no sudden change in the slope of the curve.

2.2.3 Results

Finally, taking the two criteria together, we find that 103 programmes are deemed to be successful which results in an overall success rate of 58.5 per cent. This shows that countries which succeeded according to the growth criterion typically succeeded in achieving debt reduction as

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[8] In our sample there are 19 programmes where a default or a debt restructuring occurred during the period [T,T+3]. In seven of those cases debt restructurings were part of programme design. It is also worth noting that for all but a few of the remaining cases, the country also did not meet the growth criterion, and as a result only a handful of programmes were considered failures on the base of a default alone.

Figure 4

Share of Successful Programmes in Debt Reduction Dependent on the Percent Value by Which the Debt-to-GDP Ratio is Required to Decline Compared with its Peak Value in [T,T+5]

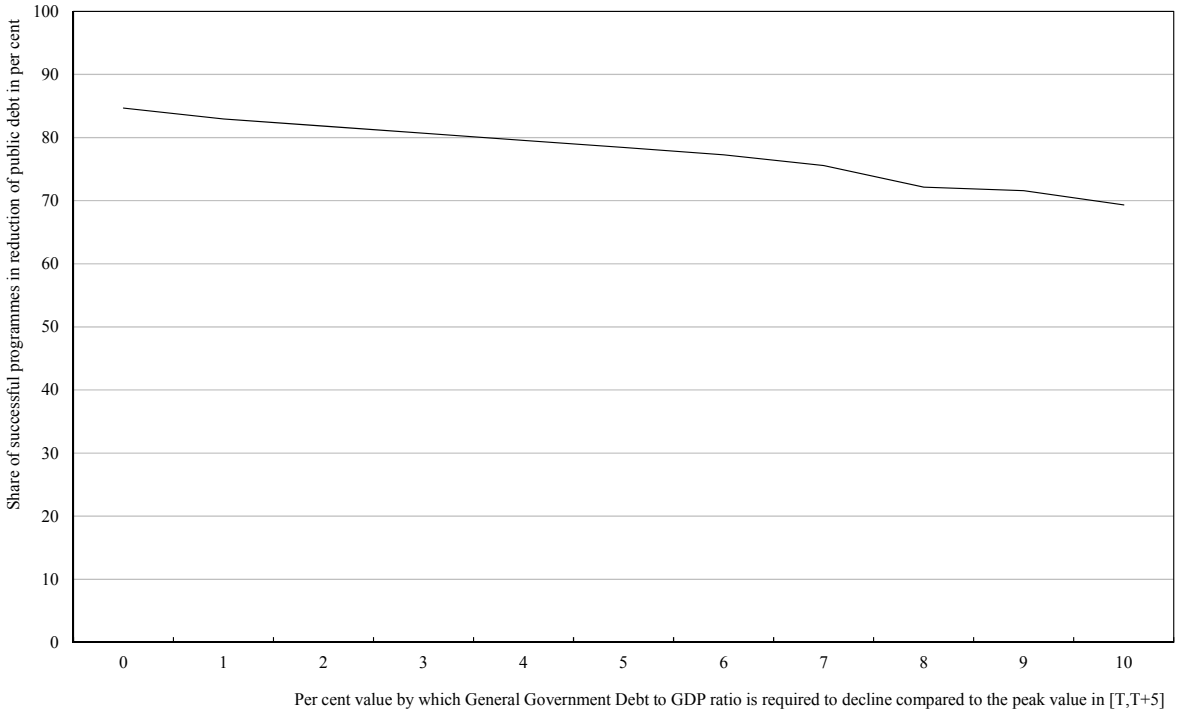

Table 1

Success Rate of GRA-supported Adjustment Programmes

	General Government Debt to Decline by 5% until T+5 and No Default in [T+1,T+3]	General Government Debt to Decline by 5% until T+4 and No Default in [T+1,T+4]
Post-adjustment real GDP growth rate to reach 3/4 of pre-crisis one	58.5%	58.0%
Post-adjustment real GDP growth rate to reach 2/3 of pre-crisis one	60.8%	60.2%

Source: Authors' calculations.

well. Table 1 provides an overview on the number of successes when using modified criteria. The table shows that modifications of our definition lead to very modest changes in the success ratio.

We also assessed the joint distribution with respect to both criteria, *i.e.*, the variation in the per cent of the pre-crisis average real GDP growth to be reached in [T+1,T+5] and the variation in the per cent value by which the debt-to-GDP ratio is required to decline compared with its peak value in [T,T+5]. A graphic illustration of the variation in both the growth and the debt criterion is provided in Appendix B Figure 6. The overall success rate ranges between 45 and 80 per cent.

3 Regression results

3.1 Baseline specification

In this section we investigate factors associated with successful adjustment episodes as defined in the previous section. We first translate the success indicator using the growth and debt criterion into a binary variable, which is then used as the dependent variable in a probit regression. We assess the importance of a range of explanatory variables found to matter in previous literature. Broadly speaking, these can be divided into those that can be influenced directly or indirectly by policy action during the period of adjustment – the "hard work" part – and those outside the control of the country in question – the external conditions. The explanatory variables are summarized in Box 1.

We follow existing literature on panel data regressions and use a one-way error population-averaged (PA) estimator as our sample consists of a specific set of countries. Notice that our panel is not a "real" panel in the sense that each programme constitutes one observation and years in which no programme was put in place were excluded from the sample. A summary of the estimations is provided in Table 2.

Some of our explanatory variables could potentially be endogenous to an adjustment programme. For instance, a forceful implementation of a programme could generate confidence effects which then may spill over to the primary budget balance. At the same time, most of our explanatory variables are measured at the onset of the financial assistance programme (period T) and should not be affected by subsequent events.

The first and most parsimonious specification includes only headline macro-fiscal variables (column 1 and 2 in Table 2). In line with previous literature, our hypothesis is that both the degree of initial fiscal vulnerabilities and the degree to which they are addressed matter for the success of the adjustment. In particular, we include both the fiscal balance in per cent of GDP at programme start and its improvement over the programme horizon. We find both to contribute to successful adjustment in a positive and highly significant manner, which is in line with what theory would suggest as well as with the results in the earlier literature on successful fiscal consolidation referred to above.

It is important to note that our results do not indicate whether the speed of adjustment was in any way optimal, in the sense of striking the right balance between its impact on economic activity and progress towards sustainable public finances. We refer here to the recent debate about the size of fiscal multipliers triggered by the contribution by Blanchard and Leigh (2013) according to which fiscal consolidation could be self-defeating in view of larger than expected fiscal multipliers. Based on their findings, Blanchard and Leigh have argued in favour of a less-now-and-more-later type of fiscal adjustment. Evidently, this does not clash with our finding about the role of fiscal consolidation for successful macroeconomic adjustment: Blanchard and Leigh focus on the short term, while our analysis looks at the medium term horizon when possible negative effects of fiscal consolidation are likely to be outweighed by positive effects. There is a growing body of empirical literature showing that fiscal consolidation triggers a medium-term adjustment process, typically via the labour market, which has a positive impact on a country's competitiveness and, ultimately,

BOX 1
EXPLANATORY VARIABLES

- ***Fiscal Balance in T:*** fiscal balance in the year of programme start measured as general government net lending in percent of GDP
- ***Fiscal Balance adjustment:*** the change in general government net lending in percent of GDP during programme, percentage points
- ***Real GDP growth in T:*** year-on-year percentage change
- ***Primary Balance in T:*** general government net lending in percent of GDP excluding interest expenditures
- ***Primary Balance adjustment:*** change in primary balance in percent of GDP during programme, percentage points
- ***Public Debt in T:*** general government debt to GDP at programme start
- ***World GDP growth:*** average year-on-year percentage change between T+1 and T+5
- ***Banking crises:*** dummy variable taking the value 1 if a banking crisis was ongoing in the year of programme start using the definition in Laeven and Valencia (2012)
- ***Credit crunch:*** dummy variable taking value 1 if real credit advanced to private sector recorded negative growth in at least two years between T and T+2
- ***Exchange rate regime in T:*** IMF classification taking values from 1 to 15; a higher value indicates a more flexible exchange rate regime.
- ***Openness indicator:*** measured as exports plus imports divided by GDP
- ***VIX in T:*** (Chicago Board of Exchange S&P 500 Implied Volatility Index) capturing the risk appetite of the market and taking high values in times of turbulence and crisis
- ***Nominal Effective Exchange Rate, change:*** adjustment in nominal effective exchange rate under a programme. An increase in the NEER is equivalent to an appreciation
- ***Current Account Balance:*** in per cent of GDP
- ***Change in Current Account Balance:*** percentage point change in the current account balance under a programme

Note: T denotes the year of a programme start. Data sources are listed in Appendix A.

its aggregate level of economic activity (see Alesina and Perotti, 1995, for an early contribution to this field, as well as were Hernández de Cos and Moral-Benito, 2014 and Lamo *et al.*, 2014 for recent and specific evidence of this labour market or competitiveness channel).

There is also a vivid discussion on the level at which, if at all, public debt impacts negatively on growth (Reinhart and Rogoff, 2010; Herndon *et al.*, 2013). In our framework, we both require a positive association with growth and material reduction of debt to consider the adjustment process a success, and can, therefore, only include the initial level of debt among our explanatory variables to avoid spurious correlations. We find only a small and not significant effect of the debt-to-GDP level at programme start in our parsimonious specification.

However, the definition of the fiscal adjustment also matters for properly disentangling the effects of debt and fiscal consolidation on the outcome. Hence, we also estimated the model using the primary balance at programme start and the adjustment carried out in the primary balance instead of the overall budget balance, as we believe that this measure which excludes interest expenditure provides a better measure of the de facto fiscal adjustment (column 3 and following in Table 2). In addition, countries agreeing to a GRA-supported programme typically cover some of their financial needs by drawing on the credit provided by the programme, which is usually extended at somewhat concessional terms and has a bearing on the interest bill which needs to be kept in mind when extrapolating the results to discuss adjustment episodes in general. The results of the estimation using the primary balance are presented in column 2. The significance of the budgetary variables is maintained while the negative impact of the debt-to-GDP level on success is higher, though still borderline insignificant.

Real GDP growth at programme start was positively associated with successful adjustment episodes, which simply and intuitively suggests that adjustment episodes where growth had already returned at programme inception had a higher probability of success.

The recent crisis has shed light on the role of the financial system during adjustment episodes, with emerging conclusions that banking crises typically are associated with slower and more protracted recoveries. Therefore, we would expect that a banking crisis affects the outcome of an adjustment episode in a negative way. However, and in contrast to existing research, in our regressions the corresponding dummy variable is estimated to exert a positive effect (column 4). A closer look at the banking crises identified by Laeven and Valencia (2012) however show that while the effects on GDP growth and public debt are typically negative, they vary widely. One hypothesis is that it is only in instances when a banking crisis leads to a protracted lack of credit that the recovery is hurt (Abiad *et al.*, 2011; Calvo *et al.*, 2006). We therefore included a credit crunch dummy taking on the value one if real credit growth is flat or negative for two years during the period [T,T+2]. The results in column 5 show that a credit crunch has a significantly negative influence on the outcome which is in line with a priori expectations. This again suggests that hard work, *i.e.*, sufficient repair of the financial sector after banking crisis, pays off in terms of a higher likelihood of a successful adjustment. When measures of financial sector health are included, the impact of the initial debt-to-GDP ratio also becomes significant.

Turning to external variables, we find that external demand (average real world GDP growth for the period [T+1,T+5]) had a strong positive association with success (column 3). This is in line with expectations as increasing demand for export goods is certainly supportive for economic growth and may also help cushion negative effects of a decline in domestic demand on the back of fiscal retrenchment. To underpin this hypothesis from an econometric perspective, openness was added to the model as well with results reflected in column 7. The positive coefficient suggests that the chance of a successful exit from an official adjustment programme increases with the degree of openness, again as expected.

A more flexible exchange rate regime is typically found to be helpful for economic adjustment through its favourable price effects on export goods, which is also confirmed by our model in column 6. However, currency flexibility, or more specifically depreciation, may also have unfavourable effects. A high degree of pass-through to import prices may partly offset the gain resulting from relatively cheaper export goods for the rest of the world.[9] Depreciation of the home

[9] The extent of the gain in competitiveness as a result of currency devaluation depends largely on the share of import goods necessary for the production of export goods and the added value in the export sector.

Table 2

Factors Conducive to Successful Adjustment; Results from Probit Regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Fiscal Balance in T	0.088 *(0.038)***									
Fiscal Balance adjustment	0.099 *(0.033)****									
Public Debt in T	–0.001 *(0.003)*	–0.004 *(0.003)*	–0.006 *(0.004)*	–0.007 *(0.004)**	–0.007 *(0.004)**	–0.006 *(0.004)*	–0.008 *(0.004)**	–0.008 *(0.004)***	–0.007 *(0.003)***	–0.008 *(0.003)***
Real GDP Growth in T	0.050 *(0.018)****	0.056 *(0.019)****	0.059 *(0.022)****	0.073 *(0.030)***	0.064 *(0.032)***	0.081 *(0.029)****	0.096 *(0.026)****	0.093 *(0.027)****	0.094 *(0.031)****	0.092 *(0.030)****
Primary Balance in T		0.077 *(0.039)**	0.092 *(0.040)***	0.093 *(0.038)***	0.091 *(0.033)****	0.099 *(0.031)****	0.090 *(0.029)****	0.082 *(0.033)***	0.114 *(0.038)****	0.118 *(0.039)****
Primary Balance adjustment		0.087 *(0.039)***	0.073 *(0.037)***	0.075 *(0.039)**	0.068 *(0.038)**	0.077 *(0.039)***	0.085 *(0.040)***	0.090 *(0.036)***	0.128 *(0.040)****	0.121 *(0.043)****
World GDP Growth [T+1,T+5]			1.388 *(0.256)****	1.489 *(0.285)****	1.573 *(0.309)****	1.673 *(0.309)****	1.907 *(0.286)****	2.115 *(0.287)****	2.171 *(0.311)****	2.272 *(0.349)****
Banking Crisis				0.783 *(0.318)***	0.868 *(0.333)****	0.816 *(0.342)***	0.898 *(0.305)****	1.042 *(0.285)****	1.240 *(0.384)****	1.254 *(0.383)****
Credit Crunch					–0.497 *(0.233)***	–0.531 *(0.231)***	–0.536 *(0.231)***	–0.497 *(0.244)***	–0.530 *(0.263)***	–0.548 *(0.270)***
Exchange Rate Regime						0.067 *(0.031)***	0.085 *(0.031)****	0.064 *(0.033)**	0.092 *(0.032)****	0.088 *(0.033)****
Openness Indicator							0.008 *(0.003)***	0.009 *(0.003)****	0.008 *(0.004)***	0.007 *(0.004)**
VIX - S&P 500 Volatility Index								–0.057 *(0.020)****	–0.044 *(0.020)***	–0.049 *(0.021)***
NEER change									0.022 *(0.010)***	0.023 *(0.010)***
Current Account Balance										–0.004 *(0.015)*
Change in Current Account Balance										0.022 *(0.021)*
Constant	0.423 *(0.247)**	0.334 *(0.254)*	–4.643 *(0.959)****	–5.144 *(1.124)****	–5.260 *(1.237)****	–6.149 *(1.275)****	–7.756 *(1.209)****	–7.275 *(1.198)****	–7.910 *(1.380)****	–8.068 *(1.440)****
N	176	176	176	176	176	176	176	176	176	176

Note: For variable definitions, please see Box 1. T denotes the year of programme start. *, ** and*** denote significance at the 10, 5 and 1% levels, respectively. Source: Authors' calculations.

currency if debt is denominated in foreign currency leads to higher debt servicing costs.[10] We included the percentage change of the nominal effective exchange rate (NEER) to investigate the relative importance of these channels, and the results in column 9 show us that its effect is significantly positive, suggesting that an appreciation of the home currency is positively associated with successful adjustment. This could suggest that the negative effect of a currency depreciation on the debt servicing costs in the short-run outweighs the possible benefits which would arise from a gain in competitive advantage, but could also be a spurious correlation in the sense that both, e.g., the resumption of growth and the appreciation of the currency stem from enhanced confidence in the sovereign more generally.

International investors' risks appetite is also likely to matter for successful adjustment, as it could result in different perceptions of countries' creditworthiness over time regardless of their economic fundamentals. We proxy risk appetite with the VIX indicator as in previous literature. According to the results reported in column 8 a higher implied volatility – or conversely, lower risk tolerance – is significantly negatively associated with successful adjustment.

A large current account deficit is often seen as an important vulnerability that could be incompatible with successful adjustment, although the expected effects are not clear-cut as discussed earlier.[11] We included the initial position and the adjustment carried out in the current account under the programme to the regression, but did not obtain significant results. As the benefit arising from the inclusion of the current account balance into the model is rather limited, in the following we will disregard this variable and use the specification in column 9 as our baseline model.

3.2 Extensions

One factor of interest is whether the degree of imbalances experienced by a country affects the results. We proxy the degree of imbalances with whether the IMF-programme was disbursing or not, with the hypothesis that smaller adjustment needs meant that the country could continue to finance itself on the market and did not need to draw on official financing. We therefore added a dummy variable reflecting whether disbursements occurred under the programme.[12] Results suggest that this does not play a role as the coefficient is slightly negative and does not substantially differ from zero (for results, see Appendix D). The share of the funds drawn under the programme relative to the amount available and the size of the programme relative to the country's economy were also found to be insignificant.

We also investigated which types of economic reforms are most conducive to successful adjustment. To ensure a common definition, we identify these reforms by way of the conditionality agreed under the programme. Broadly speaking there exist two different subgroups of conditions, quantitative performance criteria (QPC) and structural conditions.[13] QPCs are quantifiable and measurable criteria while structural conditions are often non-quantifiable criteria and consist of

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[10] A possible criticism is that foreign currency denominated debt was mostly issued in USD and the nominal effective exchange rate is the exchange rate *vis-à-vis* a basket in which the weight of the USD might be small. Yet, under no arbitrage assumptions a depreciation of the home currency *vis-à-vis* other currencies would result in a depreciation versus the USD as well if keeping the relative price of the currencies of the trading partners constant versus the USD. Therefore on average the NEER should also reflect exchange rate movements versus the USD.

[11] An improving current account balance also signals capital outflows, while an economic recovery in emerging markets usually goes along with capital inflows. Exchange rate effects on the interest bill might further obscure clear results.

[12] The number of non-disbursing adjustment programmes is 50.

[13] The IMF streamlined the number of quantitative performance criteria in 2002 leading to an overall reduction in the number of quantitative performance criteria. Therefore, the QPC series suffers from a structural break which may also result in lack of significance.

policy measures aimed at implementing structural reforms (e.g., to the labour or product markets) and in general correcting disruptions to the supply side of the economy. First, we assess whether the total amount of criteria per se matter for the chance of success. Results show that the probability of a successful exit is increasing with the overall number of criteria and conditions (see Appendix 3). We also included separately the total number of the QPCs and the total number of structural conditions into the model. We found that the impact of both the QPCs and the structural conditions is positive but only the coefficient of the structural conditions is significant. Five years might appear to be a rather short period of time for the assessment of the impact of structural reforms, but we tried to strike a balance between allowing a sufficient time frame for the full effects to be felt while not letting so much time pass that we in fact mainly picked up the effects of other factors. Finally, there are three different types of structural conditions, so called prior actions (formerly: conditions for completion of the review), structural performance criteria and structural benchmarks. We estimated the regression including the QPCs and three different types of structural conditions separately. Results show that only prior actions and structural performance criteria have a statistically significant positive impact on the outcome.

3.3 Robustness checks

We performed a number of sensitivity checks and found that our results hold up. First, we reran the baseline regression with the modified criteria for success outlined in Chapter 2. Using the modified criterion for public debt, *i.e.*, changing the relevant horizon for the reduction to occur, and maintaining the original criterion for economic growth did not substantially change the coefficients. If applying both the modified criterion for economic growth, *i.e.*, lowering the bar to 2/3 of average growth, and public debt reduction, we obtain again similar results. At last, when using the modified criterion for economic growth and the original criterion for public debt reduction we obtain the same results and all variables are significant, independently from the estimator used.

We also tested the baseline regression using only the 3/4 growth criterion as the dependent variable. The results mainly hold up with the exception that the impact of the adjustment in the nominal effective exchange rate variable is less than one third if compared with the baseline regression and also turns insignificant which again appears to support the hypothesis on the link between exchange rate flexibility and debt reduction posited earlier. We also used average five year real GDP growth rates after programme start, as opposed to the binary indicator, as the dependent variable and found that the results do not substantially differ from those in the baseline setting. Finally, as our panel regression is not a "real" panel the model was also estimated as a customary probit regression and results remain similar.

We also estimated the baseline model using the cyclically adjusted primary balance (see Appendix D) as well, to try to control for cyclical effects on fiscal adjustment. Cyclical effects were removed using the HP-filter, for which advantages and drawbacks were discussed in the previous part. The results are not substantially different compared with the baseline model.[14] While the composition of a fiscal adjustment, *i.e.*, whether revenue versus expenditure based adjustments, is an interesting and relevant question as well (Barrios and Langedijk, 2010), the necessary data is

[14] The sole divergence is that openness variable becomes insignificant, though there is no change in the sign or the order of magnitude. A further issue to be addressed is the link between the variables measuring the primary balance at programme start and the adjustment carried out during the programme horizon. It could be expected that the initial condition and change should sum up (primary balance and adjustment under programme) to the end condition and the interaction leads to wrong results. In the baseline model we see that the coefficient in the primary balance at programme start and in the adjustment carried out during programme horizon are nearly similar. We exchanged both variables related to the primary balance for the end condition which is the primary balance at programme end and we found that results remain similar.

unfortunately not available for a sufficiently large part of our sample. We re-classified the 15-notch variable of exchange rate flexibility into a binary one (fixed vs. non-fixed exchange rate regime) and found that a fixed exchange rate regime has a negative impact on success which is in line with findings from the baseline model.

We applied gradual cut-offs in terms of income levels to our sample and found that our results held up, although some variables became insignificant when the sample size shrunk by more than a third. Our results also held up to the exclusion of countries in early stages of post-communism transition and to the exclusion of a specific region as well (e.g., Asia, Latin-America and the Caribbean, non-EU Europe, Europe).

A number of financial programmes which lasted only for a rather short period and were succeeded by the next agreement in the following year are included in the sample, which makes it difficult to determine the length of the adjustment episode. When excluding those programmes which were followed by a successor agreement in the following year the openness and credit crunch variables became insignificant in specifications without country-fixed effects.

We also changed the reference year as a significant part of the adjustment in the primary balance was carried out in the year of the programme start. We estimated the baseline model using T–1 (the year before programme start) as the reference year for the initial condition with respect to the primary balance and the adjustment carried out, and found no significant difference in the coefficients compared with the baseline model, which again indicates that exiting the programme with a sound public finances positively contributes to programme success. We also redefined the reference year for the programme end contingent on in which month in the year the programme ended and found that results remain similar. Finally, the results were also robust to using the random effects (RE) estimator, since country fixed effects were not found significant. This could likely be due to the "incomplete" panel nature of our sample.

3.4 Comparison with market perceptions of success

A common view of a successful adjustment following a financial assistance programme is that the country can again fully finance itself from the markets, without the aegis of an IMF-supported programme. To compare this notion of success with our indicator requiring improvement in the growth and debt situation, we define market-based success as a country not requesting another IMF-programme within a certain time frame.[15] Another advantage of this definition is that market participants should take spillovers between different government securities into account when making their investment decisions, and therefore this measure of success ought to internalize the cross-country effects of adjustments in different countries to a greater extent than our growth-debt indicator.

We find that 36 per cent (32 per cent) of countries did not request a follow-on programme within a two (three) year horizon. This means that the success rate for a market-based indicator is about half of the one using the growth and debt situation, which could be taken as evidence that e.g., contagion concerns are fairly prevalent for market participants when assessing the creditworthiness of a sovereign exiting an adjustment episode. When instead using this success rate as the dependent variable, most of the estimated coefficients still have the expected signs but their magnitude and significance change somewhat compared to the growth-debt criterion. The market-based indicator gives relatively higher weight to the countries' own economic characteristics, *i.e.*, growth at programme start, fiscal adjustment and openness. Of the external

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[15] An alternative (but more resource-consuming) option would have been to look at the conditions, especially currency, yields, coupons and maturity, at which a country could issue government bonds.

variables, only the VIX remains significant while trading partner demand (which was found to be a key explanatory variable for the previous indicator) becomes insignificant.

3.5 What do our models imply for ongoing programmes in Europe?

In this section we use the estimated coefficients to investigate implications for the ongoing programmes in Europe. Naturally, the results need to be treated with substantial caution as the results obtained for a large number of adjustment episodes are very likely to miss specific factors conducive to the success or failure of a particular programme. For instance, compared to the "average" country in the sample, the ongoing European programmes (with the exception of Romania) faced a more challenging fiscal and debt situation and lack of exchange rate flexibility. On the other hand they were outliers in terms of institutional quality, GDP per capita and financial depth, all of which *ex ante* could be expected to facilitate adjustment. The adjustment strategy in the euro area programmes, as earlier mentioned, aimed to achieve other issues such as a need to prevent contagion and preserve financial stability, and our indicator cannot assess whether these objectives were met or not.

The exercise also relies to a large extent on projections, which especially for e.g., exchange rate developments are known to be hard to forecast.[16] For other variables, we use available values at end-October 2013. Our success indicator also considers success a resumption of growth and debt reduction, and as such may be especially stringent for countries such as Portugal, that are more vulnerable in that regard compared to others, for instance Ireland, where problems were instead concentrated in the financial sector.

From the chart below, we can see that the European programmes in all cases reach the average probability of success in the sample and exceed it substantially for the majority of countries. Ireland benefits to a large extent from its openness, Romania from its relatively comfortable fiscal and debt situation, and Cyprus both from its relatively open economy but also from entering its programme at a time of much more robust global growth and lower risk aversion compared the other euro area programmes. The second programme in Greece has a success probability quite exactly in line with the average in the sample, which must be considered a major achievement given its very challenging fiscal and debt situation at the onset of the crisis and relatively low openness. Portugal would seem to have a marginally lower success probability, mostly as a result of the success criterion as earlier mentioned being especially challenging for it, but also the adverse global conditions during a large part of the programme period and its relatively low openness. Taken together, this section again underlines the importance of taking both domestic policy achievements and the external environment into account when judging a country's adjustment process, but also that the progress under the European programmes are substantially higher than sometimes argued.

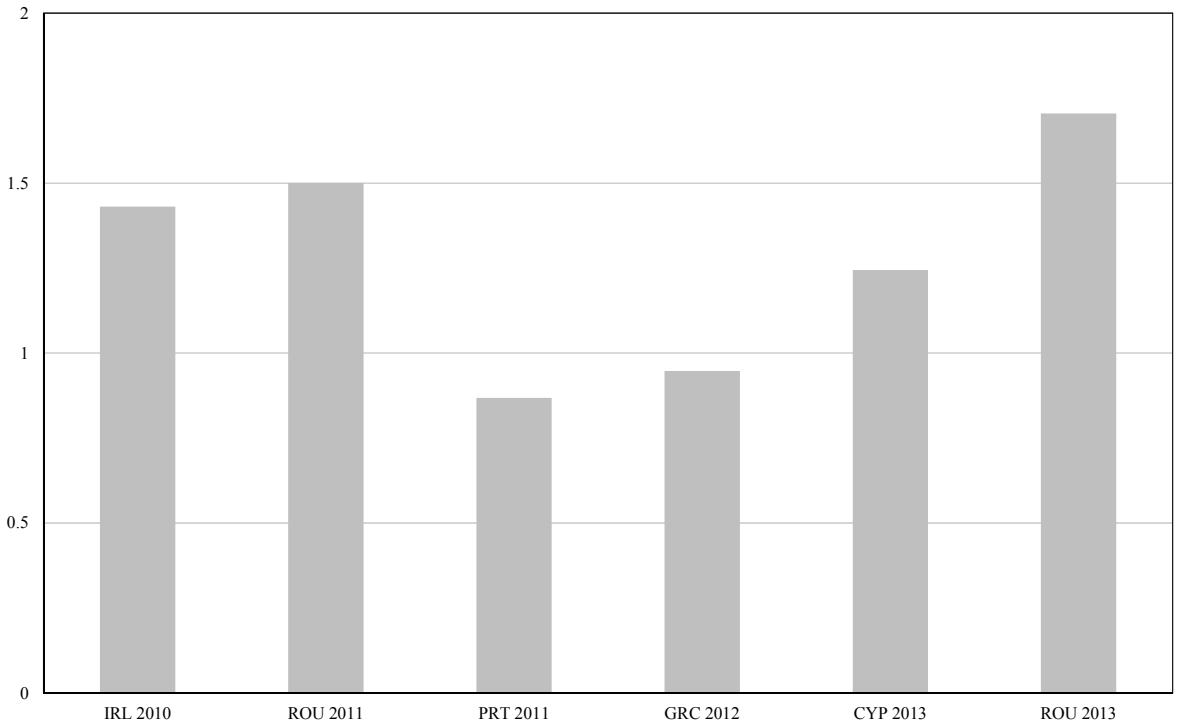
4 Concluding remarks

We reviewed more than 170 adjustment episodes, identified by the need to approach the IMF for official assistance, with the aim of identifying factors that help countries resume positive growth and reduce government debt levels. We found that decisive policy action, especially faster fiscal adjustment and progress on financial sector repair, contribute significantly and positively to a successful adjustment episode. Regarding the importance of a functioning financial system, it is

[16] For programmes started after 2012 we assumed that no change occurs in the NEER during the programme. Slight changes in the NEER do not impact the probability of a success substantially.

Figure 5

Probability of Successful Adjustment



Note: Conditional probability over unconditional probability. Results obtained using the estimated coefficients in the baseline regression, including structural reforms, and the RE-estimator. Authors' calculations.

important to note that a banking crisis per se need not be detrimental for successful adjustment if the handling of it allows for continued extension of credit to the private sector. We find that initial vulnerabilities in the form of high government debt lowers the chances of successful adjustment, but a large current account deficit does not. More trade openness and exchange rate flexibility helps. The effects of the latter is not clear-cut as only appreciation episodes are found to be conducive to adjustment, contrary to the often-made claim that exchange rate depreciation and an export-led recovery are prerequisites for success. The probability of successful adjustment is also considerably higher if global growth is favourable and risk appetite strong. Our results suggest that more official financing (which conversely is typically coupled with less fiscal adjustment) does not significantly contribute to success, while more stringent conditionality especially in the structural area appears to exert a significantly positive effect.

Our definition of success based on growth and debt developments give a success rate that is about twice a market-based one, proxied by whether a country requested a follow-on programme or not. The fact that two-thirds of countries request follow-on programmes within a three-year horizon is interesting in itself and shows that follow-on programmes need not be considered failures; in fact they are the norm to date.

Our results have important implications for the ongoing adjustment processes in the euro area. Global conditions are forecast to improve over the next years compared to the conditions present during the early days of the crisis, that is, when the programmes for Greece, Portugal and Ireland were put in place. The very adverse conditions under which these countries undertook their

initial adjustment therefore needs to be strongly acknowledged when assessing their progress in restoring growth and debt sustainability. It also means that while more support from external demand can be expected for the programmes starting later such as Cyprus, it is still imperative to continue fiscal consolidation, financial sector and structural reforms. Our results also underline the importance of decreasing the risk of large adjustment needs by reducing vulnerabilities during good times, and therefore the importance of honouring the commitments set out under the new economic governance processes in the EU.

APPENDIX A
DATA SOURCES AND CONSTRUCTION

IMF GRA-supported adjustment programmes start date and end date: *Source: IMF Monitoring of Fund Arrangements, IMF Annual Reports*

Real GDP growth: Annual percantage change. *Source: IMF World Economic Outlook Database; for a handful observations the data set was complemented from IMF country reports*

Public Debt: Gross debt of general government or of the public sector broadest coverage available, in percent of GDP. *Soucre: IMF World Economic Outlook Database, IMF Historical Public Debt Database Fall 2012 Vintage, IMF Monitoring of Fund Arrangements, IMF country reports, OECD Economic Outlook, World Bank, Eurostat, Republic of Croatia Ministry of Finance, Ministry of Finance Romania*

Fiscal Balance: of general government or the public sector broadest coverage available, in percent of GDP. The basic source is the *IMF World Economic Outlook Database* and missing data was complemented from other sources (see below). *Source: IMF World Economic Outlook Database, IMF country reports, IMF (2003),OECD Economic Outlook, World Bank (2002), Peru Reserve Bank, Republic of Turkey Prime Ministry Undersecretariat of Treasury, AMECO, Eurostat*

Primary Balance: of general government or of the public sector broadest coverage available, in percent of GDP.The basic source is the *IMF World Economic Outlook Database* and missing data was complemented from other sources (see below). *Source: IMF World Economic Outlook Database, IMF country reports, IMF (2003), OECD Economic Outlook, World Bank (2002), Peru Reserve Bank, Republic of Turkey Prime Ministry Undersecretariat of Treasury, AMECO, Eurostat, Bosnia and Herzegovina National Bank Annual Reports, Inter-American Development Bank, Central Bank of Indonesia*

Cyclically Adjusted Balance: Fiscal balance of general government or of the public sector broadest coverage available, adjusted for cyclical components, in percent of GDP. The output gap was estimated with the Hoddrick-Prescott filter using $\lambda=100$.

Cyclically Adjusted Primary Balance: Primary balance of general government or of the public sector broadest coverage available, adjusted for cyclical components, in percent of GDP. The cyclically adjusted primary balance was obtained by subtracting interest expenditure to the cyclically adjusted balance.

Adjustment in Net Lending, Primary Balance, Cyclically Adjusted Balance, Cyclically Adjusted Primary Balance: Difference in the value of the variable, respectively, between the value in the year of the programme end and in the year of the programme start. In case the programme ended between the first and eighth month of the relevant year, the value from the year before the year of the programme end is taken as the value for the year of the programme end. For cases in which the adjustment programme lasted only one year, that is the difference between the start year and end year of the programme is one, no such adjustment is undertaken.

Real world GDP growth: Annual percantage change of the real world GDP growth, five year arithmetic average between T+1 and T+5. *Source: IMF World Economic Outlook Database*

Banking Crisis: Dummy variable takes value 1 if a banking crisis was ongoing in the year of the programme start, otherwise 0. For banking crises started in 2008 or afterwards no end date is

provided in the source data base and these crises are marked as still ongoing. Therefore, we assumed that a banking crisis has not ended yet if it started in 2008 or afterwards.[17] *Source: Laeven and Valencia (2012)*

Credit Crunch: Dummy variable takes value 1 if real credit advanced to private sector recorded negative growth in at least two years between T and T+2, otherwise 0. The annual percentage change in nominal credit advanced to private sector was corrected for inflationary effects by dividing through the relative change in the GDP deflator.[18] *Source: World Bank, IMF country reports, National Bank of Romania (credit advanced to private sector); IMF World Economic Outlook Database, IMF country reports (nominal GDP and GDP deflator)*

Exchange Rate Regimes: Exchange Rate Regime Reinhart and Rogoff Classification, annual fine classification. *Source: Carmen M. Reinhart Author Website, www.carmenreinhart.com*

Openness indicator: Exports plus imports divided by GDP at current prices. *Source: Penn World Table 7.1*

VIX: Chicago Board of Exchange S&P 500 Implied Volatility Index; annual, calculated as the average of the daily "last price" of the index. *Source: Bloomberg*

Nominal Effective Exchange Rate (NEER) change: Percentage change in the nominal effective exchange rate: values in the year of programme end and programme start were compared. In case the programme ended between the first and eighth month of the relevant year, the value from the year before the year of the programme end is taken as the value for the year of the programme end. For cases in which the adjustment programme lasted only one year, that is the difference between the start year and end year of the programme is one, no such adjustment is undertaken. *Source: Darvas (2012)*

Current Account Balance: in percent of GDP in USD. *Source: IMF World Economic Outlook Database April 2013; for a handful observations the data set was complemented from IMF country reports*

Programme Conditionality: *Source: IMF Monitoring of Fund Arrangements*

Programme Size, Country Quota and Disbursement: *Source: IMF Monitoring of Fund Arrangements, IMF Annual Reports, IMF Financial Data Query Tool, IMF Lending Arrangements*

Consumer Price Index: *Source: IMF World Economic Outlook*

Real Effective Exchange Rate: *Source: Darvas (2012)*

Nominal Exchange Rate: *Source: IMF International Financial Statistics; complemented from IMF World Economic Outlook by calculating the ratio of GDP measured in US dollar and home currency*

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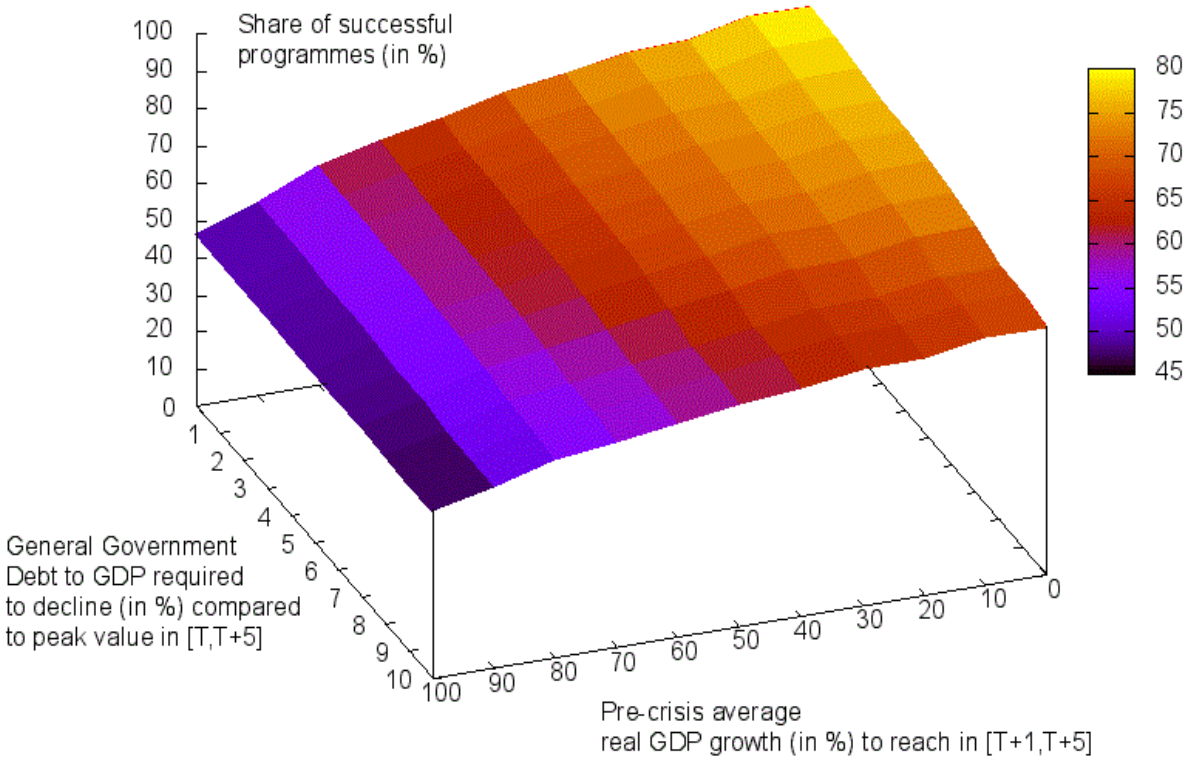
[17] This does not turn out to be an issue as all programmes started in 2011 or afterwards are excluded from the sample.

[18] The nominal values were calculated from the credit advanced to private sector expressed as percentage share nominal GDP by multiplying with the nominal GDP.

APPENDIX B
SENSITIVITY OF THE SUCCESS RATE TO VARIATIONS IN THE GROWTH AND DEBT CRITERION

Figure 6

Share of Successful Programmes Dependent on Percent of Average Pre-crisis Real GDP Growth to be Reached in [T+1,T+5] and Percent Value by Which the Debt-to-GDP Ratio Is Required to Decline Compared with its Peak Value in [T,T+5]



Note: T denotes the year of programme start.
Source: Authors' calculations.

APPENDIX C
LIST OF INCLUDED PROGRAMMES

Country	ISO	Year
Algeria	DZA	1994, 1995
Angola	AGO	2009
Argentina	ARG	1992, 1996, 1998, 2000, 2003
Armenia	ARM	1995, 2009
Azerbaijan	AZE	1995, 1996
Belarus	BLR	1995, 2009
Bolivia	BOL	2003
Bosnia and Herzegovina	BIH	1998, 2002, 2009
Brazil	BRA	1998, 2001, 2002
Bulgaria	BGR	1994, 1996, 1997, 1998, 2002, 2004
Colombia	COL	1999, 2003, 2005
Costa Rica	CRI	1993, 1995, 2009
Croatia	HRV	1994, 1997, 2001, 2003, 2004
Czech Republic	CZE	1993
Dominica	DMA	2002
Dominican Republic	DOM	1993, 2003, 2005, 2009
Ecuador	ECU	1994, 2000, 2003
El Salvador	SLV	1993, 1995, 1997, 1998, 2009, 2010
Estonia	EST	1993, 1995, 1996, 1997, 2000
FYR Macedonia	MKD	1995, 2000, 2003, 2005
Gabon	GAB	1994, 1995, 2000, 2004, 2007
Georgia	GEO	1995, 2008
Greece	GRC	2010
Guatemala	GTM	2002, 2003, 2009
Honduras	HND	2008, 2010
Hungary	HUN	1993, 1996, 2008
Iceland	ISL	2008
Indonesia	IDN	1997, 1998, 2000
Jamaica	JAM	1992, 2010

Jordan	JOR	1994, 1996, 1999, 2002
Kazakhstan	KAZ	1994, 1995, 1996, 1999
Korea	KOR	1997
Latvia	LVA	1993, 1995, 1996, 1997, 1999, 2001, 2008
Lesotho	LSO	1994, 1995, 1996
Lithuania	LTU	1993, 1994, 2000, 2001
Maldives	MDV	2009
Mexico	MEX	1995, 1999
Moldova	MDA	1993, 1995, 1996, 2010
Mongolia	MNG	2009
Pakistan	PAK	1993, 1994, 1995, 1997, 2000, 2008
Panama	PAN	1995, 1997, 2000
Papua New Guinea	PNG	1995, 2000
Paraguay	PRY	2003, 2006
Peru	PER	1993, 1996, 1999, 2001, 2002, 2004, 2007
Philippines	PHL	1994, 1998
Poland	POL	1993, 1994
Republic of Congo	COG	1994
Romania	ROU	1994, 1997, 1999, 2001, 2004, 2009
Russia	RUS	1995, 1996, 1999
Serbia	SRB	2001, 2002, 2009
Seychelles	SYC	2008
Slovak Republic	SVK	1994
Sri Lanka	LKA	2001, 2009
Thailand	THA	1997
Turkey	TUR	1994, 1999, 2002, 2005
Ukraine	UKR	1995, 1996, 1997, 1998, 2004, 2008, 2010
Uruguay	URY	1996, 1997, 1999, 2000, 2002, 2005
Venezuela	VEN	1996
Vietnam	VNM	1993

Source: IMF Monitoring of Fund Arrangements, IMF Annual Reports.

APPENDIX D
REGRESSION RESULTS (EXTENSIVE)

Table 3

Factors Conducive to Successful Adjustment; Results from Probit Regressions – Cyclically-adjusted Primary Balance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Cycl. Adj. Balance in T	0.146 *(0.057)***									
Cycl. Adj. Balance adjustment	0.077 *(0.036)***									
Public Debt in T	0.000 *(0.003)*	–0.006 *(0.004)*	–0.009 *(0.005)**	–0.009 *(0.005)**	–0.009 *(0.005)**	–0.009 *(0.005)**	–0.010 *(0.005)**	–0.010 *(0.005)***	–0.009 *(0.004)***	–0.010 *(0.004)***
Real GDP Growth in T	0.068 *(0.016)****	0.076 *(0.019)****	0.085 *(0.021)****	0.094 *(0.027)****	0.085 *(0.030)****	0.103 *(0.030)****	0.115 *(0.027)****	0.112 *(0.028)****	0.122 *(0.034)****	0.117 *(0.034)****
Cycl. Adj. Primary Balance in T		0.130 *(0.053)***	0.151 *(0.051)****	0.141 *(0.048)****	0.139 *(0.044)****	0.144 *(0.037)****	0.131 *(0.033)****	0.125 *(0.034)****	0.167 *(0.042)****	0.171 *(0.039)****
Cycl. Adj. Primary Balance adjustment		0.059 *(0.036)*	0.062 *(0.032)**	0.060 *(0.032)**	0.060 *(0.034)**	0.070 *(0.036)***	0.070 *(0.037)**	0.079 *(0.036)***	0.121 *(0.037)****	0.112 *(0.041)****
World GDP Growth [T+1,T+5]			1.504 *(0.335)****	1.592 *(0.317)****	1.707 *(0.325)****	1.830 *(0.315)****	2.037 *(0.295)****	2.241 *(0.300)****	2.313 *(0.337)****	2.409 *(0.364)****
Banking Crisis Dummy				0.763 *(0.325)***	0.861 *(0.343)***	0.804 *(0.352)***	0.873 *(0.321)****	1.005 *(0.314)****	1.254 *(0.439)****	1.269 *(0.437)****
Credit Crunch Dummy					–0.506 *(0.255)***	–0.556 *(0.257)***	–0.553 *(0.256)***	–0.528 *(0.264)***	–0.582 *(0.291)***	–0.609 *(0.298)***
Exchange Rate Regime						0.065 *(0.033)**	0.083 *(0.035)***	0.063 *(0.037)**	0.092 *(0.037)***	0.088 *(0.038)***
Openness Indicator							0.007 *(0.003)***	0.007 *(0.003)***	0.005 *(0.004)*	0.004 *(0.004)*
VIX - S&P 500 Volatility Index								–0.052 *(0.020)****	–0.039 *(0.021)**	–0.044 *(0.022)****
NEER adjustment									0.025 *(0.011)***	0.027 *(0.012)****
Current Account										–0.013 *(0.021)*
Adjustment in Current Account Balance										0.021 *(0.026)*
Constant	0.453 *(0.252)**	0.349 *(0.272)*	–5.002 *(1.218)****	–5.477 *(1.203)****	–5.694 *(1.283)****	–6.646 *(1.282)****	–8.069 *(1.214)****	–7.692 *(1.243)****	–8.337 *(1.499)****	–8.454 *(1.523)****
N	176	176	176	176	176	176	176	176	176	176

Note: For variable definitions, please see Box 1. T denotes the year of programme start. *, ** and*** denote significance at the 10, 5 and 1% levels, respectively. Source: Authors' calculations.

Table 4

Primary Balance

	RE	**PA**	**PA-Robust**
World GDP Growth [T+1,T+5]	2.387021	2.171238	2.171238
	*(0.535755)***	*(0.421878)***	*(0.310862)***
Real GDP Growth in T	0.105260	0.093980	0.093980
	*(0.031853)***	*(0.026351)***	*(0.030635)***
Primary Balance in T	0.129054	0.114185	0.114185
	*(0.043714)***	*(0.035841)***	*(0.038460)***
Primary Balance Adjustment	0.142981	0.127853	0.127853
	*(0.048720)***	*(0.042417)***	*(0.039984)***
Public Debt in T	–0.008006	–0.007228	–0.007228
	*(0.003985)***	*(0.003479)***	*(0.003206)***
Banking Crisis Dummy	1.365305	1.239851	1.239851
	*(0.435149)***	*(0.358202)***	*(0.384019)***
Exchange Rate Regime	0.102142	0.092435	0.092435
	*(0.039269)***	*(0.034783)***	*(0.032218)***
VIX– S&P 500 Volatility Index	–0.047997	–0.043895	–0.043895
	*(0.022318)***	*(0.019855)***	*(0.020475)***
Openness Indicator	0.008131	0.007555	0.007555
	*(0.003849)***	*(0.003536)***	*(0.003678)***
NEER Adjustment	0.024733	0.021895	0.021895
	*(0.009631)***	*(0.007908)***	*(0.009775)***
Credit Crunch Dummy	–0.588661	–0.529840	–0.529840
	*(0.285740)***	*(0.258805)***	*(0.262547)***
Constant	–8.687828	–7.909802	–7.909802
	*(2.059537)****	*(1.679219)****	*(1.379751)****
N	176	176	176

Note: For variable definitions, please see Box 1. T denotes the year of programme start. *, ** and*** denote significance at the 10, 5 and 1% levels, respectively. RE denotes the random-effects model, PA the population averaged model and PA-Robust stands for the population–averaged model with heteroscedasticity-robust variance calculation. Source: Authors' calculations.

Table 5

Cyclically-adjusted Primary Balance

	RE	PA	PA-Robust
World GDP Growth [T+1,T+5]	2.868541 *(0.708928)***	2.313229 *(0.453264)***	2.313229 *(0.337369)***
Real GDP Growth in T	0.161021 *(0.049910)***	0.121781 *(0.028783)***	0.121781 *(0.034005)***
Cycl. Adj. Primary Balance in T	0.225636 *(0.072852)***	0.166524 *(0.038395)***	0.166524 *(0.041968)***
Cycl. Adj. Primary Balance Adjustment	0.162861 *(0.058176)***	0.121484 *(0.038072)***	0.121484 *(0.037306)***
Public Debt in T	–0.011298 *(0.005372)***	–0.008759 *(0.003804)***	–0.008759 *(0.003881)***
Banking Crisis Dummy	1.638089 *(0.585535)***	1.253814 *(0.379211)***	1.253814 *(0.439020)***
Exchange Rate Regime	0.114579 *(0.049927)***	0.092122 *(0.037230)***	0.092122 *(0.037094)***
VIX – S&P 500 Volatility Index	–0.049029 *(0.026938)**	–0.039109 *(0.020705)**	–0.039109 *(0.021024)**
Openness Indicator	0.005600 *(0.004830)*	0.005175 *(0.003760)*	0.005175 *(0.003896)*
NEER Adjustment	0.034842 *(0.013543)***	0.025388 *(0.008384)***	0.025388 *(0.010831)***
Credit Crunch Dummy	–0.735546 *(0.345290)***	–0.582245 *(0.268509)***	–0.582245 *(0.291027)***
Constant	–10.258414 *(2.670068)***	–8.336743 *(1.803321)***	–8.336743 *(1.498705)***
N	176	176	176

Note: For variable definitions, please see Box 1. T denotes the year of programme start. *, ** and*** denote significance at the 10, 5 and 1% levels, respectively. RE denotes the random-effects model, PA the population averaged model and PA-Robust stands for the population–averaged model with heteroscedasticity-robust variance calculation. Source: Authors' calculations.

Table 6

Disbursement

	RE	PA	PA-Robust
World GDP Growth [T+1,T+5]	2.386287	2.165201	2.165201
	*(0.539171)***	*(0.422003)****	*(0.311944)****
Real GDP Growth in T	0.103716	0.092362	0.092362
	*(0.032186)***	*(0.026655)****	*(0.031001)****
Primary Balance in T	0.127417	0.112492	0.112492
	*(0.044060)***	*(0.036006)****	*(0.039489)****
Primary Balance Adjustment	0.141404	0.126228	0.126228
	*(0.049046)***	*(0.042494)****	*(0.040927)****
Public Debt in T	–0.007429	–0.006723	–0.006723
	*(0.004216)**	*(0.003679)**	*(0.003503)**
Banking Crisis Dummy	1.375428	1.244862	1.244862
	*(0.439406)***	*(0.358188)****	*(0.387038)****
Exchange Rate Regime	0.106475	0.095903	0.095903
	*(0.040948)***	*(0.035921)****	*(0.034916)****
VIX– S&P 500 Volatility Index	–0.047605	–0.043492	–0.043492
	*(0.022351)***	*(0.019853)***	*(0.020480)***
Openness Indicator	0.008127	0.007552	0.007552
	*(0.003862)***	*(0.003537)***	*(0.003693)***
NEER Adjustment	0.024819	0.021882	0.021882
	*(0.009706)***	*(0.007904)****	*(0.009887)***
Credit Crunch Dummy	–0.586852	–0.526013	–0.526013
	*(0.286044)***	*(0.258575)***	*(0.265454)***
Disbursement	–0.144227	–0.123067	–0.123067
	(0.356348)	*(0.317620)*	*(0.341586)*
Constant	–8.650911	–7.859367	–7.859367
	*(2.072662)***	*(1.683311)****	*(1.410155)****
N	176	176	176

Note: For variable definitions, please see Box 1. T denotes the year of programme start. *, ** and*** denote significance at the 10, 5 and 1% levels, respectively. RE denotes the random-effects model, PA the population averaged model and PA-Robust stands for the population–averaged model with heteroscedasticity-robust variance calculation. Source: Authors' calculations.

Table 7

Size to Quota

	RE	PA	PA-Robust
World GDP Growth [T+1,T+5]	2.397339 *(0.531328)***	2.210429 *(0.427870)***	2.210429 *(0.301402)***
Real GDP Growth in T	0.106135 *(0.031609)***	0.096284 *(0.026781)***	0.096284 *(0.029524)***
Primary Balance in T	0.130395 *(0.043278)***	0.117548 *(0.036495)***	0.117548 *(0.040772)***
Primary Balance Adjustment	0.142172 *(0.048135)***	0.129099 *(0.042679)***	0.129099 *(0.040962)***
Public Debt in T	–0.007976 *(0.003936)***	–0.007303 *(0.003486)***	–0.007303 *(0.003295)***
Banking Crisis Dummy	1.314626 *(0.438806)***	1.203880 *(0.370167)***	1.203880 *(0.437868)***
Exchange Rate Regime	0.104777 *(0.039224)***	0.096738 *(0.035198)***	0.096738 *(0.032307)***
VIX – S&P 500 Volatility Index	–0.051285 *(0.023089)***	–0.047665 *(0.020969)***	–0.047665 *(0.022289)***
Openness Indicator	0.008381 *(0.003825)***	0.007868 *(0.003555)***	0.007868 *(0.003600)***
NEER Adjustment	0.025465 *(0.009723)***	0.022995 *(0.008049)***	0.022995 *(0.008307)***
Credit Crunch Dummy	–0.600109 *(0.285151)***	–0.551736 *(0.261361)***	–0.551736 *(0.264993)***
Programme Size to IMF Quota	0.000192 *(0.000372)*	0.000192 *(0.000350)*	0.000192 *(0.000415)*
Constant	–8.731203 *(2.043721)***	–8.057676 *(1.698701)***	–8.057676 *(1.311324)***
N	176	176	176

Note: For variable definitions, please see Box 1. T denotes the year of programme start. *, ** and*** denote significance at the 10, 5 and 1% levels, respectively. RE denotes the random-effects model, PA the population averaged model and PA-Robust stands for the population–averaged model with heteroscedasticity-robust variance calculation. Source: Authors' calculations.

Table 8

Drawn to Quota

	RE	PA	PA-Robust
World GDP Growth [T+1,T+5]	2.391025 *(0.525470)***	2.228613 *(0.428796)***	2.228613 *(0.299994)***
Real GDP Growth in T	0.106465 *(0.031297)***	0.097852 *(0.027036)***	0.097852 *(0.029507)***
Primary Balance in T	0.129868 *(0.042786)***	0.118630 *(0.036537)***	0.118630 *(0.040489)***
Primary Balance Adjustment	0.140956 *(0.047676)***	0.129670 *(0.042870)***	0.129670 *(0.040789)***
Public Debt in T	–0.008068 *(0.003911)***	–0.007479 *(0.003515)***	–0.007479 *(0.003381)***
Banking Crisis Dummy	1.290104 *(0.430762)***	1.195090 *(0.366852)***	1.195090 *(0.406945)***
Exchange Rate Regime	0.104833 *(0.038638)***	0.097983 *(0.035097)***	0.097983 *(0.032080)***
VIX – S&P 500 Volatility Index	–0.053425 *(0.022898)***	–0.050095 *(0.021014)***	–0.050095 *(0.022556)***
Openness Indicator	0.008556 *(0.003776)***	0.008099 *(0.003555)***	0.008099 *(0.003637)***
NEER Adjustment	0.025836 *(0.009693)****	0.023675 *(0.008128)****	0.023675 *(0.007852)****
Credit Crunch Dummy	–0.601367 *(0.283449)***	–0.560416 *(0.262650)***	–0.560416 *(0.266485)***
Amount Drawn to IMF Quota	0.000432 *(0.000472)*	0.000419 *(0.000454)*	0.000419 *(0.000531)*
Constant	–8.691459 *(2.020758)****	–8.107554 *(1.701071)****	–8.107554 *(1.304348)****
N	176	176	176

Note: For variable definitions, please see Box 1. T denotes the year of programme start. *, ** and*** denote significance at the 10, 5 and 1% levels, respectively. RE denotes the random-effects model, PA the population averaged model and PA-Robust stands for the population–averaged model with heteroscedasticity-robust variance calculation. Source: Authors' calculations.

Table 9

Drawn to Size

	RE	PA	PA-Robust
World GDP Growth [T+1,T+5]	2.378252	2.174190	2.174190
	*(0.530213)***	*(0.422204)***	*(0.303218)***
Real GDP Growth in T	0.109629	0.098608	0.098608
	*(0.031932)***	*(0.026724)***	*(0.029016)***
Primary Balance in T	0.131291	0.117197	0.117197
	*(0.043806)***	*(0.036259)***	*(0.038780)***
Primary Balance Adjustment	0.145584	0.131043	0.131043
	*(0.048803)***	*(0.043030)***	*(0.039959)***
Public Debt in T	–0.009574	–0.008726	–0.008726
	*(0.004342)***	*(0.003813)***	*(0.003695)***
Banking Crisis Dummy	1.366770	1.246060	1.246060
	*(0.435117)***	*(0.364175)***	*(0.387880)***
Exchange Rate Regime	0.095661	0.086919	0.086919
	*(0.039463)***	*(0.035432)***	*(0.034561)***
VIX – S&P 500 Volatility Index	–0.052588	–0.048297	–0.048297
	*(0.022995)***	*(0.020283)***	*(0.020539)***
Openness Indicator	0.008531	0.007928	0.007928
	*(0.003875)***	*(0.003583)***	*(0.003772)***
NEER Adjustment	0.023555	0.021009	0.021009
	*(0.009548)***	*(0.008024)****	*(0.009559)***
Credit Crunch Dummy	–0.590207	–0.535527	–0.535527
	*(0.287014)***	*(0.260814)***	*(0.262761)***
Amount Drawn to Programme Size	0.004160	0.003870	0.003870
	(0.003918)	*(0.003551)*	*(0.003795)*
Constant	–8.675547	–7.935771	–7.935771
	*(2.038132)****	*(1.681617)****	*(1.344869)****
N	176	176	176

Note: For variable definitions, please see Box 1. T denotes the year of programme start. *, ** and*** denote significance at the 10, 5 and 1% levels, respectively. RE denotes the random-effects model, PA the population averaged model and PA-Robust stands for the population–averaged model with heteroscedasticity-robust variance calculation. Source: Authors' calculations.

Table 10

Conditionality – Total Number

	RE	PA	PA-Robust
World GDP Growth [T+1,T+5]	2.550609 (0.584051)***	2.220153 (0.436260)***	2.220153 (0.325883)***
Real GDP Growth in T	0.112839 *(0.034730)****	0.094813 *(0.027186)****	0.094813 *(0.033885)****
Primary Balance in T	0.129580 *(0.045743)****	0.109261 *(0.036663)****	0.109261 *(0.042921)***
Primary Balance Adjustment	0.143266 *(0.051512)****	0.122494 *(0.042387)****	0.122494 *(0.038664)****
Public Debt in T	–0.008045 *(0.004275)**	–0.006993 *(0.003516)***	–0.006993 *(0.003247)***
Banking Crisis Dummy	1.411400 *(0.465797)****	1.208036 *(0.366583)****	1.208036 *(0.368495)****
Exchange Rate Regime	0.106630 *(0.043287)***	0.094047 *(0.036559)***	0.094047 *(0.035082)****
VIX – S&P 500 Volatility Index	–0.068092 *(0.027001)***	–0.057206 *(0.021034)****	–0.057206 *(0.022847)***
Openness Indicator	0.010204 *(0.004357)***	0.008920 *(0.003737)***	0.008920 *(0.004187)***
NEER Adjustment	0.029344 *(0.011040)****	0.024599 *(0.008407)****	0.024599 *(0.009437)****
Credit Crunch Dummy	–0.654349 *(0.311494)***	–0.576937 *(0.265283)***	–0.576937 *(0.250894)***
All Conditions	0.016763 *(0.007244)***	0.014286 *(0.005829)***	0.014286 *(0.005067)****
Constant	–9.647083 *(2.290746)****	–8.430064 *(1.769194)****	–8.430064 *(1.425315)****
N	176	176	176

Note: For variable definitions, please see Box 1. T denotes the year of programme start. *, ** and*** denote significance at the 10, 5 and 1% levels, respectively. RE denotes the random-effects model, PA the population averaged model and PA-Robust stands for the population–averaged model with heteroscedasticity-robust variance calculation. Source: Authors' calculations.

Table 11

Conditionality – Quantitative vs. Structural

	RE	PA	PA-Robust
World GDP Growth [T+1,T+5]	2.546343 *(0.585524)***	2.216554 *(0.437349)***	2.216554 *(0.327444)***
Real GDP Growth in T	0.112551 *(0.034750)***	0.094547 *(0.027218)***	0.094547 *(0.033966)***
Primary Balance in T	0.129011 *(0.045894)***	0.108690 *(0.036820)***	0.108690 *(0.043836)**
Primary Balance Adjustment	0.142166 *(0.051878)***	0.121485 *(0.042668)***	0.121485 *(0.038942)***
Public Debt in T	–0.008021 *(0.004280)**	–0.006976 *(0.003517)**	–0.006976 *(0.003252)**
Banking Crisis Dummy	1.408852 *(0.465930)***	1.205785 *(0.366118)***	1.205785 *(0.367197)***
Exchange Rate Regime	0.107660 *(0.043721)**	0.094952 *(0.036870)**	0.094952 *(0.035853)***
VIX – S&P 500 Volatility Index	–0.069985 *(0.029238)**	–0.058850 *(0.023149)**	–0.058850 *(0.024076)**
Openness Indicator	0.010177 *(0.004360)**	0.008899 *(0.003739)**	0.008899 *(0.004199)**
NEER Adjustment	0.029127 *(0.011126)***	0.024382 *(0.008488)***	0.024382 *(0.009531)**
Credit Crunch Dummy	–0.646598 *(0.314166)**	–0.570694 *(0.266337)**	–0.570694 *(0.244589)**
Quantitative Performance Criteria	0.010736 *(0.035824)*	0.009051 *(0.030989)*	0.009051 *(0.025830)*
Structural Conditions	0.017277 *(0.007877)**	0.014735 *(0.006328)**	0.014735 *(0.005086)***
Constant	–9.539933 *(2.372770)***	–8.336994 *(1.857071)***	–8.336994 *(1.514086)***
N	176	176	176

Note: For variable definitions, please see Box 1. T denotes the year of programme start. *, ** and*** denote significance at the 10, 5 and 1% levels, respectively. RE denotes the random-effects model, PA the population averaged model and PA-Robust stands for the population–averaged model with heteroscedasticity-robust variance calculation. Source: Authors' calculations.

Table 12

Conditionality – All Condition Types

	RE	PA	PA-Robust
World GDP Growth [T+1,T+5]	2.738735 *(0.654541)***	2.301346 *(0.467092)***	2.301346 *(0.309019)***
Real GDP Growth in T	0.115706 *(0.036507)***	0.094214 *(0.027304)***	0.094214 *(0.031367)***
Primary Balance in T	0.133108 *(0.050477)***	0.107699 *(0.037846)***	0.107699 *(0.042131)**
Primary Balance Adjustment	0.156987 *(0.054665)***	0.129645 *(0.042391)***	0.129645 *(0.034931)***
Public Debt in T	–0.008559 *(0.004653)**	–0.007302 *(0.003673)**	–0.007302 *(0.003342)**
Banking Crisis Dummy	1.460414 *(0.505197)***	1.208460 *(0.379940)***	1.208460 *(0.359993)***
Exchange Rate Regime	0.126152 *(0.047661)***	0.108622 *(0.038417)***	0.108622 *(0.036800)***
VIX – S&P 500 Volatility Index	–0.075643 *(0.031524)**	–0.061506 *(0.024003)**	–0.061506 *(0.025456)**
Openness Indicator	0.010110 *(0.004674)**	0.008781 *(0.003947)**	0.008781 *(0.004712)**
NEER Adjustment	0.031961 *(0.012001)***	0.025877 *(0.008518)***	0.025877 *(0.008206)***
Credit Crunch Dummy	–0.651668 *(0.333281)**	–0.552533 *(0.270208)**	–0.552533 *(0.241235)**
Prior Action/ Necessary for Review Completion	0.028004 *(0.016059)**	0.023219 *(0.012619)**	0.023219 *(0.010862)**
Structural Performance Criteria	0.087056 *(0.049434)**	0.073962 *(0.040619)**	0.073962 *(0.031686)**
Structural Benchmarks	0.000862 *(0.012798)*	0.000974 *(0.010840)*	0.000974 *(0.010907)*
Quantitative Performance Criteria	–0.010615 *(0.040192)*	–0.009479 *(0.033529)*	–0.009479 *(0.028670)*
Constant	–9.929770 *(2.565440)***	–8.408188 *(1.933841)***	–8.408188 *(1.417475)***
N	176	176	176

Note: For variable definitions, please see Box 1. T denotes the year of programme start. *, ** and*** denote significance at the 10, 5 and 1% levels, respectively. RE denotes the random-effects model, PA the population averaged model and PA-Robust stands for the population–averaged model with heteroscedasticity-robust variance calculation. Source: Authors' calculations.

Table 13

Primary Balance – Criteria: 3/4 of Average Growth and 4 Years for Debt Reduction

	RE	PA	PA-Robust
World GDP Growth [T+1,T+5]	2.194559 *(0.500478)***	1.925270 *(0.380114)***	1.925270 *(0.304083)***
Real GDP Growth in T	0.106245 *(0.032602)***	0.091920 *(0.025503)***	0.091920 *(0.028460)***
Primary Balance in T	0.132666 *(0.045353)***	0.112958 *(0.035373)***	0.112958 *(0.037628)***
Primary Balance Adjustment	0.135877 *(0.048632)***	0.116847 *(0.040682)***	0.116847 *(0.036143)***
Public Debt in T	–0.007577 *(0.004079)**	–0.006608 *(0.003436)**	–0.006608 *(0.003133)***
Banking Crisis Dummy	1.198027 *(0.422936)***	1.044218 *(0.336934)***	1.044218 *(0.359450)***
Exchange Rate Regime	0.099453 *(0.039692)***	0.087446 *(0.033968)***	0.087446 *(0.031610)***
VIX – S&P 500 Volatility Index	–0.046315 *(0.022495)***	–0.041213 *(0.019291)***	–0.041213 *(0.019709)***
Openness Indicator	0.007612 *(0.003958)**	0.006947 *(0.003510)***	0.006947 *(0.003562)**
NEER Adjustment	0.025351 *(0.009891)***	0.021646 *(0.007793)***	0.021646 *(0.009287)***
Credit Crunch Dummy	–0.498975 *(0.282675)**	–0.431412 *(0.250451)**	–0.431412 *(0.265880)*
Constant	–8.020013 *(1.935645)***	–7.049251 *(1.538704)***	–7.049251 *(1.366748)***
N	176	176	176

Note: For variable definitions, please see Box 1. T denotes the year of programme start. *, ** and*** denote significance at the 10, 5 and 1% levels, respectively. RE denotes the random-effects model, PA the population averaged model and PA-Robust stands for the population–averaged model with heteroscedasticity-robust variance calculation. Source: Authors' calculations.

Table 14

Primary Balance – Criteria: 2/3 of Average Growth and 4 Years for Debt Reduction

	RE	PA	PA-Robust
World GDP Growth [T+1,T+5]	1.873924	1.663717	1.663717
	*(0.435125)***	*(0.352732)***	*(0.318219)***
Real GDP Growth in T	0.091490	0.080258	0.080258
	*(0.029525)***	*(0.024307)***	*(0.023921)***
Primary Balance in T	0.108241	0.095236	0.095236
	*(0.039437)***	*(0.033536)***	*(0.034963)***
Primary Balance Adjustment	0.110828	0.097421	0.097421
	*(0.045142)***	*(0.039522)***	*(0.032687)****
Public Debt in T	–0.006361	–0.005531	–0.005531
	(0.003927)	*(0.003354)**	*(0.002901)**
Banking Crisis Dummy	1.032273	0.908710	0.908710
	*(0.383941)****	*(0.320185)****	*(0.328248)****
Exchange Rate Regime	0.092405	0.082490	0.082490
	*(0.037308)***	*(0.032510)***	*(0.028525)****
VIX – S&P 500 Volatility Index	–0.039069	–0.035152	–0.035152
	*(0.020788)**	*(0.018592)**	*(0.020106)**
Openness Indicator	0.008110	0.007336	0.007336
	*(0.003834)***	*(0.003399)***	*(0.003253)****
NEER Adjustment	0.015473	0.013262	0.013262
	*(0.008389)**	*(0.007045)**	*(0.006178)****
Credit Crunch Dummy	–0.569657	–0.511993	–0.511993
	*(0.270212)***	*(0.240426)***	*(0.244548)****
Constant	–6.895223	–6.129089	–6.129089
	*(1.733543)****	*(1.441207)****	*(1.315802)****
N	176	176	176

Note: For variable definitions, please see Box 1. T denotes the year of programme start. *, ** and*** denote significance at the 10, 5 and 1% levels, respectively. RE denotes the random-effects model, PA the population averaged model and PA-Robust stands for the population–averaged model with heteroscedasticity-robust variance calculation. Source: Authors' calculations.

Table 15

Primary Balance – Criteria: 2/3 of Average Growth and 5 Years for Debt Reduction

	RE	PA	PA-Robust
World GDP Growth [T+1,T+5]	2.040549	1.860293	1.860293
	*(0.465096)***	*(0.384513)***	*(0.344065)***
Real GDP Growth in T	0.091189	0.081678	0.081678
	*(0.029180)***	*(0.025001)***	*(0.025395)***
Primary Balance in T	0.105780	0.095181	0.095181
	*(0.038596)***	*(0.033753)***	*(0.035578)***
Primary Balance Adjustment	0.118074	0.106708	0.106708
	*(0.045567)***	*(0.040876)***	*(0.035553)***
Public Debt in T	–0.006750	–0.006048	–0.006048
	*(0.003876)**	*(0.003382)**	*(0.002978)***
Banking Crisis Dummy	1.196892	1.084896	1.084896
	*(0.397016)***	*(0.337454)***	*(0.345860)***
Exchange Rate Regime	0.094878	0.086408	0.086408
	*(0.037253)***	*(0.033131)***	*(0.029021)***
VIX – S&P 500 Volatility Index	–0.040668	–0.037250	–0.037250
	*(0.020790)**	*(0.019069)**	*(0.020948)**
Openness Indicator	0.008469	0.007808	0.007808
	*(0.003774)***	*(0.003407)***	*(0.003351)***
NEER Adjustment	0.015275	0.013422	0.013422
	*(0.008330)**	*(0.007171)**	*(0.006472)***
Credit Crunch Dummy	–0.650229	–0.597976	–0.597976
	*(0.274236)***	*(0.247213)***	*(0.237049)***
Constant	–7.464828	–6.810967	–6.810967
	*(1.839656)****	*(1.548210)****	*(1.387450)****
N	176	176	176

Note: For variable definitions, please see Box 1. T denotes the year of programme start. *, ** and*** denote significance at the 10, 5 and 1% levels, respectively. RE denotes the random-effects model, PA the population averaged model and PA-Robust stands for the population-averaged model with heteroscedasticity-robust variance calculation. Source: Authors' calculations.

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COMMENT TO "HARD WORK, AND FOREIGN HELP – HOW TO SUCCESSFULLY CONDUCT ADJUSTMENT WITH OFFICIAL ASSISTANCE" BY MARTIN LARCH, KRISTIN MAGNUSSON BERNARD AND BALINT TATAR

Nicola Giammarioli[*]

Summary and main conclusions of the paper

The paper provides a contribution to the issue on how to evaluate the conditionality and effectiveness of IMF programs. This is a very topical issue, highly debated in the academia, among practitioners and policy makers. Just as anecdotal evidence, a google research of "conditionality and effectiveness of IMF programmes" gives 95,000 entries.

In the current juncture, especially with European adjustment programmes expired or about to finish, there is an increasing demand for empirical and theoretical analysis aimed at ether challenging or confirming the common wisdom. Against this background, the paper constitutes an attempt to bring evidence on the relationship between program conditions and success of IMF programs from a historical perspective. It shows that actual policy adjustment, stringent conditionality and favourable external conditions are key factors of success for IMF programs.

The paper analyses 176 IMF supported programs in the period 1993-2010 and constructs an indicator to measure programs' success in terms of growth and public debt reduction. In particular, it identifies, performing an econometric analysis, those factors which are considered relevant in predicting successful adjustments.

Those factors can be summarised in "hard work", notably fiscal consolidation and decisive fiscal repair, as well as in "stringent programme conditionality". Supportive external conditions such as global growth or investors risk appetite also play a decisive role.

The analysis is finally utilised to draw some conclusions on the economic adjustment programmes which have been undertaken in the euro area since the eruption of the sovereign debt crisis.

General discussion

The evaluation of official assistance programs may concern different aspects of a country's domestic economy. How to incorporate different dimensions of valuation (e.g., post-program growth, post-crisis debt level, unemployment, financial market access, etc.) while keeping the criterion of successfulness meaningful and easy to interpret?

According to an OECD study, H. Blöchliger *et al.* (OECD, 2012), past successful consolidation events can be detected by a turnaround of the primary balance, form deficit to surplus. However in most of the episodes studied (Australia, Canada, Denmark, Finland, UK, Greece, Ireland, Italy, Japan, and Japan), the public debt at the end of the consolidation period was higher that at the beginning. Those cases would not classify as success in the Larch et al. paper, but indeed they were! Moreover the OECD analysis show that consolidation is possible outside an IMF programme. Is there scope to control for those episodes in the econometric analysis? Or for a counterfactual analysis?

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[*] European Stability Mechanism.

The paper put together, without differentiating, a sample of countries with heterogeneous types of crises, both from a geographical point of view and different root causes. The demand for official assistance might be motivated by different reasons (as crises are of different nature): debt unsustainability (Russia), banking crises (Korea), massive currency depreciation (Mexico, Korea), balance-of-payments crises, etc. In essence, the sample includes countries which asked for official assistance for very different motives while the dependent variable only captures growth and debt reduction.

The conditionality requirements of the Fund changed throughout the sample. This could have had an impact on the "success" of the programs as well. The regressions do not control for such policy shift, though. Moreover the paper is silent about the common IMF practice to have successor programmes. Uruguay, for example, was under five different IMF programmes between 1991 and 2007. If we take the 5-year window utilised in the paper, between 1997 and 2002, Uruguay was contemporaneously under a programme, in post-programme and under distress and hence in need of a successor programme. Does it create an endogeneity problem? How to interpret the result in this cases?

To what extent is the post-program recovery related to the successfulness of the assistance program? It is commonly admitted that the rapid growth of Asian countries after the 1997-98 financial crisis is more related to national crisis management than IMF programs which were heavily criticized in Asia (even declined in Malaysia). Moreover, due to the existence of business cycles, downturns are most likely followed by periods of growth. It might be a good idea to control the boom-and-bust cycle in order to distinguish the effect of IMF programs from the cyclical effects.

The paper concludes by utilising its findings to draw lessons from the recent economic adjustment programmes undertaken in the euro area. However, the situation in Europe might be very different from other countries where IMF programs were solicited. First the programme were not managed by the IMF alone, but also the European Commission and the European Central Bank were involved. Second, the amount of financial assistance has been of a magnitude without precedents in the IMF history. Third, the countries under a programme were all members of a monetary union, a situation which determined additional elements of complexity, including the impossibility of utilising the nominal exchange rate channel. Finally, the nature of the crisis in Europe has its focus on sovereign debt and financial instability while IMF programmes rather deal with balance-of-payments crises.

Technical discussion

On the econometric analysis, the selection of "index of success" as a dependent variable raises some questions. First, there is a time difference between the descriptive statistics utilised to show the evidence where time period {T-2,T-1]; [T,T+2]; and [T+3,T+4} are utilised with respect to the more formal econometric analysis where (T+5, T, T+5) period is introduced. Second, the dependent dummy variable includes two aspects which can be reversely affected by independent variables. This makes the interpretation of regression results difficult. For example, an increase in public debt may stimulate economic growth but it is undesirable for the debt reduction objective. More importantly, it makes the conclusion weaker to include public debt both in the left and right hand of the regression equation. In other words, as *success* is partly defined as lower government debt, it is not surprising that fiscal consolidation leads to more *success*.

The paper criticise the use of "threshold analysis". However the authors themselves utilised thresholds for growth performances (less than 3 per cent, between 3 and 6 per cent, above 6 per cent) as well as thresholds for debt ratios (below and above 25 per cent). In addition, they

compare growth outcomes before and after a crisis. It is worth however underscoring that not necessarily reaching pre-crisis levels is always feasible or warranted. Crisis episodes often represent structural changes in the economies hence making comparisons of pre-crisis and post-crisis periods difficult, unless those structural changes are controlled for.

On the definition of sustainability of public finances, the paper takes a very widespread shortcut of utilising the level of public debt as a proxy. However, as debated at length during the SADIBA workshop of 2000, sustainability of public finances depends on a wide range of parameters and also on the dynamic interaction among them (primary surplus, interest rates, inflation, exchange rates, etc.). While it is difficult to take care of all of them in a technical paper, in practice they play a major role. This is confirmed by the empirical evidence that crises happened in the past at very different levels of public debt.

Overall, there is a risk that the results of the paper might suffer either from type 1 or type 2 errors. In other words success episodes might be considered a failure, while lack of consolidation might be capture as a success story. Refining the technical analysis to minimise such risks is therefore advisable.

Conclusion

In conclusion, the paper is very interesting and deals with a "hot topic" in the current policy debate. The most interesting part is represented by the attempt of using empirical evidence from IMF past experience to draw some lessons for Europe.

The paper would however benefit from putting the European experience in perspectives by better appreciating the peculiarities of the programmes at stake (magnitude of financial assistance, length of repayment period, role of the so-called "troika") as well as the specific framework (monetary, union, institutional settings, etc.). Furthermore, the empirical analysis could be improved by adding a taxonomy of crises by taking into account the root causes (e.g., currency, balance of payments, financial, fiscal crises); by identifying the specific impact of a programme (controlling the sample by adding countries having experienced adjustment path without a programme); and by refining the index utilised to proxy "success".

GOVERNMENTS' PAYMENT DISCIPLINE: THE MACROECONOMIC IMPACT OF PUBLIC PAYMENT DELAYS AND ARREARS

Cristina Checherita-Westphal,[*] *Alexander Klemm*[**] *and Paul Viefers*[***]

This paper considers the impact of changes in the governments payment discipline on the private sector. It argues that increased delays in payments can affect private sector liquidity and profits and hence ultimately economic growth. This is then tested empirically on European Union countries using two complementary approaches. First, we use annual panel data, including a newly constructed proxy for government arrears. This approach allows us to control for more relevant variables and to capture the essence of overdue government payments, but it restricts the number of time periods and may not fully capture individual country conditions. Here we find, using panel data techniques, that payment delays and to some extent estimated arrears lead to a higher likelihood of bankruptcy, lower profits, and lower economic growth. Second, we use a Bayesian VAR approach on quarterly data for selected countries faced with significant payment delays. In this approach, we also find that the likelihood of bankruptcies rises when the government increases the average payment period.

1 Introduction

The issue of government arrears has gained prominence during the current European sovereign debt crisis. Particularly in EU/IMF programme countries – both in and outside the euro area – but also in other fiscally vulnerable economies, such as Italy and Spain, the identified amounts were considerable and measures to reduce the stock of arrears featured prominently in government strategies and as programme targets. At the same time, the European Commission took initiatives at the EU-wide level to reduce payment delays, such as the 2011 Directive on combating late payment in commercial transactions, which also covers transactions between undertakings and public authorities.[1]

Like private agents, governments have some discretion on when to pay their bills and other obligations. The outstanding payments of governments are, however, different in various respects from trade credit among private sector agents. First, within the private sector, paying a bill shifts liquidity across firms, but does not affect aggregate private sector liquidity. Second, given the size of the government, particularly in European countries, its payment policies are important to a large base of suppliers. Third, the government is at the same time a debtor and creditor, but in a very distinct way, as most of the funds owed to the government are taxes, *i.e.*, unrequited payments, whose payment terms are set by the government.

Moreover, given its size and the existing legal frameworks, the government may have an edge compared to the private sector in enforcing payments due and in collecting (versus paying) interest and fees for overdue payments. This discretion governments have in choosing when to pay

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We would like to thank seminar participants at an ECB internal seminar for helpful comments. We would also like to thank Madeleine Bosch from Intrum Justitia AB, Sweden, for her valuable help with European Payment Index data. Views expressed in this paper are those of the authors and do not necessarily represent those of the ECB or the IMF.

[1] The directive, which entered into force in March 2013, imposes a maximum delay for new government payments of 30 days (60 days for a limited set of exceptions, inter alia, the health sector) and an 8 per cent surcharge for infringement.

may be foreseen already in contracts that include explicit or customary trade credit, but it can also go beyond that if governments miss due dates and fall into arrears. Payment traditions and expectations vary across countries and sectors, but as long as the situation is static the impact should be limited. If a government has a tradition of taking a long time to pay bills, then suppliers will price the cost of such credit into the goods supplied. There could still be some limited impact, though, as firms with extreme credit constraints may then not be able to do business with the government.

In times of economic crisis, however, payment delays could change in unexpected ways. Most obviously, a government facing a funding constraint could delay the payment of bills thus increasing its trade credit. Even government with full access to cheap financing could decide to delay payments, in particular if they wish to report lower public debt or deficit figures. Not paying bills typically leads to lower debt, because trade credit and even arrears are not counted under the definition of Maastricht debt according to the European accounting standards, ESA-95. Although initially proposed by Eurostat, the recent update of the public accounting standards (ESA-2010, to be enforced by the EU Member States as of September 2014) will not include the obligation to count trade credits (and arrears) under government debt. The deficit in selected years would also be reduced if measured on cash basis, but not normally if an accrual definition is used (see below for some subtleties).

Governments could also decide to accelerate payments to suppliers or previously accumulated arrears, at some stage in a crisis, in particular to support a liquidity-constrained private sector. In this spirit, the Italian government announced in April 2012 a major programme (EUR 40bn) to clear arrears over two years. This programme was extended by another government upon its investiture in March 2014, with promise for an ever larger amount (EUR 68bn). Similarly, Spain announced in May 2012 a mechanism in the form of a government guaranteed syndicated loan worth EUR 30 billion by which the central government helps regional and local governments clear their arrears.

Changes in payment lags can be expected to have implications on the macroeconomic situation through various channels.

First, corporate profits can be affected, because unexpected delays change the present discounted value of payments. If no or a low interest rate applies, this reduces suppliers profitability. Second, the size of the corporate sector can be affected if liquidity-constrained firms, in particular small and medium-sized enterprises (SMEs), go bankrupt. This will also have knock-on effects on creditors of such firms. Various second-round effects are also likely, e.g., a higher bankruptcy rate could increase the cost of capital even to firms with access to credit. Third, business investment can be affected in liquidity-constrained firms. These may not only be those directly dependent on government payments, but also their own suppliers as payment delays trickle on. Aggregate demand, and finally output and growth, could thus be negatively impacted.

The previous literature on governments' accounts payable or arrears is very limited. Diamond and Schiller (1993) provide an overview of arrears, noting how important they are in many developing countries: "in 7 out of 14 countries shown, changes in arrears were the equivalent of 10 percentage points of total recorded expenditures". They also describe the likely macroeconomic effects, but do not model or estimate them. Ramos (1998) describes how a large stock of arrears can be tackled, and recommends securitisation as an option, as it strikes a balance between addressing the needs of funding-constrained governments and creditors, and discusses the macroeconomic implications, but again without modelling or estimating them.[2] Bank of Italy

[2] The paper does present, however, a simple two-period model to illustrate the welfare gains of creditors when their arrears are recognised and securitised.

(2013) contains a short box describing an estimate of the impact of the planned initiative to clear arrears on growth. They estimate multipliers from the clearing of arrears, which are close to unity if payments are used to finance investment, 0.3 if used for firms' wage arrears and close to zero if kept for precautionary saving. Overall they estimate a positive impact on the economic growth rate of between 0.5 and 0.7 percentage points.

This paper's aim is to analyse the impact of changes in government payment delays on macroeconomic performance. To lay the foundation of this analysis, Section 2 discusses the various forms of payment delays and the extent to which they form arrears. It also describes the available data and explains the construction of our measures of arrears and delayed payments. Section 3 provides an analysis of the impact of payment delays on profits, bankruptcies and growth, using dynamic panel data techniques. Section 4 complements the previous analysis by using a Baysian VAR on quarterly data for Italy, Spain and Portugal. Section 5 brings together the findings and concludes.

2 Definitions and data availability

According to the IMF Government Finance Statistics Manual, arrears appear when "an obligatory payment is not made by its due-for-payment date". The term arrear should not be confused with general unpaid government bills or other obligations. A true arrear only occurs if a bill is not paid by the due date, whether this is based on a contractual agreement, commercial law or custom (*e.g.*, 60 days after the invoice date). A government may therefore have large amounts of unpaid bills without falling into arrears. Nevertheless an increase in unpaid bills would be indicative of potential arrears. Arrears may also occur in expenditure categories where there are no bills, such as pensions, transfers or wages. In that case, the definition is less clear, especially as the government could define the payment terms. However, a payment that occurs much later than the month to which it refers would probably be seen as an arrear.

In an accrual accounting system, such as ESA95, the timing of payments does not affect reported spending (with a few exceptions), as spending is registered at the time of good supply or service provision. If payment is not made at the same time – be it an arrear or a delay within permissible payment terms – then it shows up under the category "other accounts payable" (AF.7) in the national accounts. This category comprises any financial liability "which are created as a counterpart of a financial or a non-financial transaction in cases where there is a timing difference between this transaction and the corresponding payment. It includes trade credits and advances and any other receivables and payables. Trade credits and advances are financial assets/liabilities arising from the direct extension of credit by suppliers and buyers for goods and services transactions and advance payments for work that is in progress or to be undertaken and associated with such transactions" (see ESA95 manual).

Public accounts typically do not track true arrears, except following ad hoc audits to identify them (as sometimes required in IMF programmes). Alternative sources from international datasets do not report fiscal arrears either. For example, in the GFS, public payment arrears are a memorandum item that member countries are free to report, but rarely do. Instead, depending on the public accounting system in place, there could be data on spending commitments, payment orders and actual payments (cheque or transfer). Differences between these stages can provide indications of the development of payment lags.

First, the difference between commitments and payment orders can reflect late supply by private parties or delays by the government in issuing payment orders.

Second, the difference between payment orders and actual payments (accounts payable) is necessarily due to government procedures. An increase in this figure could, however, still take place without the government breaching due dates.

Finally, if cheques are used, there is a float as a result of uncashed cheques. This would not lead to arrears, as companies would consider a debt cleared on receipt of a cheque, unless the cheque bounces.

An unusual increase in any of these measures would indicate a potential problem, but would not be proof for the presence of arrears. Conversely, small or stable differences are not proof for the absence of arrears either, as these aggregated figures could hide individual payments with excessive delays. Moreover, if only some steps are observed, arrears can be missed. For example, if only accounts payable are known, arrears could occur because of the delayed issue of payment orders (or more generally recognition of liabilities). Finally, irregular payments, made without recording a commitment could still be potentially legally valid, but would not be known until regularised.

While it may therefore not be possible to cleanly identify arrears in a legal sense, from an economic point of view, it may be more important to identify changes in payment delays that go beyond what is expected by suppliers. Clearly accounts payable, possibly as a share of total spending would be a proxy for the average payment duration, even if an imperfect one as governments may delay or avoid recognising valid liabilities. In this paper we mainly use Eurostat's Sector Accounts data on accounts payable (ESA95 code AF.7) as a basis for further data construction. For a few countries, we also have direct estimates of arrears that allow us to make comparisons.

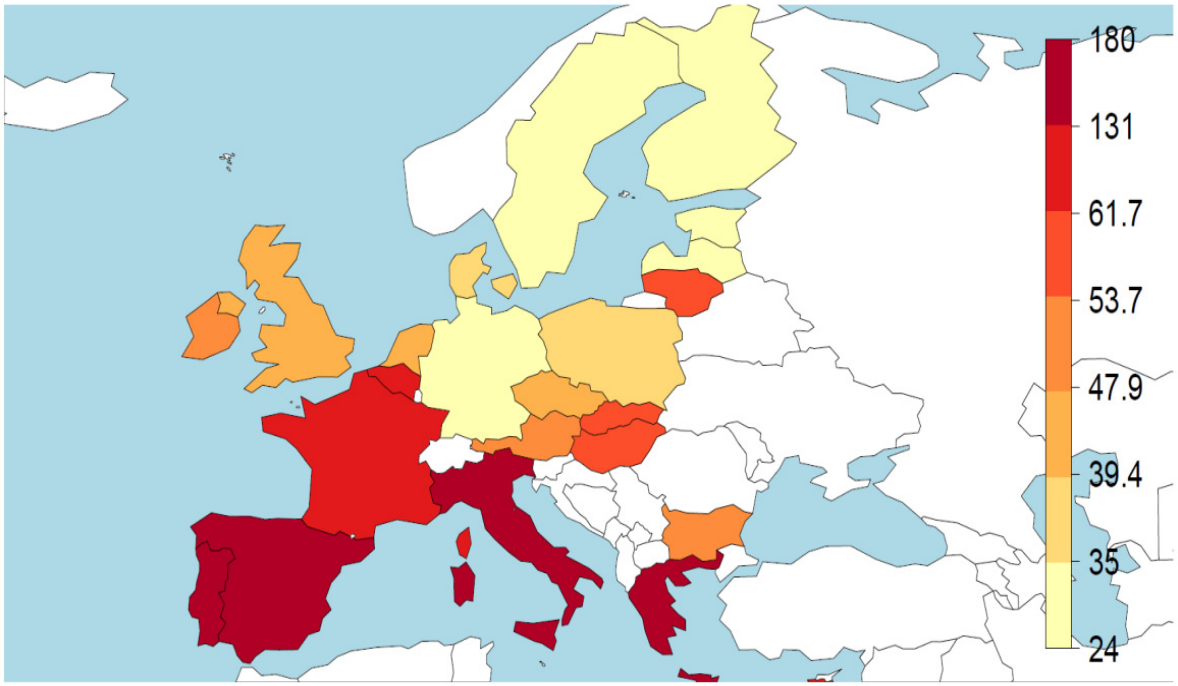
2.1 A proxy for fiscal arrears

As was mentioned, the exact amount of payments in arrears is not available from ESA95 national accounts data. Without supplementary information, it is thus very difficult to estimate the share of total accounts payable that is in arrears as opposed to the share that exists because of normal payment delays. By definition, the due-for-payment basis will show clearly the arrears arising from purchases on credit, but arrears from the failure to repay debt obligations, such as loans and securities other than shares, as scheduled will not be apparent without supplemental information. We therefore put forward a method to construct a proxy for the amount of payments in arrears based on survey data from a private credit management company (Intrum Justitia). This supplementary information on the payment duration of the public sector in several countries, provides us with a way to disentangle the share of accounts payable that are within or beyond the due-to-payment date.

To illustrate how we construct our proxy, first suppose the full information setting. In this ideal situation, we could on a given day retrieve the full payment record of the public sector (ESA 95 sector code S.13) from the national accounts. That is, on given day of a fiscal year τ and for every invoice i, we have information on (i) the amount $\$x_i$ to be paid, (ii) the contractual payment period $\bar{T}_i$and (iii) the payment duration T_i. We then say that invoice i is in arrears, if $T_i > \bar{T}_i$. For example, if the contractual period $\bar{T}_i$ is 30 days and we are 45 days from the payment date, the payment has been in arrear for 15 days. For any date τ, one could then immediately determine the amount of payments in arrears, but also construct the full duration distribution $F_T(c) = \Pr[T \leq c]$ of public payments. Hence, $1 - F_T(\bar{T})$ represents the share of payments beyond the due-to-payment date. The duration distribution of payments can therefore be used, e.g., to compare the amount of arrears.

Figure 1

Average Reported Payment Duration in 2012
(number of days)



Source: Intrum Justitia, EPI 2013.

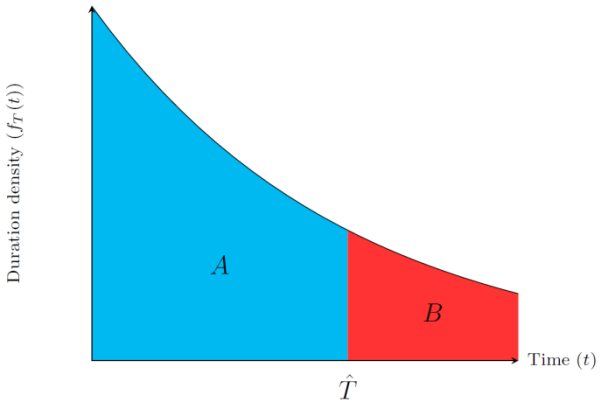
In our less ideal case, the ESA95 accounts only provide the total amount of other accounts payable (AF.7) for each country. In order to estimate the share of AF.7 that is in arrears, we first reconstruct the duration distribution of public payments. Because administrative data on the duration of public payments is not available, we use survey data on the average payment duration and the average contractual payment period of public authorities. This data is provided by the Intrum Justitia, a private credit management firm, which conducts an annual written survey among several thousand firms in 27 countries. The results from this survey are published in an annual European Payment Index (EPI) Report. Among several other payment statistics, the survey reports (i) the average annual payment duration and (ii) the average annual contractual payment period. Both numbers are further disaggregated into consumer, business-to-business and public sector debtors. We have plotted the reported data from the current EPI 2013 report in Figure 1. The map visualizes what several other studies have already documented to be a prevalent pattern in terms of payment practices in Europe (see, e.g., Ferrando and Mulier, 2013), *i.e.*, payment durations and also contractual payment periods are relatively lower in northern Europe and higher in the Mediterranean.

In order to estimate the duration distribution we assume that the duration distribution of public payments is exponential, *i.e.*, its cdf is given by:

$$F_T(t) = \begin{cases} 1 - \exp(-\lambda t) & \text{for } t \geq 0 \\ 0 & \text{for } x < 0 \ , \end{cases}$$

Figure 2

Duration Density of Public Payments



Area A shows share of obligations within contractual payment period $\hat{T}$, area B shows share of obligations beyond the contractual period.

where $\lambda > 0$ is the parameter of the distribution and is often called *rate* or *intensity* of the distribution. The duration T decreases in λ in the sense of first order stochastic dominance, *i.e.*, higher values for T become uniformly less probable. The exponential duration is often used to model time-to-event data, such as waiting times, queuing times or the time until default in credit risk modelling. One of its key feature that motivates its use in our case is the fact that we may estimate the key parameter λ via simple methods of moments (MM). Let the reported average payment duration for country j be denoted by $\bar{T}_j$. Under weak regularity conditions, the sample average provides a consistent estimator for the mean duration of payments and hence we would estimate λ_j in the following way:

$$\mathbb{E}[T_j] = \lambda_j^{-1} \Rightarrow \tilde{T}_j = \hat{\lambda}^{-1} \Rightarrow \hat{\lambda} = \tilde{T}_j^{-1} \ . \tag{1}$$

This immediately leads to the estimated duration distribution

$$\hat{F}_T(t) = \begin{cases} 1 - \exp\left(-\hat{\lambda}t\right) & \text{for } t \geq 0 \\ 0 & \text{for } t < 0 \ , \end{cases} \ . \tag{2}$$

Hence, with information on the average payment duration, an exponential distribution of payment durations is fully identified.[3] If we do not allow for any grace period, the estimated the share of payments in arrears equals

$$\text{Other accounts payable in arrears} = AF.7 \times (1 - \hat{F}_T(\bar{T}). \tag{3}$$

In the existing literature on the measurement of arrears, there is no general consensus which value to take for $\bar{T}$. An exact notion of payment arrears would define them to be any amounts that are past due for payment and are unpaid. Hence, any payment for which $T > \bar{T}$ would be in arrears

[3] More flexible distributions that seem pertinent for our use, e.g., a Gamma distribution, feature two parameters and hence need more information than only the sample average to be identified.

under this definition. In practice, however, this strict notion of arrears is often loosened to allow for the fact that some grace period beyond the due date may be commonly granted.

In a similar vein, the IMF's Compilation Guide on Financial Soundness Indicators 2006 (see Section 4.84) defines loans to be in arrears once "(...) payments of principal and interest are past due by three months (90 days) or more (...)" and goes on to note that "The 90-day criterion is the time period that is most widely used by countries to determine whether a loan is non-performing". Since trade credit granted by the private sector to the public sector is a form of a loan, this criterion is equally applicable and provides another way to define an "acceptable grace period".

Our final estimate of the total amount of payment arrears, however, is rather sensitive to what exact value is assumed to be the "acceptable" contractual payment period. We therefore provide our estimates under all three different notions of "acceptable" below.

Under the first strict notion of arrears, we estimate for the arrears in country *j* as follows. We first use equation (2) to estimate $\hat{\lambda}$ and thus $\hat{F}_T(\cdot)$ and then evaluate one minus the estimated duration distribution at the average reported payment period $\hat{T}_j$. The final estimate for the amount of payments in arrears is then given by equation (3).

Under the second notion of arrears, we proceed very much the same way, but set $\hat{T}_j$ equal to 90 days.

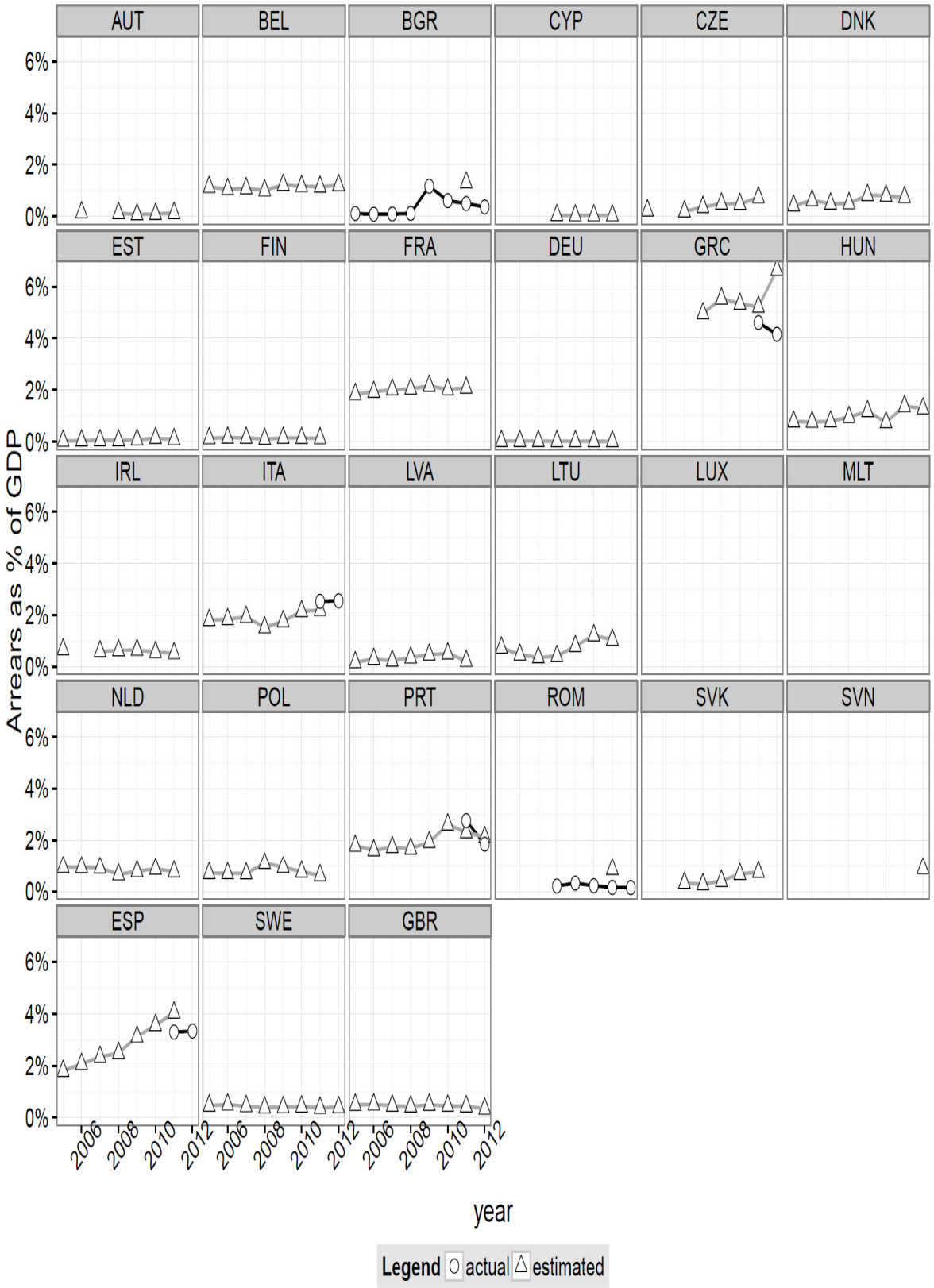
Conceptually, our third estimate for the arrears in country j is similar to the second, but allows the general government to pay after 90 days or 110 per cent of the contractual payment period. Hence, in a first step we use equation (2) to estimate $\hat{\lambda}$ and thus $\hat{F}_T(\cdot)$. In the second step, we compute $1 - \hat{F}_T(c)$ where:

$$c = \begin{cases} 90 & \text{if } \bar{T}_j \leq 90 \\ 1.1 \cdot \bar{T}_j & \text{if } \bar{T}_j > 90 \end{cases} .$$

In the final step, we take the share $1 - \hat{F}_T(c)$ from the second step and calculate the total amount of payments in arrears using equation (3). To make figures comparable, we plotted our estimates as a share of GDP in Figure 3. We also included available administrative data on actual payment arrears, e.g., when measured as part of a bailout program. There are several features worth mentioning. First, several European countries e.g. Finland, Denmark, Sweden and Bulgaria, tend to have a relatively large AF.7-to-GDP ratios. While this may be indicative of payment arrears, especially Scandinavian countries are known to roll over their debt in a timely manner and should have only very little payment in arrears – if any. Our measure incorporates this explicitly via the average payment duration in these countries. As a result, our estimates of arrears for these countries is attenuated by their high payment discipline. Second, the individual time series for the different countries show fairly little variation over time and thus appear to be very persistent. Third, the time series variation is higher for countries with relatively high Arrears-to-GDP ratios, being the highest in Greece and Spain. Fourth, in terms of matching official numbers, our estimates come surprisingly close in most cases, but may still deviate substantially in individual country-years, *e.g.*, the estimate for 2012 arrears in Greece. This deviation in some cases, however, is also very likely to stem from conflicting definitions of what is to subsumed under the term payment arrears. For example, official figures from Bulgaria do not comprise outstanding hospital bills from state-owned hospitals.

Figure 3

Actual and Estimated Payment Arrears of the Public Sector by Country



3 The aggregate effects of payment arrears – evidence from panel regressions

In a first step we estimate the macroeconomic impact of government delayed payments, arrears and total accounts payable in a panel setting, as such exploiting both the country and time variation in data. In line with the theoretical insights on the potential channels that delayed payments may have on the economy, we investigate the short-term impact on real GDP growth, on profitability as proxied by the economy-wide gross operating surplus, as well as liquidity as proxied by the probability of default (the later given by Moody's measure of distance to default, DTD).[4]

Given the large potential for endogeneity – especially reverse causation – of government delayed payments and arrears, our preferred estimator is the system GMM (Arellano-Bover) estimator for dynamic panel models. This is particularly suitable for the regressions with variables constructed based on the EPI dataset, which has a rather short time dimension (maximum T = 7, *i.e.*, the period 1995-2012) and larger cross-section dimension (the number of EU countries with sufficient observations to be kept in the regressions being 24).[5] With the GMM estimator, we also correct for the heteroskedasticity and autocorrelation that may be present in the error structure by using the consistent estimator. In general, results with other estimators, in particular fixed effects, are stronger with respect to both statistical and economic significance. Fixed-effect model results are used in particular in for regressions using accounts payable, given the longer time dimension of data (1991-2012).

3.1 Growth regressions

In this subsection, we investigate the short-term impact of government delayed payments and arrears on the real GDP growth. We begin by analysing the impact of government delayed payments, constructed as an interaction term between the variable "other accounts payable" of the general government (AF.7) as a share to GDP and the surveyed number of days public contracts are in delay, as available from EPI. We then employ our estimated measures of arrears overdue more than 90 days (as a share to GDP) and, lastly, the total accounts payable (as a share to GDP).[6] Table 3 of the Appendix shows the estimation results for various regressions starting with the simplest one in which only government delayed payments, and respectively estimated arrears, is controlled for, in addition to country and year fixed effects and two lags of the dependent variable (using only the first lagged GDP growth does not eliminate serial auto-correlation as indicated by the rejection of the AR(2) test null hypothesis). In the next columns (2) to (9), one potentially relevant variable is added at a time, as follows (by category): (i) fiscal variables: We first control for a base effect of our variable of interest by adding the government spending-to-GDP ratio (column 2) in order to capture the possibility of higher delayed payments accumulating only as a result of higher total spend ing. We then aim to capture the impact of the discretionary fiscal policy on the economy through the change of the structural primary balance ratio (column3); (ii) credit to the private sector as captured by the GDP share of loans to private entities (column 4); (iii) position in the business cycle as captured by: the output gap (column 5) and the unemployment rate (column6); (iv) basic determinants of growth in a conditional convergence model, that is labour force (population) growth rate (column 7), the saving (investment) ratio to GDP (column 8) and the

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4 The distance to default measures the number of standard deviations it takes a shock to be large enough to render a firm's asset value lower than the value of the firm's debt (see http://www.moodysanalytics.com/).

5 The results remain robust if the difference GMM (Arellano-Bond) estimator is used instead. The same holds if the forward orthogonal transformation is used instead of differencing.

6 Checks performed with other measures (estimated arrears overdue more than 30 or 60 days) showed less robust results.

initial level of GDP per capita (column 9). Column 10 includes all the three variables of the convergence growth model together with our variable of interest.

Overall, the results presented in Table 3 show pretty robust evidence that delayed payments have a negative impact on growth. The findings with estimated arrears (see Table 4) are more variable, and a significant result is obtained only in about half of the specifications.[7] The results with total accounts payable (not reported, but available upon request) are all insignificant, supporting the idea that large amounts that are rolled over regularly may not be a problem.

3.2 Impact on gross operating surplus growth

We investigate the impact of delayed payments, estimated arrears and accounts payable on the economy-wide gross operating surplus (as available from Ameco). We find a statistically significant, robust impact only in the case of delayed payments, as shown in Table 6 (the results for the other two variables of interest are presented in the Appendix).

3.3. Impact on likelihood of bankruptcy

As expected, government delayed payments and arrears seem to exert a stronger economic impact through indirect channels, such as the degree of liquidity constraint and likelihood of bankruptcy. We posit that such channels can be relatively well captured by the Moody's measure of a country's distance to default. In this vein, delayed payments and our measure of estimated arrears, but not the total accounts payable, are found to exert a negative effect on the distance to default (see Table 7 and 8). That is, the largest such delayed payments, the smaller the distance to default (or higher the probability of default among private companies).

4 The aggregate effect of payment arrears – evidence from Bayesian VARs

Our proxy for the payment discipline of the public sector is the AF.7-to-Expenditure ratio. Much like the debt-to-GDP ratio, the AF.7-to-Expenditure is in units of time and measures how many quarters on average the general government needs to pay its obligations, for every Euro it committed to pay. The smaller this ratio, the more efficient the general government is in a given quarter in paying its obligations. We took the ratio of AF.7 to total expenditure, instead of, e.g., the ratio to GDP, to control for the purely mechanical positive relationship between expenditure and the amount of outstanding payments. It seems natural to assume that AF.7 rises when spending increases. If the general government rolls over this additional obligations with the same efficiency, our measure of payment efficiency should not be affected. This, however, could be the case with the AF.7-to-GDP ratio. This way we also control for expenditure shocks.

The liquidity channel through which we suspect the AF.7-to-Expenditure ratio to affect the private sector is proxied by the DTD measure that was used earlier, too.

In terms of methodology, we move to a system of equations that takes each variable to be endogenous with respect to one another. This simultaneous equations framework is accommodated in a structural Bayesian VAR. Contrary to classical reduced-form VARs which identify shocks

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[7] Only in regression (10), the coefficient turns insignificant, but this is in a more demanding specification with more variables and correspondingly many instruments. The very high Hansen p-value indicates possibly a problem of too many instruments having weakened the test.

using a recursive identification scheme, we wanted to allow for a less restrictive identification scheme and move towards non-recursive identification *à la* Waggoner and Zha (2003).

Bayesian VARs seem a natural alternative to the univariate framework we considered in the previous sections. First, they provide a well-established way to take into account the complex interdepencies among the variables under consideration and thus control for their mutual feedback. Second, by imposing prior restrictions on the parameters in the model we are able to address (i) the proliferation of the parameter space and (ii) the relatively small sample size, which makes it likely that an unrestricted VAR would mistake much of the sample variation to be systematic instead of unsystematic. Using prior restrictions we are able to provide conservative estimates of cross-variable effects, because we "shrink" them towards a zero prior mean (see inter alia Koop and Korobilis, 2010, for a recent account). Third, the cross-variable effects from a shock in variable *j* to variable *i*, may be easily gauged by computing the dynamic multipliers

$$\frac{\partial y_{i,t+k}}{\partial \epsilon_{j,t}} \quad , \; k = 0, \ldots \tag{4}$$

which, at the same time, control for shocks to the other variables in the system.

4.1 The data

We use a similar set of variables as in the univariate regression analysis. First, we include the standard set of macroeconomic variables, i.e. quarterly real GDP (seasonally adjusted, national currency) in log-levels, inflation as measured by the GDP deflator (2005=100), the median distance to default, the 3-month Euribor money market rate and the AF.7-to-expenditure ratio. In particular, we take the AF.7 as a ratio of total expenditure, *i.e.*, including wages and transfers.

The sample ranges are unbalanced across countries, but mostly go from 1999Q3 until 2012Q4 (see table 1). We discard countries from our analysis for which the data (i) is not available before 2002Q1, (ii) an entire series contains only missing values or (iii) one or more series contain gaps. This leaves us with 16 countries in our sample.

4.2. Non-recursive identification

In this subsection we estimate a structural VAR, *i.e.*, a model that is not generically identified using a Cholesky ordering among variables. Instead, we will follow the approach put forward by Sims (1986) and Waggoner and Zha (2003) and identify shocks directly via restrictions on the contemporaneous impact matrix. This approach is more flexible than recursive identification, because (i) it allows for non-recursive causation and (ii) restrictions can interpreted as representing behavioral equations in the sense of simultaneous equations models (SEMs). The first point plays an important role in our case, because we can implement the restriction that shocks to the AF.7-to-Expenditure ratio do not enter the equation for GDP and DTD, without having to put both to the top of the vector y_t as in a Cholesky ordering.

The key behavioral assumption in the non-recursive scheme is that shocks to the AF.7-to-expenditure ratio do *not* affect GDP and DTD contemporaneously. We base this assumption on the EPI report and the average payment duration of countries. Note that for countries where the average payment duration of one quarter (90 days), the private sector is very likely to anticipate no payment within the same quarter. *I.e.*, for any invoice dated in a given quarter, payment is expected not before the next quarter. If this holds true, then any shock to public payment durations will not affect GDP or the DTD immediately but with a lag. However, the EPI

report shows that this assumption is only warranted for three countries in our sample. At the same time, the three countries – Italy, Spain and Portugal – which exhibit an average payment duration of at least 90 days are those that have been in the focus in terms of their payment discipline.[8]

To illustrate the structural BVAR model, let again $y_t \in \mathbb{R}^n$ be a *n*-dimensional random vector, now following the *structural* VAR model:

$$\mathbf{y}_t'\mathbf{A}_0 = \mathbf{c} + \sum_{i=1}^{p} \mathbf{y}_{t-i}'\mathbf{A}_i + \boldsymbol{\epsilon}_t' \quad , \; t = 1, \ldots, T \; , \tag{5}$$

where $A_k \in \mathbb{R}^{n \times n}$ are matrices of parameters, c is an intercept and $\epsilon_t \in \mathbb{R}^n$ denotes the vector of structural shocks or disturbances in the system. We assume that ϵ_t is the standard zero-mean spherical disturbance.

Letting $x_t' = [y_t, \ldots, y_{t-p}, 1]$ and:

$$\mathbf{Y} = [\mathbf{y}_t', \ldots, \mathbf{y}_1']' \; ; \; \mathbf{X} = [\mathbf{x}_t', \ldots, \mathbf{x}_1']' \; ; \; \mathbf{E} = [\boldsymbol{\epsilon}_t', \ldots, \boldsymbol{\epsilon}_1']' \; ; \; \mathbf{F} = [\mathbf{A}_1, \ldots, \mathbf{A}_p, \mathbf{c}]'$$

we may write the whole system more compactly as:

$$\underset{T\times n}{\mathbf{Y}} \; \underset{n\times n}{\mathbf{A}_0} = \underset{T\times k}{\mathbf{X}} \; \underset{k\times n}{\mathbf{F}} + \underset{T\times n}{\mathbf{E}} \; , \tag{6}$$

where $k = np + 1$. In this form, it becomes apparent that the structural VAR may be viewed as a system of linear simultaneous equations with endogenous variables *Y* and exogenous (or predetermined) variables *X*. The system is identified imposing exclusion restrictions on the matrix A_0.

In our case, the system reads:

$$\begin{bmatrix} \text{GDP}_t \\ \pi_t \\ \text{AF.7 ratio}_t \\ \text{DTD}_t \\ i_t \end{bmatrix}' \begin{bmatrix} a_{11} & 0 & a_{31} & a_{41} & a_{51} \\ 0 & a_{22} & a_{32} & a_{42} & a_{52} \\ 0 & 0 & a_{33} & 0 & a_{53} \\ 0 & 0 & 0 & a_{44} & a_{54} \\ 0 & 0 & 0 & a_{45} & a_{55} \end{bmatrix} = \mathbf{c} + \sum_{i=1}^{p} \mathbf{y}_{t-i}'\mathbf{A}_i + \boldsymbol{\epsilon}_t' \tag{7}$$

where AF.7-ratio means the AF.7-to-Expenditure ratio. The identification assumptions we impose warrant some elaboration. The first column of A_0 represents the assumption that any contemporaneous shocks to aggregate growth are pure TFP shocks and that any feedback from the other endogenous variables affect GDP only with a lag. Hence, $\epsilon_{1,t}$ may be viewed as the TFP shock. The second column states that prices are sticky in the short run. The third columns serves to identify the shock from the AF.7-to-Expenditure ratio, in particular to set it apart from the TFP shock. It states that shocks to aggregate growth affect the average payment duration in the public sector, but not vice versa. In principle, this scheme stems from the observation that for the countries under consideration, the average payment delay is 90 days or at least very close to 90 days (see Figure 5). Thus, private suppliers are thought to anticipate this average delay and to adjust their businesses accordingly. Only once an entire quarter went past and payments still did not arrive, private suppliers realize that they had underestimated the public payment delay.

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[8] For Greece the average payment duration also exceeds 90 days, but drops out according to our criteria mentioned in the section data and variable selection.

We set the following hyperparameters for the model: $\lambda_0 = 0.5, \lambda_1 = 0.1, \lambda_3 = 2$ and $\lambda_4 = 1$.[9]

Further details on the prior and the posterior simulation via Gibbs sampling can be found in Appendix C.

4.3 Empirical results

The impulse responses that derive from the structural model are depicted in Figure 6. The associated cumulative responses are given in Table 2. We restrict ourselves to report only impulse responses of interest, *i.e.*, the impulse response of the DTD, GDP and the short-term interest rate to a 10%-of-Expenditure shock. The solid black lines show the median impulse response drawn from 3,000 Monte Carlo draws from (C.9). Additionally, we have plotted two different types of error bands: the classical pointwise 68%-percentile and the joint 68 per cent error bands as proposed by Sims and Zha (1999). While the former is the more widely known measure of estimation uncertainty surrounding the impulse responses, the latter has the advantage to take into account autocorrelation in uncertainty surrounding the impulse response function.[10] The joint error bands thus depict the region around the median impulse repsonse that has a joint posterior probability of 68 per cent.[11] This illustrates that the pointwise error bands in fact depict regions that are extremely unlikely, given that there is substantial autorcorrelation in the uncertainty surrounding the impulse responses.

The model yields fairly rich dynamics in terms of the impulse responses. For the three countries under consideration, we find that private sector solvency as measured by the distance to default contracts as the average payment period of the general government increases. While for Italy, the initially negative impact gradually approaches zero and becomes insignificant after 10 or 15 quarters depending on the type of error bands, the responses in Spain and Portugal remain significantly negative in terms of the joint error bands for the whole range considered. The cumulative response of the DTD to a shock in the AF.7-to-Expenditure ratio is sizable after just 4 quarters, e.g., for Spain the annual response is such that the median distance to default is roughly 0.8 standard deviations smaller. For aggregate growth we find almost no significant impact for the three countries.

Only in Portugal the response is significantly negative, but very small in the short run. The response of the interest rates to an increase in public payment delays is ambiguous. While for example the initial response is positive in all countries, the pattern quickly reverses for Italy and Portugal and interest rates make up for the initial increase. For Italy, this renders the cumulative response even negative over the course of a year. For the other two countries, the annual response is significantly positive and economically sizeable. Even under the pointwise error bands, the response takes roughly one year to become insignificantly different from zero.

The overall results for the subset of countries in this section suggest that public payment delays affect the economy through a liquidity channel. While in aggregate terms, growth is not immediately affected (and we would arguably not expect it to do so significantly), the resilience of

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[9] We also did a prior specification search, but the marginal likelihood criterion suggested only very little shrinkage. We believe that given the small sample size, it is appropriate to be more conservative than is suggested by the prior search.

[10] The method represents the impulse response $r_{j,k}$ of variable j to a shock in variable i at horizon k, by means of a factor model. *I.e.*, we extract the first four principal components from the covariance matrix of sampled impulse responses and then represent the individual response $r_{j,k}$ by its median plus a term determined by the principal components, capturing the correlation with future $r_{j,k}$ s. The first four components usually explain at least 90 per cent of the variation observed in the data.

[11] Frequentist approaches to provide joint error bands build on, e.g., the Bonferroni or Tukey correction of the confidence bands (see Sims and Zha, 1999).

private sector entities – here publicly listed firms – is negatively affected. Moreover, the amount of liquidity absorbed by the central government also affects interest rates in the very short term. The three-month Euribor rate reacts with a mild increase over the first few quarters.

5 Conclusion

This paper has considered the impact of the government's payment discipline on the private sector. The overall conclusion is that government decisions on the speed of effecting payments has important repercussions for the economy. Interestingly, the crucial aspect appears to be the total amount of outstanding payments and their average delay, rather than whether or not payments are arrears in a legal or accounting sense.

Our empirical results from panel data have shown that payment delays appear to reduce profits, increase the likelihood of bankruptcies and even reduce economic growth. While the exact size of the impact is hard to estimate given variable results across specifications, results are significant in most specifications. Findings using estimated arrears are qualitatively similar, but are less often significant. This could either be interpreted as meaning that whether a payment is in arrear in a formal sense is less important than the size and average delay of payments, or it could be due to our estimation. If data on actual arrears were available, this aspect could be investigated further. Finally, on average for the European Union sample, the total amount of outstanding payments does not appear to play a role, suggesting that predictable and regularly cleared payment delays are not necessarily a problem, but rather changes in their duration.

Our results from Bayesian VARs performed on available quarterly data for Spain, Italy and Portugal, show that an increase in the average payment duration leads to (i) an increase in the likelihood of private sector defaults and (ii) in some cases a transitory increase in the short-term interest rate, *i.e.*, acts like a liquidity shock.

Based on the findings in this paper it would then appear that delaying payments to deal with a funding issue or a debt limit, is a costly way of achieving these aims. On the other hand, efforts to accelerate payments and reduce existing stocks of arrears could allow a helpful way of boosting the economy and typically would not increase deficits if all spending was properly captured when it accrued.

Figure 4

Annual AF7-to-GDP Ratio for EU-27 Countries (Croatia Excluded)

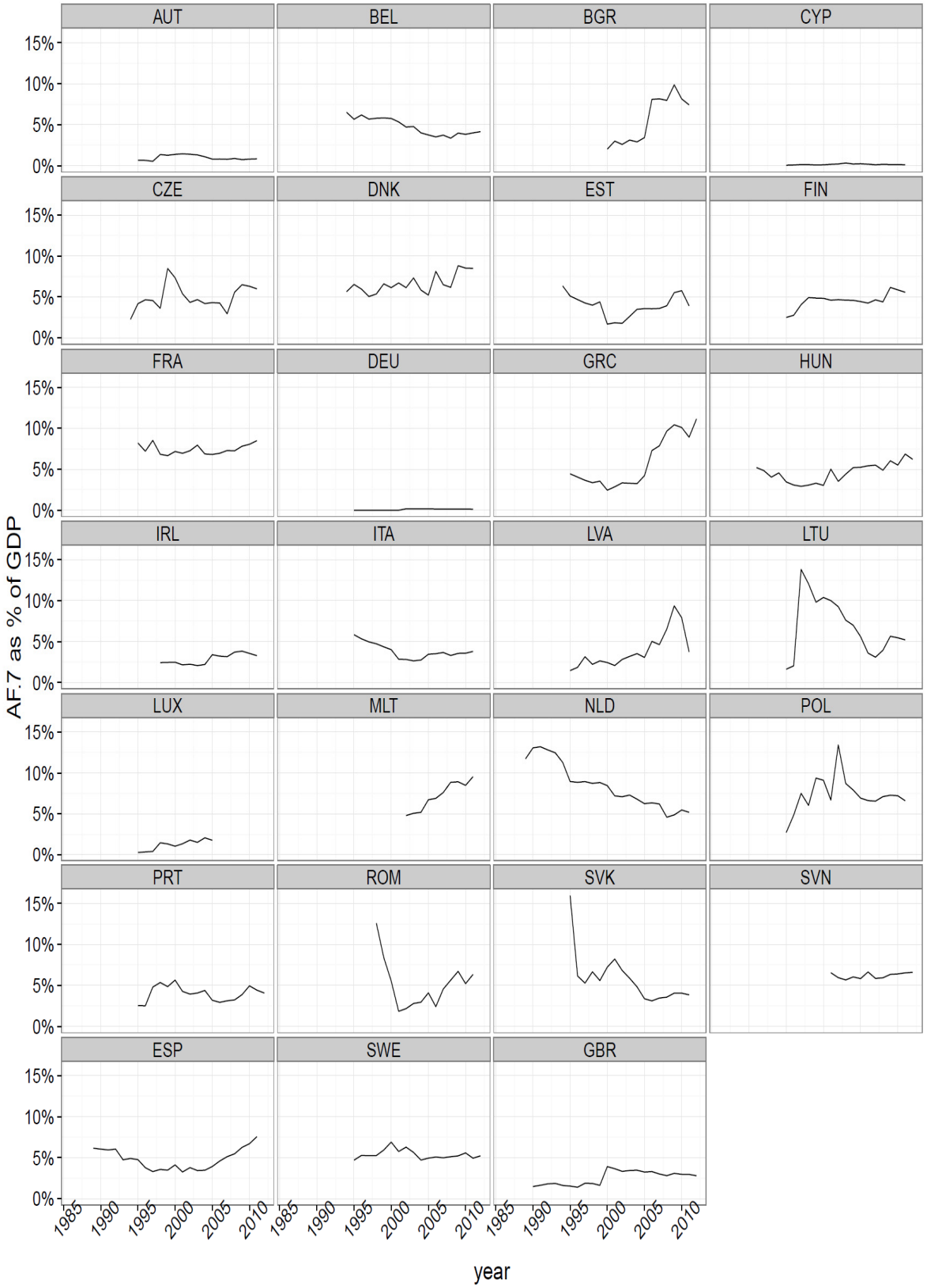
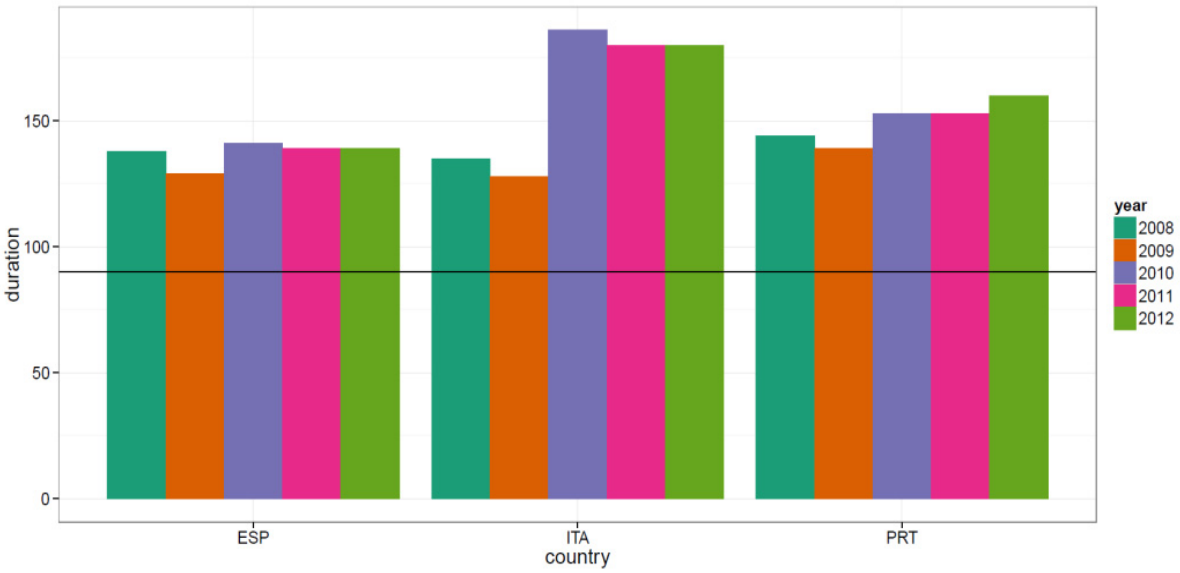


Figure 5

Average Reported Payment Duration by the Public Sector
(number of days)



Source: Intrum Justitia (EPI 2013).

Figure 6

Impulse Responses from Structural BVAR

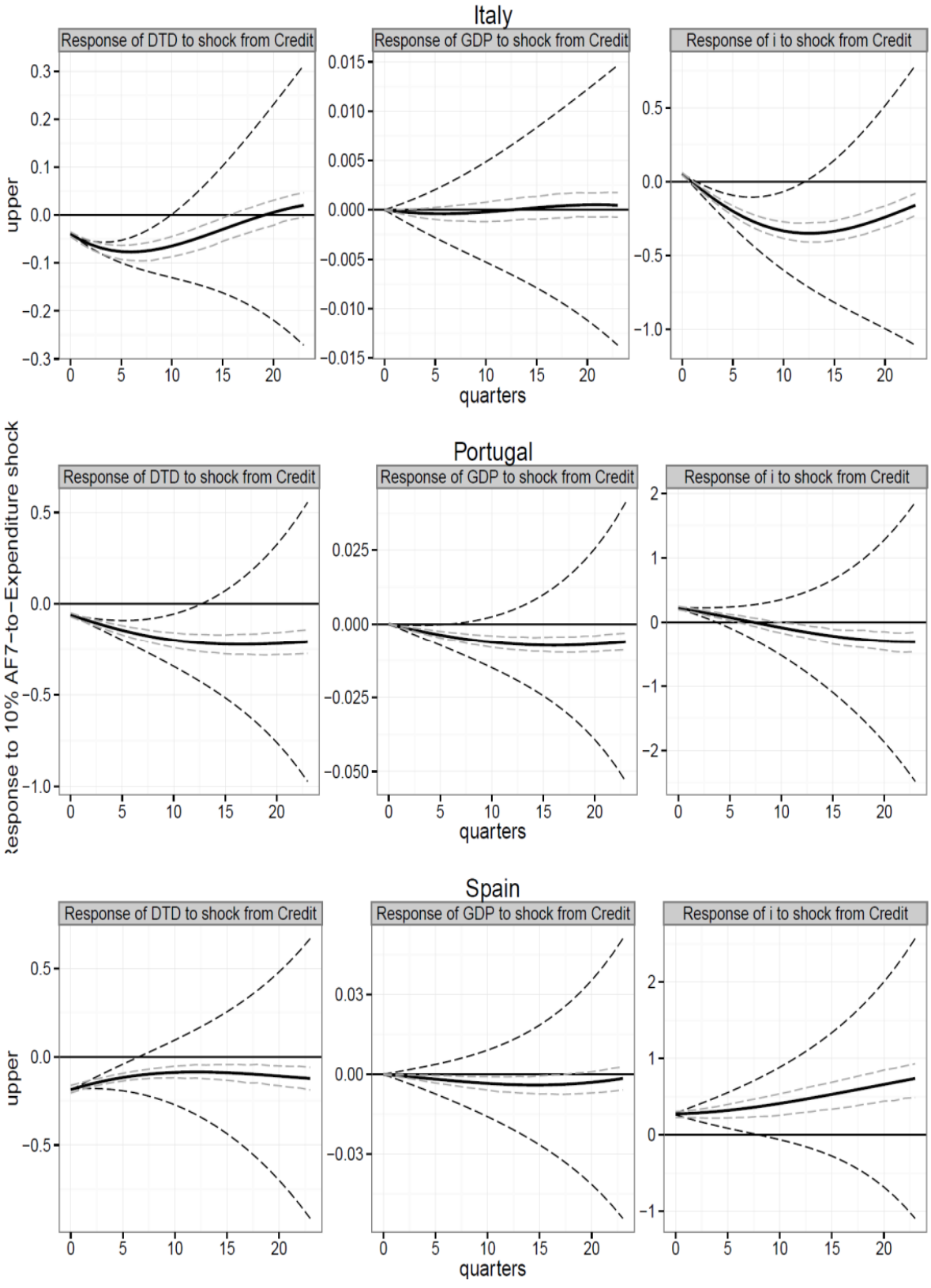


Table 1

Availability of AF.7 Quarterly Data per Country

Country	Start Date	End Date
AUT	1999Q3	2012Q4
BEL	1999Q3	2012Q4
BGR	-	-
CYP	-	-
CZE	1999Q3	2012Q4
DNK	1999Q3	2012Q4
EST	2011Q1	2012Q4
FIN	1999Q3	2012Q4
FRA	1999Q3	2012Q4
DEU	1999Q1	2012Q4
GRC	2002Q2	2012Q4
HUN	1999Q3	2012Q4
IRL	1999Q3	2012Q4
ITA	1999Q3	2012Q4
LVA	-	-
LTU	-	-
LUX	1999Q3	2012Q4
MLT	-	-
NLD	1999Q3	2012Q4
POL	1999Q3	2012Q4
PRT	1999Q3	2012Q4
ROM	2011Q2	2012Q4
SVK	2002Q3	2012Q4
SVN	2004Q2	2012Q4
ESP	1996Q3	2012Q4
SWE	1999Q3	2012Q4
GBR	1995Q2	2012Q4

Table 2

Structural Response of Variables to a 10-Percentage-point Increase in the AF.7-to-Expenditure Ratio

Country	Variable	Impulse Response				Cumulative Annual Response		
		No. of Quarters Ahead						
		1	2	4	8	Lower	Median	Upper
ITA	GDP	0.00	–0.00	–0.00	–0.00	–0.00	–0.00	0.00
	DTD	–0.04	–0.06	–0.07	–0.07	–0.35	–0.29	–0.23
	i	0.05	–0.06	–0.16	–0.30	–0.38	–0.28	–0.17
ESP	GDP	0.00	–0.00	–0.00	–0.00	–0.01	–0.00	–0.00
	DTD	–0.19	–0.15	–0.13	–0.10	–0.87	–0.78	–0.64
	i	0.27	0.29	0.31	0.37	1.21	1.44	1.73
PRT	GDP	0.00	–0.00	–0.00	–0.01	–0.01	–0.01	–0.01
	DTD	–0.06	–0.10	–0.13	–0.18	–0.56	–0.48	–0.40
	i	0.22	0.17	0.11	–0.02	0.64	0.82	0.96

Table 3

Estimation Results from Panel Regressions
(dependent variable: real GDP growth)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GDP*t*−1	0.603***	0.598***	0.469***	0.586***	0.737***	0.607***	0.627***	0.599***	0.549***	0.524***
	(0.102)	*(0.105)*	*(0.0869)*	*(0.0883)*	*(0.112)*	*(0.0927)*	*(0.117)*	*(0.0938)*	*(0.101)*	*(0.121)*
GDP*t*−2	–0.351***	–0.355***	–0.365***	–0.403***	–0.161*	–0.317**	–0.332**	–0.370***	–0.406***	–0.425**
	(0.100)	*(0.0918)*	*(0.0787)*	*(0.121)*	*(0.0847)*	*(0.129)*	*(0.139)*	*(0.114)*	*(0.109)*	*(0.153)*
AF.7 × Delay	–0.00689***	–0.00687***	–0.00476**	–0.00799***	–0.00770***	–0.00766***	–0.00654***	–0.00727**	–0.00796***	–0.00467
	(0.00148)	*(0.00148)*	*(0.00180)*	*(0.00150)*	*(0.00108)*	*(0.00198)*	*(0.00191)*	*(0.00306)*	*(0.00150)*	*(0.00370)*
Expenditure ratio		–0.00484								
		(0.0656)								
Δ Primary Balance			–0.767**							
			(0.305)							
Private credit				0.00396						
				(0.0111)						
Output gap					–0.550***					
					(0.126)					
Unemployment rate						0.104				
						(0.163)				
Labor force							–0.290			0.259
							(0.498)			*(0.319)*
Savings rate								–0.0337		0.0897
								(0.0933)		*(0.0881)*
Initial real GDP									–0.269	–0.718**
									(0.478)	*(0.326)*
Constant	0.494	0.735	1.356**	0.203	–0.863	–0.530	0.454	1.247	2.445	2.832
	(0.481)	*(2.984)*	*(0.530)*	*(1.072)*	*(0.621)*	*(1.553)*	*(0.548)*	*(2.439)*	*(3.067)*	*(2.932)*
Observations	144	144	144	141	144	144	144	144	144	144
Number of countries	24	24	24	24	24	24	24	24	24	24
No. of instruments	17	22	22	22	22	22	22	22	22	32
AR(1) p	0.00358	0.00371	0.0156	0.00428	0.00536	0.00362	0.00761	0.00282	0.00286	0.00256
AR(2) p	0.237	0.288	0.401	0.315	0.290	0.205	0.398	0.270	0.455	0.598
Hansen p	0.474	0.414	0.361	0.299	0.434	0.156	0.667	0.370	0.749	0.921

Notes: Dependent variable is always annual growth rate of real GDP. All explanatory variables lagged by one year except the change in structural primary balance and the labor force growth rate. Accounts payable, spending, private credit and savings rate are in percent of GDP. All regressions include time and country fixed effects. System GMM regressions use the second to fifth lag collapsed lag as instruments. Windmeijer-corrected standard errors in parentheses below.
*** p<0.01, ** p<0.05, * p<0.1.

Table 4

Estimation Results from Panel Regressions
(dependent variable: real GDP growth)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GDP*t*−1	0.618***	0.616***	0.469***	0.599***	0.759***	0.615***	0.639***	0.615***	0.555***	0.545***
	(0.105)	*(0.112)*	*(0.0907)*	*(0.0928)*	*(0.119)*	*(0.106)*	*(0.0988)*	*(0.0945)*	*(0.105)*	*(0.128)*
GDP*t*−2	–0.352***	–0.364***	–0.368***	–0.396***	–0.151*	–0.345**	–0.334**	–0.369***	–0.404***	–0.412**
	(0.105)	*(0.0973)*	*(0.0800)*	*(0.121)*	*(0.0849)*	*(0.142)*	*(0.139)*	*(0.115)*	*(0.112)*	*(0.148)*
Estimated arrears	–0.806*	–0.759	–0.676*	–1.071**	–0.982***	–0.828**	–0.790*	–0.906	–1.150***	–0.336
	(0.439)	*(0.448)*	*(0.329)*	*(0.450)*	*(0.245)*	*(0.339)*	*(0.442)*	*(0.762)*	*(0.322)*	*(0.657)*
Expenditure		0.0145								
		(0.0717)								
Δ Primary Balance			–0.777**							
			(0.284)							
Private credit				0.00295						
				(0.0113)						
Output gap					–0.568***					
					(0.127)					
Unemployment rate						0.0473				
						(0.102)				
Labor force							–0.300			0.250
							(0.441)			*(0.317)*
Savings rate								–0.0364		0.124
								(0.126)		*(0.0857)*
GDP									–0.149	–0.768**
									(0.466)	*(0.356)*
Constant	0.286	–0.421	1.382**	0.237	–1.064	–0.187	0.292	1.135	1.762	2.040
	(0.569)	*(3.205)*	*(0.562)*	*(1.091)*	*(0.654)*	*(1.066)*	*(0.546)*	*(3.288)*	*(2.914)*	*(2.761)*
Observations	144	144	144	141	144	144	144	144	144	144
Number of countries	24	24	24	24	24	24	24	24	24	24
No. of instruments	17	22	22	22	22	22	22	22	22	32
AR(1) p	0.00352	0.00354	0.0168	0.00417	0.00424	0.00370	0.00554	0.00260	0.00269	0.00242
AR(2) p	0.321	0.399	0.448	0.444	0.449	0.326	0.562	0.367	0.732	0.690
Hansen p	0.266	0.311	0.342	0.179	0.316	0.166	0.447	0.379	0.600	0.630

Notes: Dependent variable is always annual growth rate of real GDP. All explanatory variables lagged by one year except the change in structural primary balance and the labor force growth rate. Estimated arrears, spending, private credit and savings rate are in percent of GDP. All regressions include time and country fixed effects. System GMM regressions use the second to fifth lag collapsed lag as instruments. Windmeijer-corrected standard errors in parentheses below.
*** p<0.01, ** p<0.05, * p<0.1

Table 5

Estimation Results from Panel Regressions
(dependent variable: gross operating surplus)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Operating Surplus	0.260***	0.250**	0.233***	0.325***	0.233**	0.367***	0.259***	0.108	0.337***
	(0.0891)	*(0.0981)*	*(0.0819)*	*(0.101)*	*(0.0922)*	*(0.105)*	*(0.0916)*	*(0.121)*	*(0.111)*
AF.7 × Delay	–0.0130***	–0.0131**	–0.0136***	–0.0117**	–0.0198***	–0.0108**	–0.0132*	–0.00925**	–0.0114*
	(0.00455)	*(0.00468)*	*(0.00480)*	*(0.00425)*	*(0.00472)*	*(0.00475)*	*(0.00761)*	*(0.00420)*	*(0.00598)*
Expenditure ratio		0.133							0.149
		(0.298)							*(0.226)*
Private credit			–0.00697						0.00770
			(0.0155)						*(0.0149)*
Output gap				–0.702**					–0.576
				(0.282)					*(0.462)*
Unemployment rate					0.713**				
					(0.297)				
Labor force						–1.762**			–0.388
						(0.679)			*(0.906)*
Savings rate							–0.128		
							(0.303)		
GDP								0.353	
								(0.273)	
Constant	2.152	–4.022	3.101	0.351	–4.047	1.756	4.664	1.701	–7.694
	(1.258)	*(14.10)*	*(2.413)*	*(1.236)*	*(3.004)*	*(1.293)*	*(7.280)*	*(1.320)*	*(11.77)*
Observations	143	143	140	143	143	143	143	143	140
Number of countries	24	24	24	24	24	24	24	24	24
No. of instruments	17	22	22	22	22	22	22	22	37
AR(1) p	0.000839	0.00111	0.000648	0.00121	0.000965	0.00144	0.000811	0.00102	0.00153
AR(2) p	0.251	0.211	0.244	0.584	0.351	0.242	0.220	0.147	0.394
Hansen p	0.532	0.690	0.319	0.296	0.233	0.441	0.152	0.348	0.955

Notes: Dependent variable is always annual growth in gross operating surplus. All explanatory variables lagged by one year except the labor force growth rate. Accounts payable, spending, private credit and savings rate are in percent of GDP. All regressions include time and country fixed effects. System GMM regressions use the second to fifth lag collapsed lag as instruments. Windmeijer-corrected standard errors in parentheses below.
*** p<0.01, ** p<0.05, * p<0.1

Table 6

Estimation Results from Panel Regressions
(dependent variable: gross operating surplus)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Operating Surplus	0.252**	0.254**	0.223**	0.325***	0.224**	0.373***	0.251**	0.110	0.362***
	(0.0903)	*(0.102)*	*(0.0866)*	*(0.103)*	*(0.0952)*	*(0.104)*	*(0.0921)*	*(0.122)*	*(0.116)*
Estimated arrears	–2.590	–2.252	–2.886	–1.225	–2.855***	–1.848	–3.027	–1.186	–1.045
	(1.587)	*(1.641)*	*(1.745)*	*(1.099)*	*(1.000)*	*(1.584)*	*(2.206)*	*(1.043)*	*(1.286)*
Expenditure ratio		0.217							0.149
		(0.337)							*(0.231)*
Private credit			0.000610						0.00559
			(0.0241)						*(0.0156)*
Output gap				–0.646**					–0.447
				(0.272)					*(0.432)*
Unemployment rate					0.635***				
					(0.212)				
Labor force						–1.901***			–0.760
						(0.663)			*(0.812)*
Savings rate							–0.334		
							(0.387)		
GDP								0.355	
								(0.287)	
Constant	3.097	–7.477	3.335	–0.0144	–3.063	2.164	10.09	1.575	–7.818
	(2.066)	*(16.01)*	*(2.875)*	*(1.547)*	*(2.354)*	*(2.126)*	*(9.747)*	*(1.617)*	*(11.99)*
Observations	143	143	140	143	143	143	143	143	140
Number of countries	24	24	24	24	24	24	24	24	24
No. of instruments	17	22	22	22	22	22	22	22	37
AR(1) p	0.00103	0.00149	0.00114	0.00135	0.00148	0.00154	0.00116	0.00101	0.00171
AR(2) p	0.273	0.213	0.271	0.615	0.394	0.262	0.205	0.158	0.381
Hansen p	0.201	0.219	0.263	0.192	0.214	0.284	0.152	0.200	0.972

Notes: Dependent variable is always annual growth in gross operating surplus. All explanatory variables lagged by one year except the labor force growth rate. Accounts payable, spending, private credit and savings rate are in percent of GDP. All regressions include time and country fixed effects. System GMM regressions use the second to fifth lag collapsed lag as instruments. Windmeijer-corrected standard errors in parantheses below.
*** p<0.01, ** p<0.05, * p<0.1

Table 7

Estimation Results from Panel Regressions
(dependent variable: distance to default)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Distance to default $t-1$	0.755***		0.809***	0.880***	0.773***	0.854***	0.808***	
	(0.0935)		*(0.0948)*	*(0.0947)*	*(0.0858)*	*(0.0763)*	*(0.104)*	
AF.7 × Delay	–0.000655***	–0.00309***	–0.000578***	–0.000529***	–0.000745**	–0.000810***	–0.000735***	–0.00186*
	(0.000149)	*(0.000859)*	*(0.000192)*	*(0.000135)*	*(0.000302)*	*(0.000172)*	*(0.000246)*	*(0.00105)*
Expenditure ratio			0.0162				0.0215	0.0455**
			(0.0161)				*(0.0167)*	*(0.0222)*
Private credit				–0.000278			–8.21e–05	–0.0116*
				(0.000961)			*(0.000795)*	*(0.00606)*
Unemployment rate					0.00933		–0.00604	–0.0345
					(0.0245)		*(0.0198)*	*(0.0291)*
GDP						–0.0303*	–0.0110	–0.0412*
						(0.0162)	*(0.0147)*	*(0.0214)*
Constant	0.843***	3.063***	–0.0735	0.557**	0.725*	0.705***	–0.239	2.373*
	(0.251)	*(0.130)*	*(0.746)*	*(0.252)*	*(0.352)*	*(0.220)*	*(0.835)*	*(1.230)*
Observations	116	119	116	113	116	116	113	116
Number of countries	20		20	19	20	20	19	
No. of instruments	17	.	22	22	22	22	37	.
AR(1) p	0.0215	.	0.0155	0.0255	0.0136	0.0168	0.0169	.
AR(2) p	0.433	.	0.427	0.447	0.382	0.611	0.427	.
Hansen p	0.360	.	0.405	0.286	0.574	0.592	1.000	.

Notes: Dependent variable is always Moody's KMV Distance to Default. All explanatory variables lagged by one year except the labor force growth rate. Accounts payable, spending, private credit are in percent of GDP. All regressions include time and country fixed effects. System GMM regressions use the second to fifth lag collapsed lag as instruments. Windmeijer-corrected standard errors in parantheses below.
*** p<0.01, ** p<0.05, * p<0.1

Table 8

Estimation Results from Panel Regressions
(dependent variable: distance to default)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Distance to default $t-1$	0.767***		0.830***	0.876***	0.753***	0.877***	0.897***	
	(0.0980)		*(0.0716)*	*(0.0841)*	*(0.0777)*	*(0.0719)*	*(0.0808)*	
Estimated arrears	–0.0992***	–0.720***	–0.0642	–0.0771	–0.106**	–0.125***	–0.132***	–0.520***
	(0.0258)	*(0.135)*	*(0.0471)*	*(0.0508)*	*(0.0430)*	*(0.0308)*	*(0.0342)*	*(0.170)*
Expenditure ratio			0.0147				0.0158	0.0460**
			(0.0158)				*(0.0156)*	*(0.0217)*
Private credit				–0.000468			0.000385	–0.0116**
				(0.00138)			*(0.000723)*	*(0.00552)*
Unemployment rate					0.00603		0.00259	–0.0258
					(0.0191)		*(0.0156)*	*(0.0274)*
GDP						–0.0283*	–0.0145	–0.0278
						(0.0151)	*(0.0147)*	*(0.0222)*
Constant	0.825***	3.073***	–0.0666	0.592***	0.804**	0.664***	–0.275	2.290*
	(0.254)	*(0.133)*	*(0.774)*	*(0.203)*	*(0.313)*	*(0.218)*	*(0.808)*	*(1.192)*
Observations	116	119	116	113	116	116	113	116
Number of countries	20		20	19	20	20	19	
No. of instruments	17	.	22	22	22	22	37	.
AR(1) p	0.0215	.	0.0155	0.0255	0.0136	0.0168	0.0169	.
AR(2) p	0.433	.	0.427	0.447	0.382	0.611	0.427	.
Hansen p	0.360	.	0.405	0.286	0.574	0.592	1.000	.

Notes: Dependent variable is always Moody's KMV Distance to Default. All explanatory variables lagged by one year except the labor force growth rate. Accounts payable, spending, private credit are in percent of GDP. All regressions include time and country fixed effects. System GMM regressions use the second to fifth lag collapsed lag as instruments. Windmeijer-corrected standard errors in parantheses below.
*** p<0.01, ** p<0.05, * p<0.1

MATHEMATICAL APPENDIX

We follow Sims and Zha (1998) and Waggoner and Zha (2003) in estimating the model. Toward that end, note that the (conditional) likelihood function of the data is given as:

$$p(\mathbf{y}_1, \ldots, \mathbf{y}_T \mid \mathbf{A}) \propto |\mathbf{A}_0| \exp\left\{-\frac{1}{2}\left[\mathbf{E}'\mathbf{E}\right]\right\}$$

Conditional on $\mathbf{A}_0$ the above likelihood is quadratic in $\mathbf{F}$ and thus together with an appropriate prior $\mathbf{F} \mid \mathbf{A}_0$ is matricvariate normal. The posterior for $\mathbf{A}_0$ however turns out to be non-standard and requires further processing. The exclusion restrictions we impose on each of the columns of $\mathbf{A}_0$, may be represented by the restriction matrices Q_i of rank q_i:

$$\mathbf{Q}_i \mathbf{a}_i = \mathbf{0} \ . \tag{8}$$

Elements of $\mathbf{F}$ may be restricted in a similar way via a matrix $\mathbf{R}_i$ that has rank r_i. As has been demonstrated by Waggoner and Zha (2003), $\mathbf{a}_i$ anf $\mathbf{f}_i$ will satisfy the above restrictions, if there exists a $n \times q_i$ matrix $\mathbf{U}_i$ and $n \times r_i$ matrix $\mathbf{V}_i$, such that:

$$\mathbf{a}_i = \mathbf{U}_i \mathbf{b}_i \tag{9}$$

$$\mathbf{f}_i = \mathbf{V}_i \mathbf{g}_i \ . \tag{10}$$

The matrix $\mathbf{U}_i$ may be found via a singular value decomposition, that takes $\mathbf{U}_i$ to be the matrix of right-singular vectors that lie in the Null space of diag($\mathbf{a}_i$). The set of parameters given by $\mathbf{b}_i$ and denotes $\mathbf{g}_i$ is the set of parameters that is free to estimate.

Our prior on ($\mathbf{a}_i$, $\mathbf{f}_i$) is of the form:

$$p(\mathbf{A}_0) p(\mathbf{F} \mid \mathbf{A}_0) \ . \tag{11}$$

where:

$$\mathbf{a}_i \sim N(\mathbf{0}, \underline{\mathbf{S}}_i) \ ; \ \underline{\mathbf{S}}_i = \operatorname{diag}\left(\frac{\lambda_0^2}{\sigma_i^2}\right) \ , \tag{12}$$

$$\mathbf{f}_i \mid \mathbf{a}_i \sim N(\underline{\mathbf{P}}_i \mathbf{a}_i, \underline{\mathbf{H}}_i) \ ; \ \underline{\mathbf{P}}_i = \left[\mathbf{I}_n, \mathbf{0}_{n(p-1)+1 \times n}\right] \ ; \ \underline{\mathbf{H}}_i = \begin{bmatrix} \left(\frac{\lambda_0 \lambda_1}{l^{\lambda_3} \sigma_i}\right)^2 \mathbf{I}_k & \mathbf{0}_{k-1} \\ \mathbf{0}_{1 \times k-1} & \lambda_0^2 \lambda_4^2 \end{bmatrix} \tag{13}$$

This prior on ($\mathbf{a}_i$, $\mathbf{f}_i$) is then mapped to a prior on ($\mathbf{b}_i$, $\mathbf{g}_i$) (we refer the reader to Waggoner and Zha, 2003 for any details):

$$\mathbf{b}_i \sim N(\mathbf{0}, \tilde{\mathbf{S}}_i) \ ; \ \tilde{\mathbf{S}}_i = (\mathbf{U}_i' \underline{\mathbf{S}}_i \mathbf{U}_i)^{-1} \tag{14}$$

$$\mathbf{g}_i \mid \mathbf{b}_i \sim N(\tilde{\mathbf{P}}_i \mathbf{b}_i, \tilde{\mathbf{H}}_i) \ ; \ \tilde{\mathbf{P}}_i = \underline{\mathbf{P}}_i \mathbf{U}_i \ ; \ \tilde{\mathbf{H}}_i = \underline{\mathbf{H}}_i \ . \tag{15}$$

Combining this prior with the likelihood, the posterior is found to be:

$$p(\mathbf{b}_i, \mathbf{g}_i \mid \mathbf{Y}) = p(\mathbf{b}_1, \ldots, \mathbf{b}_n \mid \mathbf{Y}) \prod_{i=1}^{n} p(\mathbf{g}_i \mid \mathbf{b}_i, \mathbf{Y}) \tag{16}$$

where:

$$p(\mathbf{g}_i \mid \mathbf{b}_i, \mathbf{Y}) = N(\overline{\mathbf{P}}_i \mathbf{b}_i, \overline{\mathbf{H}}_i) \; ; \; \overline{\mathbf{P}}_i = \mathbf{H}_i \left(\mathbf{V}_i' \mathbf{X}' \mathbf{Y} \mathbf{U}_i + \tilde{\mathbf{H}}_i^{-1} \tilde{\mathbf{P}}_i \right) \tag{17}$$

$$\overline{\mathbf{H}}_i = \left(\mathbf{V}_i' \mathbf{X}' \mathbf{X} \mathbf{V}_i + \tilde{\mathbf{H}}_i^{-1} \right)^{-1} \tag{18}$$

and:

$$p(\mathbf{b}_1, \ldots, \mathbf{b}_n \mid \mathbf{Y}) = |[\mathbf{U}_1 \mathbf{b}_1, \ldots, \mathbf{U}_n \mathbf{b}_n]|' \exp \left\{ -\frac{T}{2} \sum_{i=1}^{n} \mathbf{b}_i' \mathbf{S}_i \mathbf{b}_i \right\} \tag{19}$$

with:

$$\mathbf{S}_i = \left(\frac{1}{T} \left[\mathbf{U}_i' \mathbf{Y}' \mathbf{Y} \mathbf{U}_i + \tilde{\mathbf{S}}_i + \tilde{\mathbf{P}}_i' \tilde{\mathbf{H}}_i^{-1} \tilde{\mathbf{P}}_i - \mathbf{P}_i' \mathbf{H}_i^{-1} \mathbf{P}_i \right] \right)^{-1} . \tag{20}$$

In order to estimate the model, we use the Waggoner-Zha Gibbs sampler, because there is no straightforward way to sample from equation (16). Especially the fact that $\mathbf{b}_i$ appears in the determinant of equation (19) makes the posterior of $\mathbf{b}_i$ non-normal. Waggoner and Zha (2003) show that, alternatively, one may sample from:

$$p(\boldsymbol{\beta}_1, \ldots, \boldsymbol{\beta}_{q_i} \mid \mathbf{b}_{-i}, \mathbf{Y}) \propto |\boldsymbol{\beta}_1|' \exp \left\{ -\frac{T}{2} \sum_{i=1}^{q_i} \boldsymbol{\beta}_i^2 \right\} \tag{21}$$

where:

$$\mathbf{b}_i = \mathbf{T}_i \sum_{i=1}^{q_i} \boldsymbol{\beta}_i \mathbf{w}_i \tag{22}$$

denotes the set of $\mathbf{b}_j$ such that $j \neq i$,

$$\mathbf{T}_i \mathbf{T}_i' = \mathbf{S}_i \tag{23}$$

and $w_1, \ldots, w_{q_i}$ form an orthogonal basis of $\mathbb{R}^{q_i}$.[12]

Thus, we use orthogonalization approach of Waggoner and Zha (2003) to devise the following Gibbs sampler:

1. Choose a starting value $\mathbf{A}_0^{(0)}$ satisfying equation (8).[13]

2. Draw $\mathbf{A}_0^{(s)}$ conditional on $(\mathbf{F}^{(s-1)}, \mathbf{Y})$: for $i = 1, \ldots, n$ draw $\beta_1, \ldots, \beta_{q_i}$ from equation (21) conditional on $\mathrm{b}_1^{(s)}, \ldots, \mathrm{b}_{i-1,}^{(s)}, \mathrm{b}_{i+1,}^{(s-1)}, \mathrm{b}_{n,}^{(s)}$, and let $\mathrm{b}_i^{(s)}$ be defined by equation (22) and take $\mathbf{a}_i = \mathbf{U} \; \mathbf{b}_i^{(s)}$.

3. Draw $\mathbf{F}^{(s)}$ conditional on $(\mathbf{A}_0^{(s)}, \mathbf{Y})$ from equation (17).

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[12] E.g., use the Gram-Schmidt method to find them.

[13] We take the posterior mode of the marginal posterior of $\mathbf{A}_0$ which we find by numerical maximization (Nelder-Mead then BFGS).

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COMMENT TO "GOVERNMENT'S PAYMENT DISCIPLINE: THE MACROECONOMIC IMPACT OF PUBLIC PAYMENT DELAYS AND ARREARS" BY CRISTINA CHECHERITA-WESTPHAL, ALEXANDER KLEMM AND PAUL VIEFERS

Pedro Hinojo[*]

1 Introduction

The paper by Checherita-Westphal, Klemm and Viefers (2014) on "Government's Payment Discipline: The Macroeconomic Impact of Public Payment Delays and Arrears" is, beyond doubt, a thorough, original and timely piece of research.

It is a thorough paper because it uses a well-grounded macroeconometric approach in order to estimate the impact of government's payment delays and arrears, resorting to two robust techniques. Firstly, the authors take advantage of a panel data estimation to quantify the effect of these delays and arrears on several economic aggregates. Secondly, they carry out a Bayesian Vector Autorregressive (BVAR) model for a selected group of individual countries.

At the same time, it is an original piece of research because it sails into uncharted waters. The literature about this topic is scarce, if not non-existent. One proof of that is the reduced list of references included in the paper's bibliography.

And, while original, the paper is also totally timely because some countries' governments (notably Italy, Greece and Spain) have accumulated a significant amount of arrears in their commercial debt. Given that these countries have taken measures to tackle this issue, it is important to reach some reliable estimates about the economic impact of both the problem and its solution.

Notwithstanding that, we still have some comments and suggestions to the authors. Our comments are going to focus on how the proxy for fiscal arrears is calculated and on some caveats and shortcomings of the macroeconometric exercise. Our suggestions are directed at overhauling the paper in order to convert it into a full-blown document with some economic theory and policy implications. Therefore, we have three types of suggestions to the authors: cross-checking their macroeconometric findings with DSGE (Dynamic Stochastic General Equilibrium) models, exploring the theoretical dimension of this phenomenon of government arrears and drawing specific policy implications from their research.

We hope that the authors find our comments and suggestions constructive.

2 Comments on the macroeconometric estimation

Starting with the comments on the macroeconometric estimation, the first issue is how the authors calculate the measure of government arrears, according to this equation:

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Errors and omissions are Pedro Hinojo's sole responsibility. These comments have been elaborated for research purposes and reflect personal views, not necessarily those of our institution.

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$$\text{Arrears} = \underbrace{\text{AF.7}}_{\substack{\text{Other}\\ \text{accounts}\\ \text{payable}}} \times \underbrace{(1 - \text{F}(\text{T}'))}_{\substack{\text{Probability of}\\ \text{exceeding the}\\ \text{legal payment}\\ \text{period (T}')}}$$

The strategy seems quite rational. The first factor tries to capture the total stock of government commercial debt with the item AF.7 in the financial accounts, labelled as 'other accounts payable'. The second one is needed to include only that portion of commercial debt which has actually fallen into arrears.

As far as the first factor is concerned, and according to the Handbook on Financial Accounts (ECB, 2012), the variable AF.7 "other accounts payable" includes two subaccounts:

- Trade credits and advances (AF.71): arising from the extension of credit by suppliers or buyers, including advance payment.
- Other accounts payable, excluding trade credits and advances (AF.79): arising from other timing differences between transactions and the corresponding payment, including those arising from the recording of income as it accrues (related to distribution operations: taxes, social contributions, wages, rents, dividend, interest...).

In strict terms, perhaps only the subaccount AF.71 should be included to track adequately government commercial debt, as AF.79 will be mostly biased by pending tax settlements, where government has sizeable liabilities but also assets. In order to see this issue's impact, Figure 1 plots government liabilities under the account AF.7 and its two subaccounts, on a non-consolidated basis, *i.e.*, including debt within the different layers of the public administration.

The subaccount AF.79 actually takes the lion share of AF.7 government liabilities. Nonetheless, spotting only AF.71 does not seem optimal either, as it is small for some countries well-known by the accrual of a big amount of commercial debt delays and arrears.[1] Chief among them is Spain[2], where using AF.71 as a proxy for commercial debt would indicate a meagre 0.9 per cent of GDP, well below the amount that has benefited from the central government plans to settle local and regional entities' debt against their suppliers (around 4-6 per cent of GDP).

Figure 1 evidences how the account AF.7 is subject to some statistical shortcomings. Indeed, to some extent because of these limitations, the European Commission decided not to include 'other accounts payable' to compute the private debt and credit indicators within the Macroeconomic Imbalances Procedure (European Commission DGECFIN, 2012).

Hence, in order to circumvent those shortcomings, taking AF.7 as a whole, instead of AF.71 exclusively, may be an adequate second best. Nonetheless, it would be advisable to factor in this series on a consolidated basis, *i.e.*, filtering out debt within the public sector. In the paper, the authors do not make clear whether they are taking consolidated data. Consolidated data are precisely depicted in Figure 2.

Figure 2 shows how consolidated data barely change for the AF.71 subaccount but do change substantially for some countries in the AF.79 subaccount (mainly Spain, France and Slovenia). This is logical, given that if AF.71 is bound to reflect commercial credit, the different layers of public administration do not hold among themselves this type of debt. But as AF.79 may be affected by pending tax settlements, the different levels of government would be expected to have some debt within this category among them.

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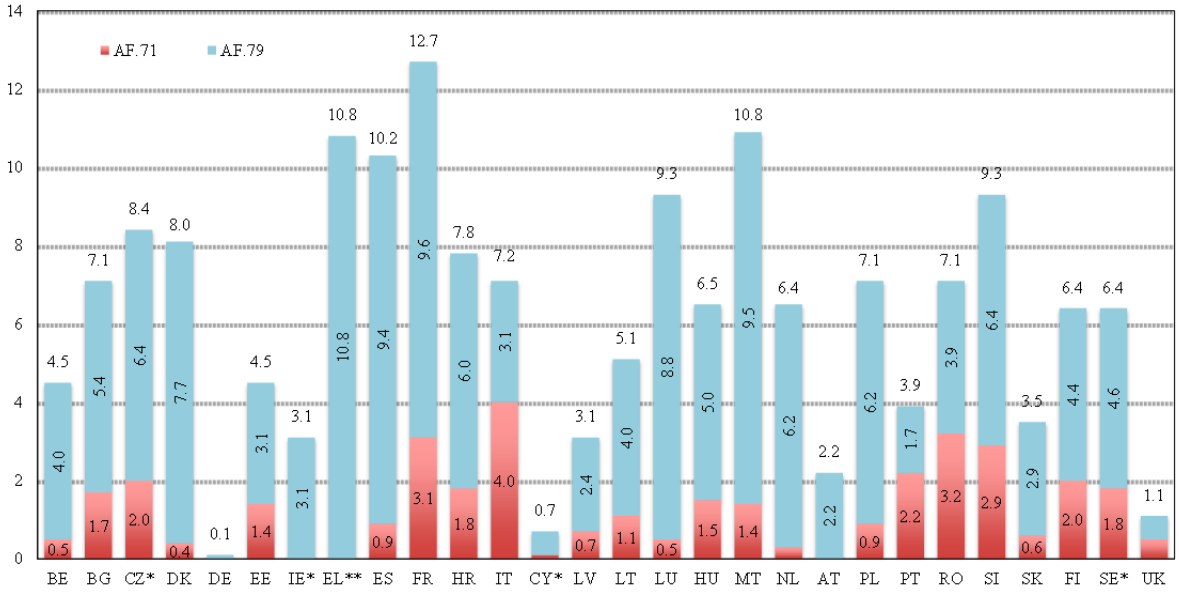
[1] Actually, Greece does not have a disaggreggated AF.71 account.

[2] This underestimation of commercial debt through the item AF.71 may be due to mismeasurement and poor accounting at a regional and local level.

Figure 1

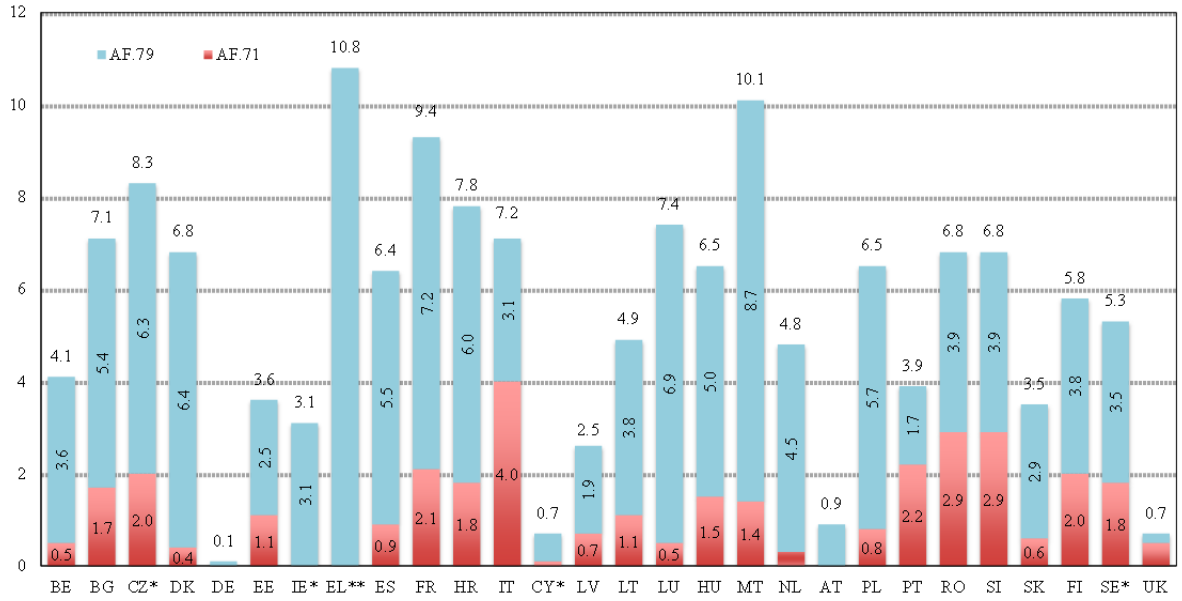
Government AF.7 Liabilities
(non-consolidated, percent of GDP, 2012 Q4)



* Incomplete coverage, ** No coverage for AF.71.
Source: Eurostat.

Figure 2

Government AF.7 Liabilities
(consolidated, percent of GDP, 2012 Q4)



* Incomplete coverage, ** No coverage for AF.71
Source: Eurostat.

Therefore, as a possible compromise between imperfect alternatives, the authors could stick to its initial strategy of taking AF.7 (instead of AF.71, which in principle would be more precise) but on a consolidated basis.

As for the second factor included in the previous equation, the authors assume the following distribution function for the payment period.

$$F(t) = 1 - e^{-\lambda t}$$

$$\text{where } \lambda = \frac{1}{T^*}$$

T^* is the average period of payment so every country will have, obviously, a different distribution function. In order to see how thorough is the assumption of that specific function, we have used some actual data available for an ad-hoc estimation for the Central Government of Spain (Gobierno de España, 2013). The average period of payment for the Spanish Central Government was 61 days[3] at 2012Q4, allowing the calculation of the parameter that shapes the distribution function.

$$T^* = 61 \rightarrow \lambda = 0.0167$$

This yields a distribution function like the one depicted in Figure 3. At the same time, according to official estimates (Gobierno de España, 2013), at 2012Q4 commercial debt exceeding the legal period of payment (at that time, 60 days) was €554 million, a 20 per cent of total commercial debt owed by the Central Government (€2,733 million).[4] In short, 80 per cent of total central government debt was paid under 60 days, while the estimated distribution function would suggest a 65 per cent.

Hence, actual data (the red point in Figure 3) are tracked relatively well by the estimation (the blue line in Figure 3). There are slight differences because it is widely known that once the legal threshold is exceeded, actual payment periods tend to be even longer (Checherita-Westphal, Klemm and Viefers, 2014, and Gobierno de España, 2013). As a consequence, this distribution may paint a relatively good picture for countries prone to delays while penalising relatively diligent governments, but overall it seems an adequate assumption.

Once the estimated measure of government arrears has been constructed, it is time to check how it performs within the macroeconometric estimation, which has two dimensions: the panel technique and the BVAR.

The panel data estimation is quite robust, and the authors appropriately bear in mind the potential for endogeneity and reverse causation. The different regressions yield economically and statistically significant results. The fact that government falls into substantial arrears implies smaller GDP growth, higher likelihood of private bankruptcies and lower firm profitability. On this last issue, maybe alternative measures of profitability (e.g., return on assets or return on equity) might have been considered instead of the gross operating surplus, as the latter is swayed by many factors different from firms' profitability.

In order to draw even more relevant conclusions, the impact on other variables could be tested. One of these variables could be the mark-up, as government arrears impact asimetrically on big firms and small and medium size enterprises. The former can bear more easily the management and financial cost of arrears, resulting potentially in impaired competition and ample mark-ups.

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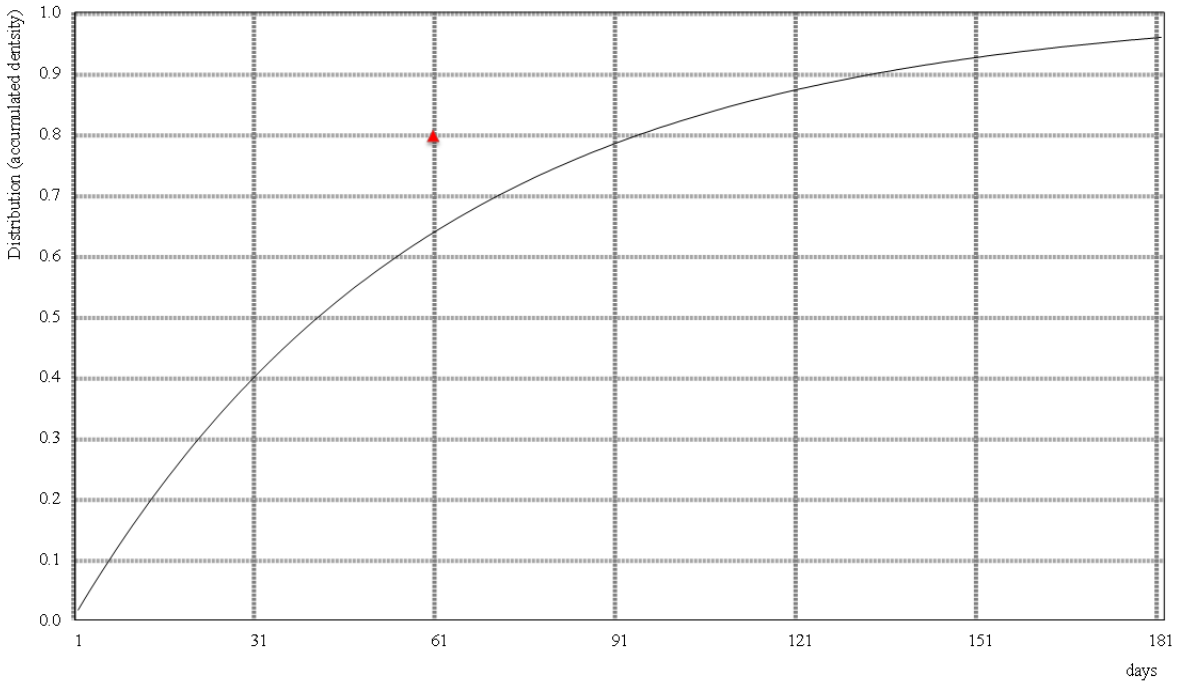
[3] These periods are much longer for local and regional governments.

[4] AF.71 at 2012 Q4 was used to compute total comercial debt because the mismeasurement of comercial debt through AF.71 seems to be the case only for regional and local governments but not for the central. In AF.71 there are no differences between consolidated and non-consolidated data, as Figures 1 & 2 point out.

Figure 3

Distribution Function of the Payment Period
(actual, red point, and estimated, blue line)



Source: Eurostat.

Another interesting variable could be total factor productivity (TFP). If firms have to devote financial and human resources to deal with government arrears, they will be bound to be less productive, with an impact on the whole economy's TFP.

Another macroeconomic measure to track would be the risk premium. Even if commercial and sovereign debt follow different paths, a government incurring delays will likely face a higher risk premium due to the bad signal sent to the markets. Actually, governments prone to delays should face higher costs, not only when issuing debt but also when being provided goods and services. Ideally, if data at a microeconomic level were to be available, it would be interesting to check whether public procurement costs[5] for the same category of goods and services do change between and within countries depending on the amount of arrears.

And, finally, the authors should consider introducing private delays and arrears in their research. Given the commendable effort made in processing data from Intrum Justitia (on payment periods) and from the financial accounts (on trade credit), it could be straightforward to construct a measure for private delays similar to the one for the government. The objective of this proposal is twofold.

On the one hand, it is interesting to see how government payment practices influence private ones. Higher government payment periods will lead to arrears within the private sector through an evident direct channel, as government suppliers will tend to pay their suppliers with delays as well.

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[5] These costs would have to be adjusted by purchasing power parity (PPP) and reflect a similar type of contract.

In addition, there is an indirect and subtle channel linked to the exemplifying effect, the mistrust and the higher transaction costs triggered by a climate of uncertainty.

On the other hand, macroeconomic effects of private arrears should be appraised too. The authors suggest in the introduction that private delays within the private sector do not impact overall liquidity, as they act as a transfer of resources between individual agents. However, that transfer of resources does generate macroeconomic effects if those resources feed the financial sector, given that liquidity could be still limited if it does not flow back to the real sector. This could harm GDP (and its components) and TFP if the financial sector keeps that liquidity for unproductive uses.

Furthermore, while big firms are capable of imposing longer payment periods, SMEs are more credit-rationed and are more affected by delays, so liquidity constraints are still binding and may weigh on private consumption and investment. Given this asymmetric impact on SMEs and big corporations, private delays would again reinforce the position of the latter (capable of imposing longer payments periods), keeping mark-ups and harming GDP growth and employment creation.

As for the BVAR for individual countries, its results are not so conclusive. This is troublesome, as the panel data estimation must be interpreted with caution given the cross-country statistical issues mentioned above. The impact of arrears on growth, while negative for Spain and Portugal, is not clear for Italy. As for the interest rate, proxied by the Euribor, the results are quite different for each country. The most conclusive results are obtained for liquidity, which falls in the three countries owing to government arrears.

The authors could try to include the same variables in the BVAR than in the panel data, in order to be coherent. Profitability, for instance, is not alluded to in these BVAR models. As for interest rates, perhaps the lack of clear results could be fixed by taking a purely domestic interest rate (like the risk premium) in the Euribor's stead.

Once we have dealt with caveats and limitations of the macroeconometric estimation, we suggest some proposals, which could be useful to hone the paper.

3 Suggestions to improve the paper

We have three types of suggestions to the authors: cross-checking their macroeconometric findings with DSGE models, exploring the theoretical dimension of government arrears and proposing specific policy implications.

The first set of suggestions considers checking the results obtained in the macroeconometric estimation also with a DSGE model. This serves not only as a robustness test for the quantitative impact but also as a general reflection on the theoretical and qualitative effects, including the above-mentioned theoretical channels, like the influence on mark-ups or the TFP.

The following macroeconomic channels could be considered within a DSGE framework in order to assess the impact of government delays and arrears on economic performance:

- Government arrears imply lower profitability of private firms and, as a consequence, subdued investment and GDP growth.
- Government arrears generate liquidity constraints to private firms and especially to SMEs, weighing on investment, consumption and GDP.
- Government arrears provoke a higher likelihood of bankruptcy for private firms, again especially for SMEs. Big corporations can cope with this problem more easily and could gain

market power, increasing their mark-ups and hindering GDP growth and employment while increasing inflation.

- Government arrears make private firms incur extra outlays, like financial, management or transaction costs. This drain of resources drags down to total factor productivity and long-term growth.

Hence, as we also said in the previous section, the macroeconometric estimation could be broadened to factor in (at least some of) the above-mentioned variables which were not previously included: private consumption and investment, mark-ups, inflation or TFP. Even if small, the impact ought to be statistically significant, given the robust results obtained in the panel data.

Should we have the effect on some of these variables, shocks could be introduced in a DSGE in order to compare the (qualitative and quantitative) empirical results with a theoretical and micro-founded framework. For instance, stepping at the macroeconometric impact of government arrears on mark-ups or TFP, we could introduce in a DSGE shocks to these more exogenous variables to obtain the response of more endogenous variables like GDP (and its components) or inflation, comparing the DSGE results with the econometric exercise.

Ideally, the DSGE used as a benchmark ought to include financial market imperfections, such as liquidity-constrained (*hand-to-mouth*) consumers and limited pledgability introducing the need of lending against a collateral. These tools allow the play of the financial accelerator mechanism and capture the government arrears' harmful effect on liquidity.

The DSGE would confirm the negative effects that government arrears exert on macroeconomic aggregates, in sync with the authors' findings in the econometric exercise. Hence, the government is shooting in its own economy feet, which does not seem very rationale.

That is why our following and second suggestion to the authors is for them to explore further the theoretical dimension of this phenomenon, in order to seek microfoundations for this type of government action.

The first alternative within this excursion into the theoretical dimension could be considering whether the public sector is falling into 'strategic default' with its commercial debt, following a careful cost-benefit analysis. This phenomenon has been deeply studied with regard to sovereign debt (Borenzstein and Panizza, 2009), where default implies painful costs, like reduced and costly future borrowing, damaged reputation and the threat of international sanctions. But the government could still default in its sovereign debt if the benefits of that decision outweigh the costs. The main benefit would be indeed avoiding a painful fiscal adjustment.

As far as commercial debt is concerned, 'strategic default' should be understood as voluntarily falling into delays and arrears, which is different from pure default. The first benefit of such a strategy would be to obtain an apparently cheap financing by delaying due payments and thus avoiding issuing debt, collecting taxes or cutting other expenditure. However, there might be a penalizing increased interest rate for late payments, so the government could end up incurring higher costs.

Another potential benefit may be reporting lower deficit figures. The government would be fooling itself, as sooner or later these figures should flourish. This could be a one-off strategy for a fiscal year where a given target should be achieved, and not even so if we bear in mind that fiscal statistics are measured on an accrual basis rather than on a cash basis.

While the 'strategic' government's behavior has very limited advantages, it is actually saddled with drawbacks. Chief among them would be the higher cost of future provisions of goods and services to the public sector, as a rational response of private suppliers in a dynamic and intertemporal framework. This would be analogous to the reduced and costly borrowing in the previous case with sovereign strategic default. And there are more analogies with the sovereign

default, as reputation would be damaged as well and the risk premium could increase as a consequence.

Therefore, the puzzle is still unresolved. Falling into arrears' costs seem to exceed benefits for the government, so the public sector is at the same time fooling itself and shooting in its own feet. When we have to explain the conduct of mean and not very smart governments, our last option to square the theoretical dimension of this phenomenon is the recourse to political economy issues.

The most straightforward explanation would be a simple problem of political cycle. As we have said before, the benefits of strategically delaying commercial payments are tangible in the short run (cheap financing and cooking the fiscal books), while costs are postponed to the medium term (increased costs of goods and services, scarce commercial and sovereign borrowing and impaired reputation). Kicking the can down the road does not seem optimal (neither for the public sector nor for citizens), but it is a rational decision for government members standing for election in the short run.

There might be more complex explanations for government delays and arrears. Given the set of countries laden with this trouble, the role of trust and other intangible variables, which grease the wheels of market economies, should be further explored (Bützer, Jordan and Stracca, 2013). Furthermore, and again taking into account the group of nations affected, one should wonder whether there is a problem with the 'capitalist ethics' of certain societies.

To conclude, after exploring the theoretical dimension, our third and last suggestion to the authors in order to improve the paper is to draw policy implications for their thorough and timely research.

The first takeaway is obviously that government delays and arrears are harmful for economic activity, so the public sector should keep its own house in order so as to improve economic performance. The authors have well documented these macroeconomic effects with their econometric estimation.

But there could be more policy implications, like, for instance, the debate on whether to include commercial debt into the general definition of public debt, as market would exert more discipline. However, this would not be advisable at this moment given the statistical issues that make difficult an adequate cross-country comparison. Hence, the final policy implication is that those statistical issues should be addressed in order to see what the financial accounts AF.7, and its subaccounts AF.71 and AF.79, really include. This is important for measuring both public sector and private sector debts (European Commission DGECFIN, 2012).

Another interesting policy debate is oriented to the reduction of government payment periods. Hitherto, imposing shorter periods by law has not been effective, as some governments are blatantly circumventing these rules. Therefore, the introduction of other incentives should be regarded.

One 'soft' incentive could be the publication of average periods of payment, which could generate *beauty contest* effects as governments with the lowest periods of payment would attract the best suppliers while those prone to delays would be charged higher prices for lower quality goods and services. In countries with several layers of government, this could be a useful measure to foster competition among different government, both horizontally (among governments of the same level, for instance, municipalities) and vertically (across different levels, e.g., municipalities and regions). Spain is one of these decentralized countries and the last Law to limit commercial debt sets the publication of payment periods as a way to introduce market discipline (Boletín Oficial del Estado, 2013).

But there are also "strong incentives" on the cards to discipline governments which tend to delay payments. These sticks and carrots could apply to governments, reducing access to federal

funding (effective for subnational levels) or forcing them to adopt specific tax or expenditure measures, or to individual politicians, making them subject to fines or administrative sanctions.

Once we have dealt with drawn some comments and suggestions, we wrap them up in some conclusions.

4 Conclusions

Checherita-Westphal, Klemm and Viefers (2014) have provided a thorough, original and timely piece of research. In order to improve the paper, we have proposed them to address some issues in the macroeconometric estimation and to increase the scope of the paper by introducing theoretical and policy debates.

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SIGNALS FROM THE GOVERNMENT: POLICY UNCERTAINTY AND THE TRANSMISSION OF FISCAL SHOCKS

Giovanni Ricco,[*] *Giovanni Callegari*[**] *and Jacopo Cimadomo*[***]

In this paper, we investigate the influence of fiscal policy uncertainty in the propagation of government spending shocks in the US economy. We propose a new index to measure fiscal policy uncertainty which relies on the dispersion of government spending forecasts as presented in the Survey of Professional Forecasters (SPF). This new index is solely focused on the uncertainty surrounding federal spending and is immune from the influence of general macroeconomic uncertainty by as much as is possible. Our results indicate that, in times of elevated fiscal policy uncertainty, the output response to policy announcements about future government spending growth is muted. Instead, periods of low policy uncertainty are characterised by a positive and persistent output response to fiscal announcements. Our analysis also shows that the stronger effects of fiscal policy in less uncertain times is mainly the result of agents' tendency to increase investment decisions in these periods, in line with the prediction of the option value theory in Bernanke (1983).

1 Introduction

Policy communication in the public sector is a delicate task. When communicating their intentions, fiscal policy makers face political, institutional and regulatory constraints that significantly complicate their job. Moreover, fiscal policy ramifies into a multiplicity of instruments, which makes particularly difficult for the policy-makers to send unambiguous signals to the rest of the economy.

In such a complex environment, the decision-making process can easily generate an elevated degree of uncertainty among economic agents, with respect to both the main policy objectives and the specific measures that fiscal authorities intend to adopt to achieve them. Moreover, governments can engage in strategic uncertainty whenever their policy and political objectives are in conflict, and they are unwilling to commit to a specific course of action. In this context, signals about future fiscal policies can have different economic consequences depending on the level of signal precision and on the credibility of policymakers.[1]

Until the recent financial crisis, signalling and fiscal policy uncertainty were of limited relevance in policy discussions. Since the onset of the financial crisis in 2008, however, policy

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We would like to thank Carlo Altavilla, Gianni Amisano, Antonello d'Agostino, Fabio Canova, Enrico D'Elia, Michele Lenza, Thomas Warmedinger, Tao Zha and the participants at an ECB seminar and at the Banca d'Italia 2014 Fiscal Workshop for useful comments and discussions. We are also grateful to Nicholas Bloom for providing us with the fiscal subcomponent of the Policy Uncertainty index in Baker *et al.* (2012). Giovanni Ricco gratefully acknowledges the Fiscal Policies Division of the ECB for its hospitality.

The opinions expressed herein are those of the authors and do not necessarily reflect those of the the European Central Bank and the Eurosystem.

[1] The analysis of the relationship between signaling and uncertainty begins with Spence (1973). More recently, central banks have recognised the importance of the active managing of expectations on monetary policy in reducing uncertainty, and enhancing policy effectiveness (see, for example, the literature on forward guidance, e.g., Eggertsson and Woodford, 2003; Campbell *et al.*, 2012; Werning, 2011; Del Negro *et al.*, 2012). As noted also in Baeriswyl and Cornand (2010) and Bachmann and Sims (2012), for respectively monetary and fiscal interventions, policy signalling may change private sector views about future fundamentals or policies, providing more leeway to policy makers.

makers have faced a new and challenging economic context. This has re-launched fiscal policy as a stabilisation tool and, contemporaneously, highlighted the importance of policy communication for an effective transmission of the policy impulses.

The turbulent political environment has also contributed to increase policy uncertainty during the crisis. Notably, in the US, the emergence of a strong anti-governmental opposition within the Congress, the expiration of specific policy provisions, and a frequently revised debt limit have created an environment for protracted political conflicts that culminated with the "Fiscal Cliff" debate in 2012 (see, e.g., Ilzetzki and Pinder, 2012) and the Federal Shutdown in 2013. In Europe, the sovereign debt crisis and the subsequent strengthening of the consolidation plans were not always accompanied by a detailed definition of the required fiscal measures. Moreover, the enhanced role of the European Commission in the supervision of member states' budgetary policies introduced a new layer to the decision process that sometimes resulted in conflicting policy signals.

Despite the increased importance of fiscal policy communication in times of crisis, the literature on the role of fiscal policy uncertainty is still limited.[2] However, since the work of Baker *et al.* (2012), which proposed a new index of economic policy uncertainty for the US, the economic literature examining the empirical effects of policy uncertainty has rapidly expanded.[3]

In this paper, we make two main contributions to the existing literature. First, we construct a new index of fiscal policy uncertainty. This index is based on the dispersion of government spending forecasts as reported in the Survey of Professional Forecasters (SPF). The idea underpinning our policy index is that a precise signal on the outlook of federal spending can coalesce private sector expectations on the future realizations of this variable, hence reducing uncertainty and disagreement among forecasters. Symmetrically, higher than average disagreement about future government spending reveals poor signalling from the government about the future stance of fiscal policies. Compared to the index proposed by Baker *et al.* (2012), our index is more specific to the type of shock under analysis (the federal spending shock). It is also more clearly connected to changes in the variance of economic agents' due to policy signalling. Moreover, it explicitly removes any influence of general macroeconomic uncertainty, to which the Baker *et al.* (2012) is exposed because it is, by construction, (linearly) uncorrelated with macroeconomic uncertainty. This should help to provide a more precise quantification of the policy signal's precision from budgetary authorities.

Second, we explore how fiscal spending shocks propagate, conditional on the level of fiscal policy uncertainty. In particular, we test whether fiscal policy announcements are more effective in stimulating GDP in an environment characterised by low or high uncertainty about present and future public spending policies.

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[2] The literature on the economic impact of uncertainty dates back to the early 1970s, with the analysis of the role of uncertainty on private savings and investment decisions (see Leland, 1968; Kimball, 1990; and Carroll, 1997). The study of investment decisions in uncertain times is centred on Bernanke (1983) which showed that during uncertain times, firms might have an incentive to wait until the uncertainty is resolved, even in presence of investment project with a positive net present value. In recent years, Bloom (2009) proposed a new modeling framework to analyse the impact of second-moment shocks in the presence of non-convex capital and labour adjustment costs, and showing that uncertainty shocks can generate short and sharp recessions, immediately followed by sudden recoveries.

[3] Papers using the Baker *et al.* (2012) index, or alternative measures, generally find large adverse effects of policy uncertainty onto macroeconomic activity (see, among others, Bachmann *et al.*, 2013; Benati, 2013; Carriero *et al.*, 2013; Mumtaz and Surico, 2013; Caggiano *et al.*, 2013). Building on the SVAR methodology, Davig and Foerster (2013) find that increased policy uncertainty related to the US "Fiscal Cliff" tends to depress investment and employment. Fernandez-Villaverde *et al.* (2012) study the impact of fiscal policy uncertainty in a DSGE model with stochastic volatility. They show that an increases in volatility can have a sizeable adverse impact on the economy, especially when the volatility affects the capital tax process. Bi *et al.* (2013) explore the effects of uncertainty on the timing and composition of consolidation plans in a non-linear New-Keynesian model. They conclude that the uncertainty on the composition (tax- or spending-based) of a consolidation can significantly alter the response of economic agents and the success of the plan in eventually reducing debt. For additional references on policy uncertainty see www.policyuncertainty.com

Our paper is related to Bachmann and Sims (2012), although we focus on the signal sent by fiscal policy authorities (and thus on fiscal policy uncertainty) rather than on confidence, which is more a measure of the degree of agent optimism towards future economic developments.[4] Our empirical analysis is structured in two steps. First, following Ramey (2011), we identify fiscal spending shocks using an expectational time series derived from the US SPF's data. However, unlike Ramey (2011), we identify the spending shocks by looking at the individual revision of forecasts, as published in the SPF, that can be thought of as proxies for fiscal news shocks. In particular, we focus on the revisions in forecaster expectations at both one and three quarter horizons. This expectational identification of fiscal shocks helps to align the econometrician information set with the real-time information flow received by the agents, thus eliminating the problem of fiscal foresight as defined by Leeper *et al.* (2013) (see Ricco, 2013).[5]

Second, based on Bayesian techniques, we estimate an Expectational Threshold VAR (ETVAR) model in which the proxies for fiscal news shocks are included together with the fiscal policy uncertainty index, SPF expectations on GDP, GDP, federal spending and the Barro-Redlick marginal tax rate. The uncertainty index is the threshold variable, and the threshold level is estimated endogenously within the model. We also study the effects of fiscal shocks on the federal fund rates, private consumption and investment. The use of a TVAR model allows us to derive some stylized facts about the propagation of fiscal shocks, conditional on the level of uncertainty surrounding fiscal policy communication.

Our results suggest that, during periods of high fiscal policy uncertainty, fiscal interventions have only weak effects on the economy. In these phases, authorities tend to accompany announcements about increases in spending with a reduction in marginal tax rates. Despite this higher activism, however, output does not significantly respond to the policy news. In periods of low uncertainty, however, the output response to the spending news shock is positive and significantly different from zero, reaching a cumulative multiplier of about 2.45 after 8 quarters. Our analysis also shows that the stronger stimulative effects in less uncertain times are mainly the result of agents' tendency to increase investment decisions, in line with the predictions of the option value theory of Bernanke (1983). We also find that, in presence of clear policy signals (*i.e.*, in the low uncertainty regime), the Federal Reserve tends to be more reactive to spending increases than in periods of high uncertainty.[6]

Overall, our analysis indicates that policy signalling should be seen as a potentially additional policy tool which may enhance the effectiveness of fiscal stimulus. Policy authorities have several concrete options when using this tool. For example, they can accompany the announcement of fiscal targets with a clear indication of the measures that they intend to adopt to achieve them. This should reduce the risk of changes in the fiscal strategy in its implementation phase, thus decreasing uncertainty. In the same vein, a reduction in the level of fiscal policy uncertainty can also be achieved through enhanced credibility of the policy authorities which can be reinforced via a consistent record of fulfilment of the policy announcements with coherent actions. These policy considerations, however, cannot be symmetrically transposed to the opposite case of negative spending shocks (*i.e.*, to the case of fiscal consolidations). In fact, our generalized impulse response functions, which account for endogenous shifts across regimes, show a smaller

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[4] See also Aastveit *et al.* (2013) for a study on the effectiveness of monetary policy shocks under different levels of uncertainty.

[5] The identification of structural fiscal shocks using news has also been proposed by Ben Zeev and Pappa (2014), Leeper *et al.* (2012) and Gambetti (2012). In the field of monetary policy analysis, similar approaches have been used by Altavilla and Giannone (2014) and Gertler and Karadi (2014).

[6] Other works on state-dependent multipliers include Kirchner *et al.* (2010), Auerbach and Gorodnichenko (2012), Batini *et al.* (2012) and Cimadomo and D'Agostino (2014), which focus on business cycle phases; Afonso *et al.* (2011) and Caggiano *et al.* (2013), which investigate the implications of financial stress. These studies tend to point to higher multipliers during periods of recessions or high financial stress.

difference between the GDP effect of a negative spending shock under the two uncertainty regimes.[7]

Our paper is structured as follows. Section 2 is devoted to the construction of the Fiscal Policy Uncertainty Index used in the paper; Section 3 comments on the identification of fiscal shocks and we present the dataset. Section 4 illustrates our Bayesian Threshold VAR model; Section 5 is devoted to illustrate our main results on the transmission of fiscal policy shocks under uncertainty and Section 6 concludes.

2 A new measure of fiscal policy uncertainty

In this study, we interpret fiscal policy uncertainty as the dispersion of individual expectations on government spending dynamics that is not induced by macroeconomic uncertainty. In this context, fiscal policy uncertainty is thus due to the precision of signals sent by governments along with their credibility, the stability of the political environment and other exogenous factors such as, for example, the geopolitical situation.

From an empirical perspective, given the two-way interaction between macroeconomic uncertainty and policy uncertainty, measuring the effect of policy uncertainty is not a straightforward exercise. That is, an uncertain macroeconomic environment can make policies less predictable and vice versa. Further, uncertainty might not have a linear relation with output, as already highlighted by Bloom (2009).

To solve this problem, the empirical literature has taken three many approaches in computing measures of general policy uncertainty, based on: 1) *ex post* realised volatility in certain time series; 2) news-based word frequency counting for terms that can be thought of as related to policy uncertainty; 3) "disagreement" measures, computed as the cross-sectional variance of experts' point forecasts, as proxies for individual uncertainty.

With regard to fiscal policy uncertainty, the realised volatility of historical fiscal time series is not completely adequate for our purposes. This is because uncertainty is fundamentally an *ex ante* concept, related to the variance associated to a forecast before the actual outcome is known. Hence, measures of uncertainty should be constructed using data available in real time. Further, the relationship between *ex post* realised volatility and *ex ante* conditional variance of the forecasts for fiscal variables is likely to be unstable as policy uncertainty might not necessarily translate into an increase in the volatility of the fiscal variables. This was evident, for instance, by the uncertainty surrounding the extension of the Bush-era tax cuts, as also reflected in the "Fiscal Cliff" episode. Finally, an increase in the realised volatility of a fiscal variable might be purely due to a systematic relationship of the variable itself with macroeconomic conditions and their variability, especially in the presence of policy smoothing over the cycle, rather than to policy uncertainty.

The index proposed by Baker *et al.* (2012) follows mainly the second approach and is based on real-time data. In particular, their index is based on the weighted sum of three main components: (i) Google-based news searches for terms likely to be related to policy uncertainty; (ii) disagreement among economic forecasters about future spending growth and (iii) the number of provisions in the U.S. tax code set to expire in future years. The Baker *et al.* (2012) index is a

[7] Some papers find that, under specific circumstances and in particular when there are concerns regarding the sustainability of public finances, fiscal adjustments can be expansionary (see, e.g., Alesina and Ardagna, 2013). In these circumstances, a clearly signalled and front-loaded fiscal consolidation may induce expansionary effects, possibly through a confidence channel that reduces the default risk and reflects the government's commitment to fiscal target. However, this hypothesis is not investigated in this paper, given that we focus on the US, *i.e.*, on a country that did not experience a very severe fiscal crisis in the post-war period.

natural benchmark in the literature on policy uncertainty and it is now also widely used by policy institutions and market participants.

Despite its many advantages, the Baker *et al.* (2012) index is not suited for our analysis because it is more geared to measuring general policy uncertainty rather than uncertainty related to fiscal spending only. Indeed, the underlying components of the index are heterogeneous and indirectly related to the variability of economic agents' expectations. In fact, the intensity of news-search findings may be related to downside or tail risks rather than policy uncertainty as second moment of expectations. Another issue related to the Baker *et al.* (2012) index is that the first two components (news and disagreement) are not immune to the influence of general economic uncertainty. The third component (the number of expiring revenue measures), on the contrary, is completely policy-specific but being based on tax measures it is not directly relevant for our work, which is focused on federal spending shocks. Finally, the weights attributed to each component reflect the priors of the authors regarding the relative importance of each element of the index and are assigned in a discretionary way.

To address these issues, we focus on the component of the disagreement among forecasters about the future federal spending developments that is orthogonal to the disagreement about current macroeconomic conditions. This allows to tackle the issue of exogeneity (*i.e.*, with respect to macroeconomic uncertainty) and to develop a measure which is more likely to reflect fiscal policy uncertainty. The resulting index has three main features: (1) it relies on real time, *ex ante* data, but it also directly connects to a measure of agents' expectations (the SPF forecasts); (2) it is linearly uncorrelated with the macroeconomic uncertainty; (3) it is fully non-judgmental and could be potentially applied to a similar dataset. Moreover, it is consistent with our definition of fiscal shocks since they are extracted from the same dataset, thus referring to the same agents' information set. Also, because of this, it fully aligns the time horizon covered by our definition of our fiscal news shocks to the one over which policy uncertainty is measured.

To construct our index we follow a two-step procedure:

1) We compute the time-varying cross-sectional standard deviation of the SPF forecasts (disagreement), at different horizons, for real federal government spending and GDP. These, under reasonable assumptions, can be thought of as proxies for the time-varying overall fiscal and macroeconomic uncertainty of the agents;
2) We extract the policy uncertainty component, projecting the disagreement among forecasters about the future development of fiscal spending onto the disagreement about the current macroeconomic conditions.

We theoretically justify this procedure by discussing under which assumptions the index we obtain could be correctly thought of as an approximation of the policy uncertainty. In addition, we provide empirical support to this procedure by matching the index obtained with the historical narrative. We also compare our index with the fiscal component of the Baker *et al.* (2012) index.

2.1 Uncertainty and disagreement in a model of Bayesian learning

A standard model of Bayesian learning can help in more precisely defining the concepts we use and in clarifying the assumptions underlying our approach (see, in particular, Lahiri and Sheng, 2010). More specifically, we want to show that, in the case of fiscal spending, changes in the disagreement of forecasting are directly proportional to the changes of the square of uncertainty, up

to some reasonable approximation.[8]

Let's assume that each forecaster *i*, at each quarter *t*, receives a public signal informative about the future fiscal spending growth at horizon h from the policy makers:

$$n_{t+h} = \Delta g_{t+h} + \eta_{t,h} \ , \qquad \eta_{t,h} \sim \mathcal{N}\left(0, \sigma^2_{(\eta)t,h}\right). \tag{1}$$

The information carried by the public signal is complemented using other sources of information, e.g., a private signal or a signal obtained by random sampling from diffuse information publicly available:[9]

$$s^i_{t+h} = \Delta g_{t+h} + \zeta^i_{t,h} \ , \qquad \zeta^i_{t,h} \sim \mathcal{N}\left(0, \sigma^2_{(\zeta)i,t,h}\right). \tag{2}$$

Without loss of generality, we can assume that the public and the private signals are independent. Each forecaster combines the two signals, via Bayesian updating, to form conditional expectations for g_{t+h}:

$$\Delta\widehat{g}_{i,t+h} = \mathbb{E}^i\left[\Delta g_{t+h} | n_{t+h}, s^i_{t+h}\right] = \frac{\sigma^2_{(\eta)t,h} s^i_{t+h} + \sigma^2_{(\zeta)i,t,h} n_{t+h}}{\sigma^2_{(\zeta)i,t,h} + \sigma^2_{(\eta)t,h}} \ , \tag{3}$$

With conditional variance:

$$U_{i,t,h} \equiv \mathbb{V}\mathrm{ar}^i\left[\Delta g_{t+h} | n_{t+h}, s^i_{t+h}\right] = \frac{\sigma^2_{(\eta)t,h}\sigma^2_{(\zeta)i,t,h}}{\sigma^2_{(\zeta)i,t,h} + \sigma^2_{(\eta)t,h}} \ . \tag{4}$$

The conditional variance of individual forecast is due to the precision of both the public signal and of the signal sent by private or diffuse sources. To obtain a measure of uncertainty in the aggregate economy we consider the average individual uncertainty:

$$U_{t,h} \equiv \frac{1}{N}\sum_{i=1}^{N} U_{i,t,h} = \frac{1}{N}\sum_{i=1}^{N} \frac{\sigma^2_{(\eta)t,h}\sigma^2_{(\zeta)i,t,h}}{\sigma^2_{(\zeta)i,t,h} + \sigma^2_{(\eta)t,h}} \ , \tag{5}$$

where N is the number of forecasters.

The disagreement amongst forecasters can be defined as:

$$\begin{aligned} D_{t,h} \quad &\equiv \mathbb{E}\left[\tfrac{1}{N-1}\textstyle\sum_{i=1}^{N}\left(\Delta\widehat{g}_{i,t+h} - \tfrac{1}{N}\sum_{j=1}^{N}\Delta\widehat{g}_{j,t+h}\right)^2\right] \\ &= U_{t,h} - \tfrac{1}{N(N-1)}\mathbb{E}\left[\textstyle\sum_{i=1}^{N}\sum_{j\neq i}^{N}\Delta\widehat{g}_{i,t+h}\Delta\widehat{g}_{j,t+h}\right] \ , \end{aligned} \tag{6}$$

where $\Delta g_{i,t+h}$ is the individual forecast defined in equation 3.

The variance of the public signal may depend on the macroeconomic environment, as well as on the credibility of the policy maker and his or her willingness to clarify the policy indication.

On the other hand, the variance of the private signal – that we think of as extracted in a judgemental way from diffused information – may depend on several features of the social environment, viz., among others, the information system, the policy decision process and the institutional framework. Given the relative stability of the American institutional framework, we

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[8] It is possible to have forecast dispersion also when agents share the same information set but use different forecasting models or have different objective functions. However, these alternative hypotheses seem to find limited support in the data (see, for example, Coibion and Gorodnichenko, 2010).

[9] In the case of fiscal policy, it is reasonable to assume that different forecasters attribute different weights to several diffuse sources of information.

can assume that the variance of the private information is nearly constant over the sample and equal across forecasters:

$$\sigma^2_{(\zeta)i,t,h} \approx \sigma^2_{(\zeta)h} + \mathcal{O}(2) \ . \tag{7}$$

Under this assumption, the expression for disagreement simplifies to:

$$D_{t,h} \approx \frac{\sigma^2_{(\eta)t,h}\sigma^2_{(\zeta)h}}{\sigma^2_{(\zeta)h} + \sigma^2_{(\eta)t,h}} - \frac{1}{\sigma^2_{(\eta)t,h}} \left(\frac{\sigma^2_{(\eta)t,h}\sigma^2_{(\zeta)h}}{\sigma^2_{(\zeta)h} + \sigma^2_{(\eta)t,h}} \right)^2 \ , \tag{8}$$

hence we find that the disagreement is approximately equal to the square of aggregate uncertainty times the average precision of the privately gathered information:

$$D_{t,h} \approx \frac{1}{\sigma^2_{(\zeta)h}} U^2_{t,h} \ . \tag{9}$$

The link between the dispersion of individual mean forecasts of inflation and the average dispersion of corresponding density forecast distributions has been extensively debated in the literature, mostly for the case of inflation (see, among many others, Lahiri and Sheng, 2010; Giordani and Soderlind, 2003; D'Amico and Orphanides, 2008; Rich and Tracy, 2010; and Lahiri and Sheng, 2010).[10] This issue is crucial in assessing the validity of using disagreement as a proxy for inflation uncertainty in empirical investigations. However results have so far been mixed.

For what concern fiscal spending, we believe our assumptions are plausible. As we will show in Section 2.3, the fact the our index matches a historical narrative provides support for our assumptions.

2.2 The survey of professional forecasters' dataset

In this section, we briefly describe the Philadelphia Fed Survey of Professional Forecasters (SPF) dataset, which underlines the construction of our index. In the SPF, professional forecasters are asked each quarter to provide forecasted values of a set 32 macroeconomic variables, for the present quarter and up to four quarters ahead. SPF forecasters do not know the current value of macroeconomic variables that have yet to be released, with a lag.[11]

The Survey does not report the number of experts involved in each forecast or the forecasting method used. Professional forecasters are mostly private firms in the financial sector and, on average, there are 29 respondents per period in the sample, 22 of which appear in consecutive periods (see Figure 1). For *real federal government consumption expenditures and gross investment*, the main quantity of interest of this work, individual responses of professional

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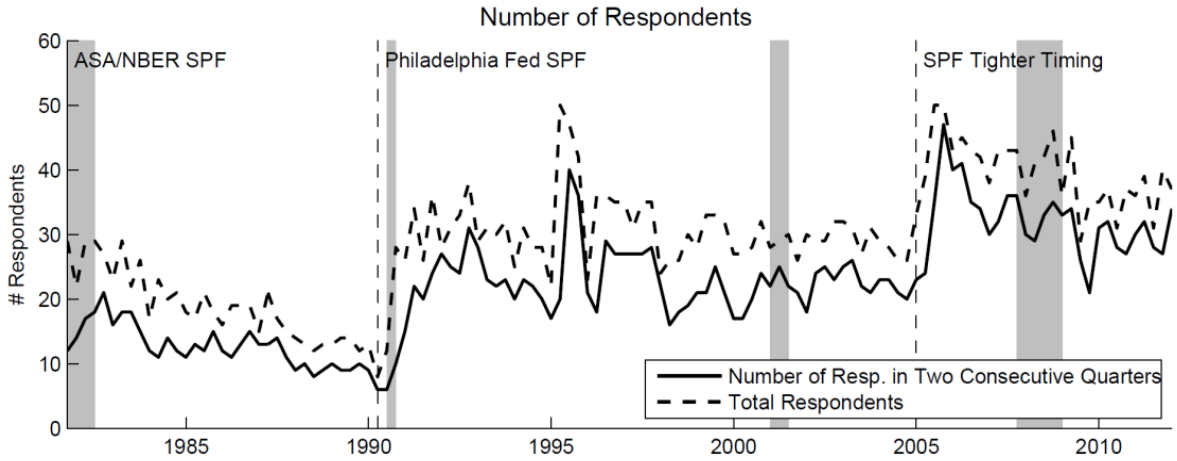
[10] For inflation forecasts, the SPF dataset contains both point and density forecasts. Using this data on inflation and a methodology based on entropy measures, Rich and Tracy (2010) conclude that there is little evidence that disagreement is a useful proxy for uncertainty. However, the SPF dataset is likely to contain a mixed of model based and judgmental forecasts. In this respect, the interpretation of density forecasts in terms of uncertainty is ambiguous and may not account for model uncertainty. However, unlike inflation, in the SPF real federal spending forecasts are reported in mean only.

[11] As reported in the SPF documentation notes: "The survey's timing is geared to the release of the Bureau of Economic Analysis' advance report of the national income and product accounts. This report is released at the end of the first month of each quarter. It contains the first estimate of GDP (and components) for the previous quarter. We send our survey questionnaires after this report is released to the public. Indeed, our survey questionnaires report recent historical values of the data from the BEA's advance report and the most recent reports of other government statistical agencies. Thus, in submitting their projections, our panelists' information sets include the data reported in the advance report. Our survey questionnaires are sent to the panelists on the day of the advance report. For the surveys we conducted after the 1990:Q2 survey, we have set the deadlines for responses at late in the second to third week of the middle month of each quarter".

Figure 1

Number of Professional Forecasters per Quarter



The figure plots the number of respondents in the Survey of Professional Forecasters (dashed line) and of respondents in two consecutive quarters (solid line). Vertical dashed lines indicate changes in the Survey of Professional Forecasters methodology. Prior to 1990:Q2 the Survey was conducted by the ASA/NBER, details of the timing of Survey in that period have not been reported. A minor change in the timing of the deadlines occurred beginning with the survey of 2005:Q1 when the schedule of the Survey was tightened. Grey shaded areas indicate the NBER business cycle contraction dates. On average, in the sample, there are 29 respondents per period, of which 22 appear in consecutive periods.

forecasters have been collected from 1981Q3 to 2012Q4.[12] As is customary, we convert level forecasts to forecasted growth rates because the base year changes several times within the sample. Figure 2 reports the median expected growth rate of federal spending for the current quarter and for the four quarters ahead, together with forecasters' disagreement up to one standard deviation. As a measure of disagreement, we use the dispersion of forecasts on real federal spending as reported by the SPF, measured as the cross-sectional variance of the point estimates of individual forecasters.

2.3 Accounting for the impact of general macroeconomic uncertainty

The uncertainty about fiscal variables can be thought of as a function of fiscal factors, macroeconomic uncertainty and other 'exogenous' components, e.g., the volatility of the geopolitical environment:

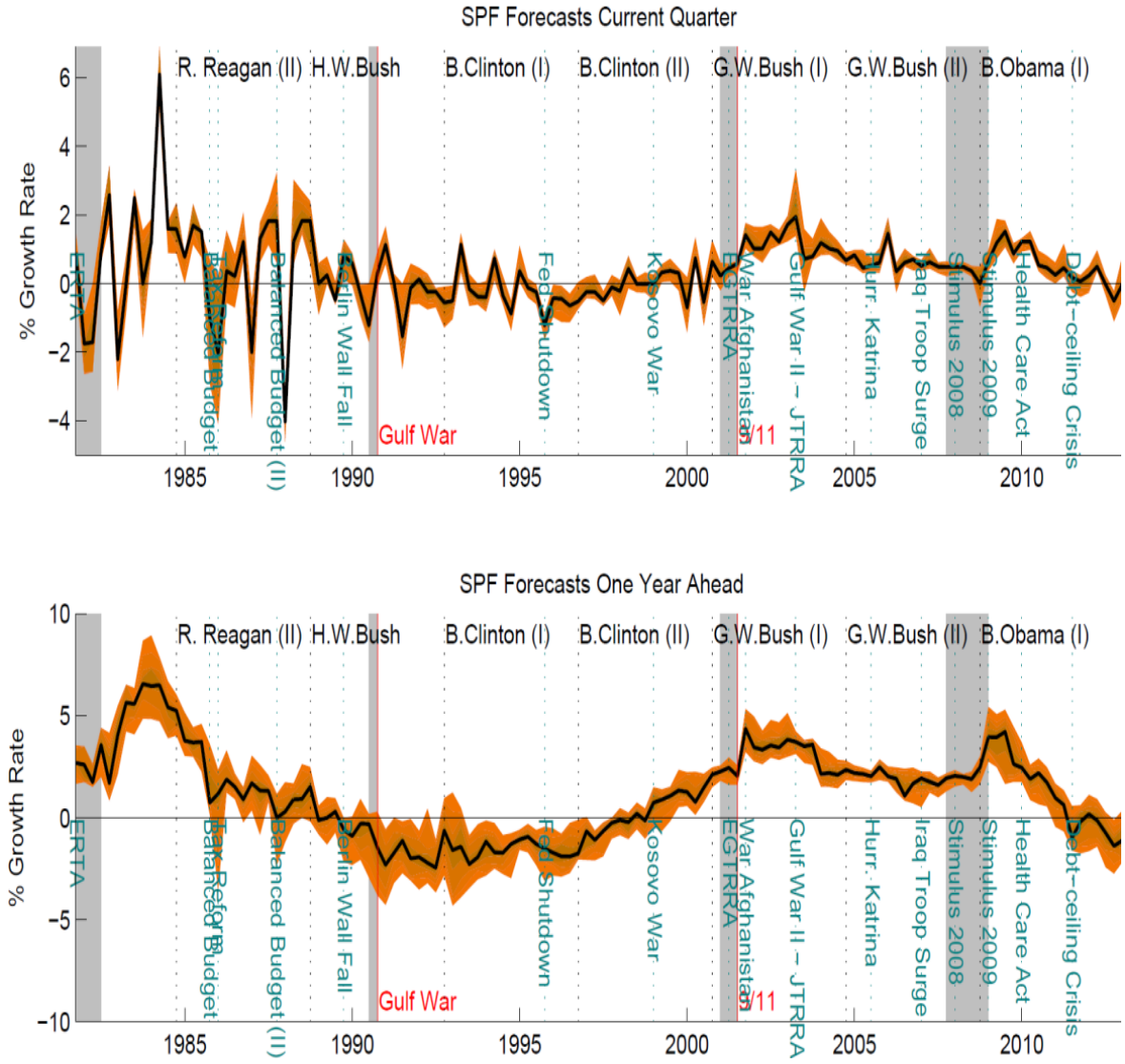
$$\begin{aligned} U_t &= f(\sigma_t^{\text{Macro}}, \sigma_t^{\text{Exogenous}}, \sigma_t^{\text{PolicyFactors}}) \simeq \\ &\simeq \alpha + \beta\sigma_t^{\text{Macro}} + \gamma\sigma_t^{\text{Exogenous}} + \delta\sigma_t^{\text{PolicyFactors}} + \mathcal{O}(2). \end{aligned} \tag{10}$$

In order to isolate the component of fiscal uncertainty due to policy factors, one cannot regress the proxy for uncertainty about fiscal variables (*i.e.*, the forecasters' disagreement of fiscal spending) onto a proxy for macroeconomic uncertainty and other factors. In fact, in doing this one would neglect the contemporaneous reverse causality between fiscal policy uncertainty and macroeconomic uncertainty.

[12] From 1969Q2 to 1981Q2, only forecasts of nominal federal defence spending were collected. This series has been discontinued thereafter.

Figure 2

Government Spending Expected Growth Rates – Fan Chart



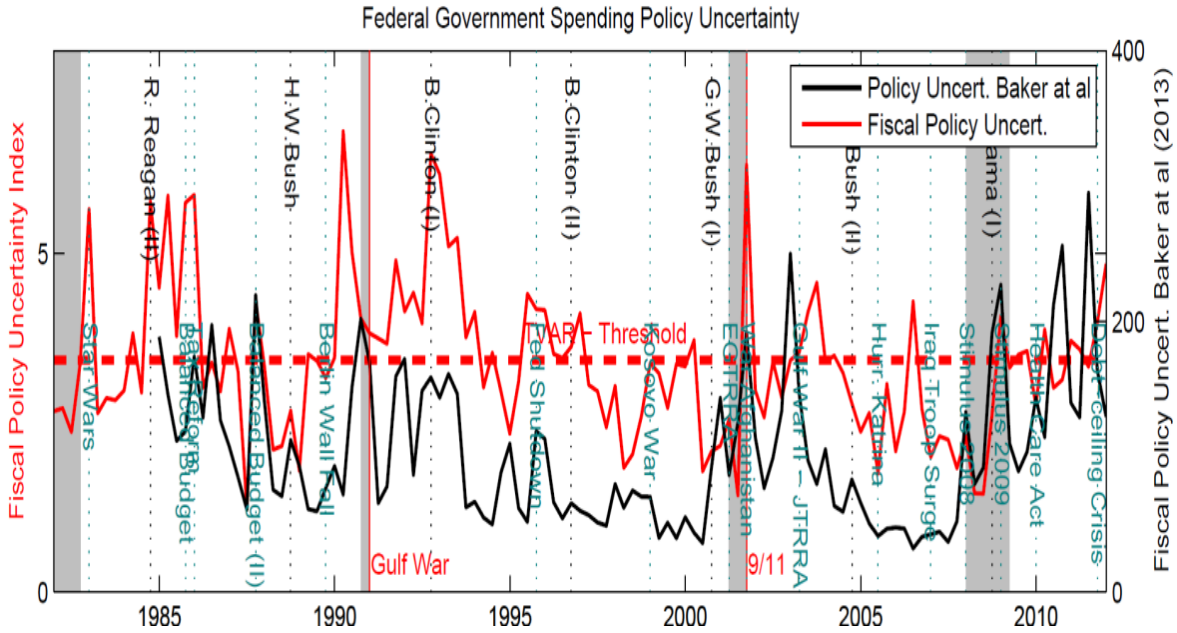
The figure plots the SPF median expected growth rate for the current quarter and for the four future quarters, together with forecasters' disagreement up to one standard deviation. Grey shaded areas indicate the NBER Business Cycle contraction dates. Vertical lines indicate the dates of the announcement of important fiscal and geopolitical events (teal), presidential elections (black), and the Ramey-Shapiro war dates (red).

We thus address this issue by assuming that uncertainty about future fiscal policies depends only on current macroeconomic uncertainty, and not on future macroeconomic conditions. Therefore, we regress the disagreement of the forecasts on real government spending for the four quarters ahead, measured as the log of the cross-sectional standard deviation, on the log-disagreement of the forecasts on current GDP, its lags, and a constant.

We also assume that the overall volatility of the other "exogenous" components has been

Figure 3

Policy Uncertainty Index



Time series of the fiscal policy uncertainty index based on the dispersion of SPF forecasts (red) and fiscal component of the policy uncertainty index of Baker *et al*. (2012) (black). Grey shaded areas indicate the NBER business cycle contraction dates. Vertical lines indicate the dates of the announcement of important fiscal and geopolitical events (teal), presidential elections (black), and the Ramey-Shapiro war dates (red). The thick red dashed line indicate the TVAR endogenous threshold.

roughly constant over the period of study.[13] Our fiscal policy uncertainty index is thus obtained by exponentiating and standardising the regression residuals. By construction, these residuals are linearly uncorrelated with the current macroeconomic uncertainty.[14]

Our policy uncertainty index is reported in Figure 3. It appears to well track the main events surrounding the management of fiscal policy in the US since the 1980s. The first peak coincides with the announcement of the "Star Wars" programme by President Reagan in 1983Q1. The index then rises in coincidence with the 1984 presidential elections and the following fiscal activism President Reagan's second term. The next spike in uncertainty is related to the fall of the Berlin wall. In the 1990s, the index reveals the uncertainty linked to the two presidential elections, the change from a Republican to a Democratic administration, the "federal shutdown" in 1995 and the war in Kosovo. In the 2000s, the first relevant moments of uncertainty are the war in Afghanistan and the Bush tax cuts of 2001 and 2003, followed by the Gulf war, Iraqi surge in the middle of the 2000s, the 2008 and 2009 stimulus acts and finally the "Debt Ceiling Crisis" in 2011.

Figure 3 plots on the right axis the fiscal component of the Baker *et al.* (2012) index. The linear correlation between the two indices is relatively low, *i.e.*, around 0.3. However the two indices seem generally to agree on the narrative of the main event generating policy uncertainty.

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[13] It might also be argued that a panel of professional forecasters is not representative of the economic agents. However, Carroll (2003) provides evidence that private agents, firms and households, update their forecast towards the views of professional forecasters.

[14] As a robustness check, we have also added the dispersion of the forecasts on current unemployment to the regressors. Results (not shown, available upon request) are broadly unchanged.

3 Fiscal shocks identification

Following Perotti (2011) and Gambetti (2012), we identify fiscal shocks using SPF forecast revisions of federal government consumption and investment forecasts, which can be thought of as fiscal news, as in Ricco (2013). This procedure overcomes the problem of fiscal foresight (see Leeper *et al.*, 2013; Forni and Gambetti, 2010; Leeper *et al.*, 2012; Leeper *et al.*, 2013 and Ben Zeev and Pappa, 2014), because it aligns the economic agents' and the econometrician information sets. It also allows the analyst to associate the shock with the time of the announcement, rather than with the time of the actual implementation of the shock.

In particular, given that the SPF includes projections for the present quarter and up to four quarters ahead, we can actually examine the macroeconomic impact of policy news related to different time horizons. Formally, this can be seen through the following decomposition of the forecast error in a nowcast error and a flow of fiscal news, updating agents' information set I_t over time:

$$\underbrace{\Delta g_t - \mathbb{E}^*_{t-h}\Delta g_t}_{\substack{\text{forecast error}\\ h \text{ periods ahead}}} = \underbrace{(\Delta g_t - \mathbb{E}^*_t \Delta g_t)}_{\substack{\text{nowcast error}\\ \notin \mathcal{I}_t}} + \underbrace{(\mathbb{E}^*_t \Delta g_t - \mathbb{E}^*_{t-1}\Delta g_t)}_{\substack{\text{nowcast revision}\\ (\text{news at t}) \in \mathcal{I}_t}} + \dots + \underbrace{(\mathbb{E}^*_{t-h+1}\Delta g_t - \mathbb{E}^*_{t-h}\Delta g_t)}_{\substack{\text{forecast revision}\\ (\text{news at t-h+1}) \in \mathcal{I}_{t-h+1}}} . \tag{11}$$

The first term on the right-hand side corresponds to the nowcast errors, which can be thought of as proxies for agents' misexpectations (as in Ricco, 2013) that can only be revealed at a later date (a minimum of one quarter later). The other components, nowcast and forecast revisions, can be seen as proxies for the fiscal news shocks, related to current and future realisations of fiscal spending, received by the agents and incorporated in their expectations (see Gambetti, 2012; and Ricco, 2013).

Because of the different timing, the two news shocks are expected to generate a different economic impact and be subject to the influence of policy uncertainty to a different extent. Our main objects of interest are the news shocks related to future changes in government spending. In fact, given the more extended time lag between news and the actual implementation of the policy change, the macroeconomic effects of these shocks are likely to be more subject to the impact of policy uncertainty than the nowcast revision.

Using individual forecaster's expectation revisions as well as the procedure described in Ricco (2013), we define two measures of fiscal news shocks in the aggregate economy related to the revision of expectations of the growth rate of the government spending in the current quarter:

$$\mathcal{N}_t(0) \equiv \text{Mean}_i\left(\mathcal{N}^i_t(0)\right) = \text{Mean}_i\left(\mathbb{E}^{*i}_t \Delta g_t - \mathbb{E}^{*i}_{t-1}\Delta g_t\right) , \tag{12}$$

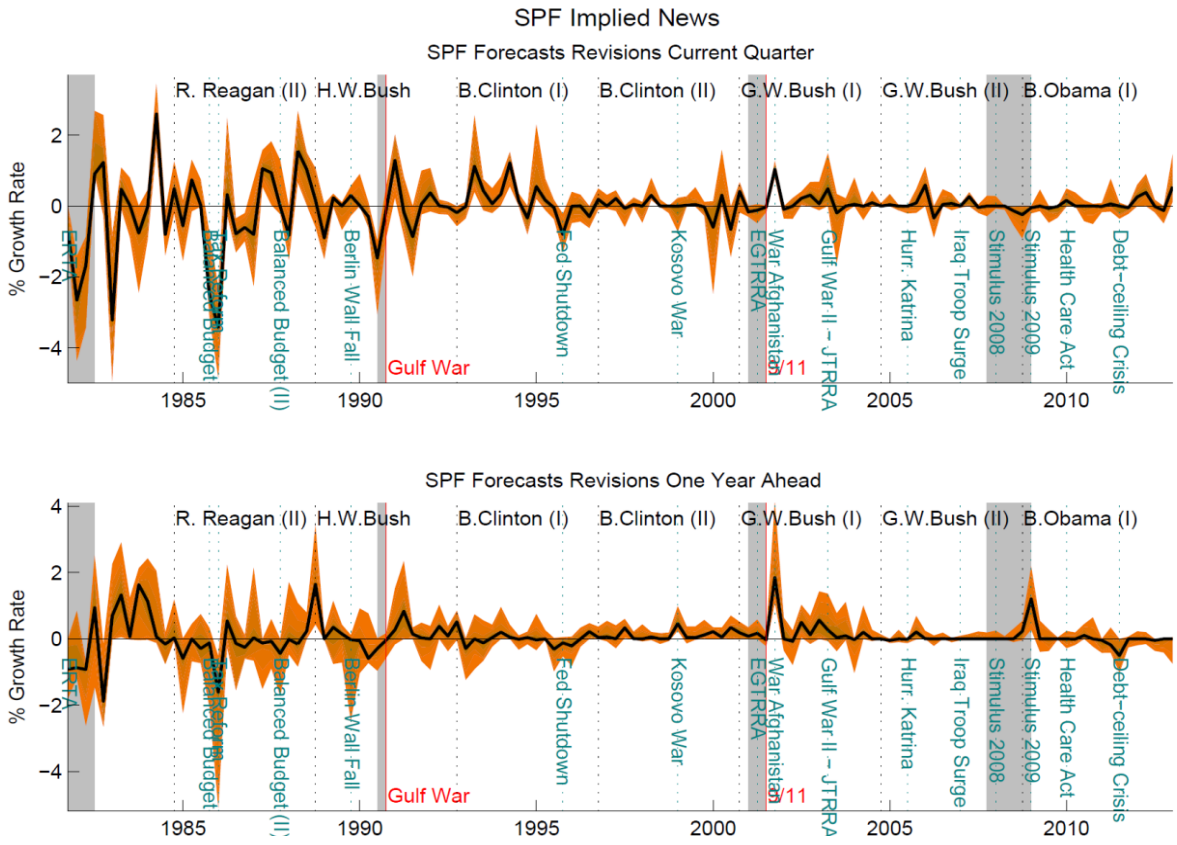
and in the future 3 quarters:

$$\mathcal{N}_t(1,3) \equiv \sum_{h=1}^{3}\mathcal{N}_t(h) = \sum_{h=1}^{3}\text{Mean}_i\left(\mathcal{N}^i_t(h)\right) = \sum_{h=1}^{q}\text{Mean}_i\left(\mathbb{E}^{*i}_t \Delta g_{t+h} - \mathbb{E}^{*i}_{t-1}\Delta g_{t+h}\right) , \tag{13}$$

where i is the index of individual forecasters. Figure 4 plots the mean implied SPF news on the current quarter and for future quarters, together with forecasters' disagreement up to one standard deviation. In the empirical analysis that follows, we use these two shocks, respectively labelled as *nowcast revision* (equation 12) and *forecast revision* (equation 13).

Figure 4

Government Spending News – Fan Chart



The figure plots the mean implied SPF news on the current quarter and for future quarters, together with forecast disagreement up to one standard deviation. Grey shaded areas indicate the NBER Business Cycle contraction dates. Vertical lines indicate the dates of the announcement of important fiscal and geopolitical events (teal), presidential elections (black), and the Ramey-Shapiro war dates (red)

In order to identify fiscal news shocks, we assume that discretionary fiscal policy does not respond to macroeconomic variables within one quarter and that the SPF time series for fiscal variables are meaningful proxy variables for the aggregate agents' expectations about government spending. As a consequence, innovations to SPF-implied fiscal news can be related to fiscal changes implemented on different horizons. We assume that the values of the main macroeconomic variables are fully revealed to the agents, but only with a lag. We also assume that forecasted future government spending incorporates the discretionary policy response to the expected values for output, as well as expectations about government spending in the present quarter. Finally, we assume that there are no shocks to future realisations of output not affecting its current realisation (e.g. technology or demand shocks) that are foreseen by the policymakers and to which the government can react.[15]

These assumptions allow for a recursive identification of the fiscal shocks in which the fiscal variables are ordered as follow:

[15] See Caldara and Kamps (2012) for a discussion of the identification of fiscal shocks in structural VAR models

$$\left(\mathcal{N}_t(0) \quad \mathbb{E}_t^*\mathrm{GDP}_t \quad \mathcal{N}_t(1,3) \quad \mathbb{E}_t^*\mathrm{GDP}_{t+1year} \quad Y_t'\right)' \tag{14}$$

and Y_t is a vector containing the macroeconomic variables of interest.

Our baseline model includes our SPF implied fiscal news, (median) SPF forecast of GDP growth for the current quarter and four quarters ahead, the policy uncertainty index, federal government spending, the Barro-Redlick marginal tax rate, and real GDP. Non-durable consumption, non-residential fixed investment and the Federal Funds rate are added using a marginal approach. We employ quarterly data from 1981Q3 to 2012Q4.

4 A Bayesian threshold VAR

The starting point of our analysis is a standard Vector-Autoregressive (VAR) model defined as:

$$y_t = C + A(L)y_{t-1} + \varepsilon_t \ , \tag{15}$$

where ε_t is a n-dimensional Gaussian white noise with covariance matrix Σ_ε, y_t is a $n \times 1$ vector of endogenous variable. The lag matrix polynomial *A(L)* and the matrices *C* and are specified as matrices of suitable dimensions containing the model's unknown parameters. In the baseline model, y_t contains a measure of the fiscal news across different horizons, the fiscal policy uncertainty index, as well as government spending, GDP, nondurable consumption, non-residential fixed investment (all in real per capita log-levels) and the federal funds rate.

In order to study the effect of policy uncertainty in the transmission of fiscal shocks, we compare results from the VAR model with those obtained when specifying a Threshold Vector-Autoregressive (TVAR) model with two endogenous regimes.[16] In the TVAR model, regimes are defined with respect to the level of our fiscal policy uncertainty index (high and low uncertainty). A threshold VAR is well suited to provide stylised facts about the signalling effects of fiscal policy and to capture differences in regimes with high and low levels of uncertainty. Moreover, the explicit inclusion of regime shifts after the spending shock allows us to account for the possible dependency of the propagation mechanism to the size and the sign of the shock itself.

Following Tsay (1998), a two-regime TVAR model can be defined as:

$$y_t = \Theta(\gamma - \tau_{t-d})\left(C^l + A^l(L)y_{t-1} + \varepsilon_t^l\right) + \Theta(\tau_{t-d} - \gamma)\left(C^h + A^h(L)y_{t-1} + \varepsilon_t^h\right) \ , \tag{16}$$

where *Θ(x)* is an Heaviside step function, *i.e.*, a discontinuous function whose value is zero for negative argument and one for a positive argument. The TVAR model allows for the possibility of two regimes (high and low uncertainty), with different dynamic coefficients $\{C^i, A_j^i\}_{i=\{l,h\}}$ and variance of the shocks $\left\{\Sigma_\varepsilon^i\right\}_{i=\{l,h\}}$. Regimes are determined by the level of a threshold variable τ_t with respect to an unobserved threshold level γ. In our case, the delay parameter *d* is assumed to be known and equal to one. This in order to study the role of the uncertainty regime in place when the shock hit the economy.

The baseline VAR and the TVAR are estimated with 3 lags. However, results are virtually unchanged whether 2 or 4 lags are included. Longer lag polynomials are not advisable due to the relatively short length of the time series.

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[16] It is possible to define TVAR models with an arbitrary number of regimes. However, for our study, a parsimonious specification guarantees a more precise estimation of the parameters and a clearer interpretation of results.

4.1 Bayesian priors

We adopt conjugate prior distributions for VAR coefficients belonging to the Normal-Inverse-Wishart family. This family of priors is commonly used in the BVAR literature due to the advantage that the posterior distribution can be analytically computed. For the conditional prior of the VAR coefficients, we adopt two prior densities commonly used in the macroeconomic literature for the estimation of BVARs in levels: the Minnesota prior, introduced in Litterman (1979) and the sum-of-coefficients prior proposed in Doan *et al.* (1983). The adoption of these two priors is based, respectively, on (i) the assumption that each variable follows either a random walk process, possibly with drift, or a white noise process, and (ii) on the assumption of the presence of a cointegration relationship between the macroeconomic variables.[17] The adoption of these priors has been shown to improve the forecasting performance of VAR models by effectively reducing the estimation error while introducing only relatively small biases in the parameters estimates (e.g., Sims and Zha, 1996; De Mol *et al.*, 2008; and Banbura *et al.*, 2010).

In selecting the value of the hyperparameters of our priors for our VAR model, we adopt the Bayesian method proposed in Giannone *et al.* (2012). From a purely Bayesian perspective, the informativeness of the prior distribution is one of the many unknown parameters of the model. Therefore, it can be inferred by maximising the conditional posterior distribution of the observed data. This method can be thought of as a procedure maximising the one-step-ahead out-of-sample forecasting ability of the model.

For the TVAR, we adopt natural conjugate priors parameters, generalising the priors for the VAR, and imposing identical priors in the two regimes. The prior tightness is set equal to the values selected for the VAR case for the sake of comparability. Details on the Bayesian priors adopted are provided in Appendix A.

4.2 Estimation of the model

The TVAR model specified in eq. (16) can be estimated by maximum likelihood. It is convenient to first concentrate on $\{C^i, A_j^i, \Sigma_\varepsilon^i\}_{i=\{l,h\}}$, *i.e.*, to hold γ (and d) fixed and estimate the constrained MLE for $\{C^i, A_j^i, \Sigma_\varepsilon^i\}_{i=\{l,h\}}$. Since $\{\varepsilon_t^i\}_{i=\{l,h\}}$ are assumed to be Gaussian, and the Bayesian priors are conjugate prior distributions, the Maximum Likelihood estimators can be obtained by using least squares. The threshold parameter can be estimated, using non-informative flat priors, as:

$$\hat{\gamma} = \arg\max \log \mathcal{L}(\gamma) = \arg\min \log |\widehat{\Sigma}_\varepsilon(\gamma)| \ , \tag{17}$$

where $\mathcal{L}$ is the Gaussian likelihood (see Hansen and Seo, 2002). The criterion function in equation 17, with flat priors, is not smooth and is not well suited for standard optimisation routines. However, given the low dimensionality of the problem, we can perform a grid search over a conveniently defined one dimensional space $\Gamma \equiv [\bar{\gamma}, \underline{\gamma}]$, covering the sample range of the threshold variable.[18]

The algorithm can be summarised as:

1) Form a conveniently defined grid $\Gamma \equiv [\bar{\gamma}, \underline{\gamma}]$.

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[17] Loosely speaking, the objective of these additional priors is to reduce the importance of the deterministic component implied by VARs that are estimated conditional on the initial observations (see Sims, 1996).

[18] The grid is trimmed symmetrically in order to ensure a sufficient number of data points for the estimation in both regimes. Given the limited span of the time series, we adopt a 20 per cent trimming level.

2) For each value of $\gamma \in \Gamma$, estimate $\{\hat{C}^i(\gamma), \hat{A}^i_j(\gamma), \hat{\Sigma}^i_\varepsilon(\gamma)\}_{i=\{l,h\}}$, conditional on the Bayesian priors for the variance of the coefficients.
3) Find the value $\hat{\gamma}$ in Γ that minimizes $\log|\hat{\Sigma}_\varepsilon(\gamma)|$.
4) Set $\{\hat{C}^i, \hat{A}^i_j, \hat{\Sigma}^i_\varepsilon\}_{i=\{l,h\}} = \{\hat{C}^i(\hat{\gamma}), \hat{A}^i_j(\hat{\gamma}), \hat{\Sigma}^i_\varepsilon(\hat{\gamma})\}_{i=\{l,h\}}$ and $\{\hat{\varepsilon}^i_t\}_{i=\{l,h\}} = \{\hat{\varepsilon}^i_t(\hat{\gamma})\}_{i=\{l,h\}}$

4.3 Within-regime IRFs and inter-regimes GIRFs

In non-linear models the response of the system to disturbances depends on the initial state, size and sign of the shock. In our TVAR model, the shock can trigger switches between regimes thereby generating more complex dynamic responses to shocks than the linear mode. Because of this, the response of the model to exogenous shocks becomes dependent on the initial conditions and is no longer linear.

We study two sets of dynamic responses to disturbances: impulse responses when the economy is assumed to remain in one regime forever (within-regime IRFs), and impulse responses when the switching variable is allowed to respond to shocks (inter-regime IRFs). While the former set can be computed as standard IRFs by employing the estimated VAR coefficients for a given regime, the latter must be studied using generalised impulse response functions (GIRFs) as in Pesaran and Shin (1998).

For a TVAR(p), the GIRFs are defined as the change in conditional expectation of y_{t+i} for $i = 1,\ldots,h$:

$$GIRF_y(h, \omega_{t-1}, \varepsilon_t) = \mathbb{E}[y_{t+h}|\omega_{t-1}, \varepsilon_t] - \mathbb{E}[y_{t+h}|\omega_{t-1}] \ , \tag{18}$$

Due an exogenous shock ε_t and given initial conditions $\omega^r_{t-1} = \{y_{t-1}, \ldots, y_{t-1-p}\}$. Details on the GIRFs computation are provided in Appendix B.

4.4 Testing for non-linearities

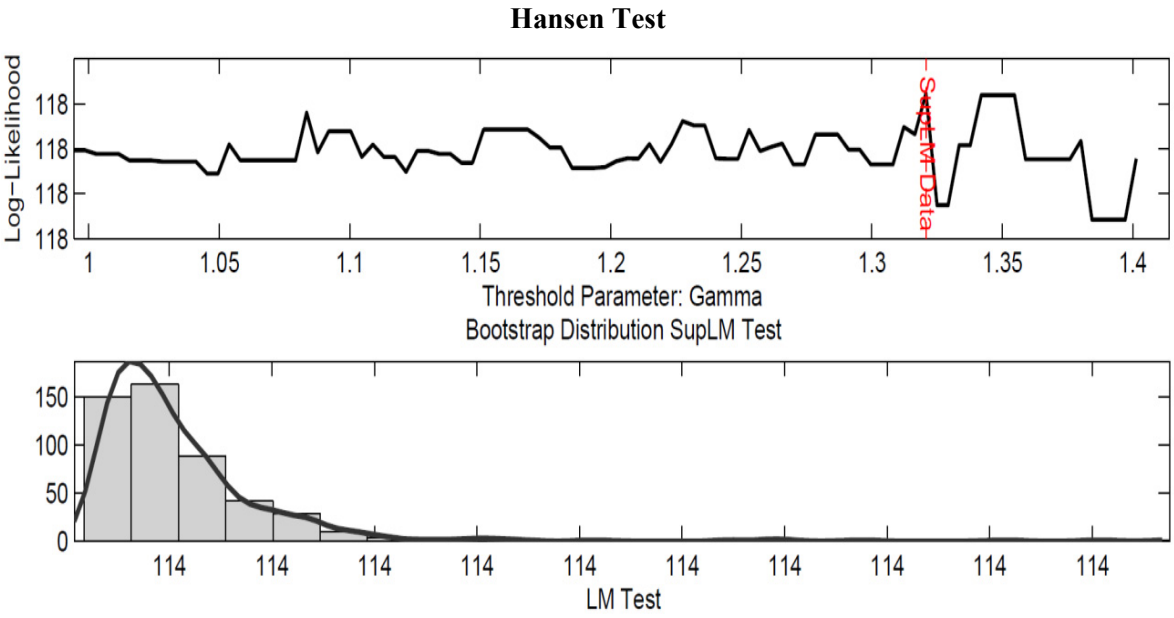
In assessing the presence of non-linearities, we limit ourself to testing the hypothesis of a two-regime threshold VAR versus the null hypothesis of linear VAR model. These models are nested given that a linear VAR can be thought of as a two-regime TVAR satisfying the restrictions $\mathcal{H}_0$: $\{C^h, A^h_j, \Sigma^h_\varepsilon\} = \{C^l, A^l_j, \Sigma^l_\varepsilon\}$. We adopt the Lagrange Multiplier (LM) test proposed in Davies (1987) and generalised to a multivariate setting with heteroscedasticity in Hansen and Seo (2002). The test is constructed as follows:

1) Estimate the model under the null hypothesis of linearity and compute the LM statistic (see Hansen and Seo, 2002).
2) Estimate the model under the alternative for each possible threshold value $\gamma \in \Gamma$, allowing for heteroscedasticity in the errors, and compute the LM statistic as function of γ.
3) Define the test statistic as:

$$\text{SupLM} = \sup_{\gamma \in \Gamma} \text{LM}(\gamma) \ . \tag{19}$$

4) The distribution of SupLM under the null hypothesis can be calculated using bootstrap simulation methods. The bootstrap calculates the sampling distribution of the test SupLM using the model, the residuals, and the parameter estimates obtained under the null.
   - Random draws are made from the residual vectors.
   - Given fixed initial conditions and the draws for the residuals, simulated time series are created by recursion, applying the linear model.

Figure 5



- The SupLM is obtained for each simulated sample.

5) The bootstrap *p*-value is obtained as the percentage of simulated statistics which exceed the actual statistics.

Figure 5 shows the results of the Hansen SupLm test for our baseline model.[19] The reported p-values are essentially zero, confirming that our Bayesian-TVAR model performs better than the linear VAR benchmark based on the same specification.

5 Policy uncertainty and the transmission of fiscal shocks

Figure 6 reports the impulse responses generated by the TVAR described in equation 16. The responses in these two figures are calculated assuming that there is no-change in the uncertainty regime (as, for example, in Auerbach and Gorodnichenko, 2012), thus maintaining their linear nature and their independence from the specific initial conditions.

The blue line for the low-uncertainty (L-U) regime and red line for the high-uncertainty (H-U) regime indicate the responses of the endogenous variables to an innovation in the 3-quarter ahead forecast spending revisions, formalised in equation 13, with the fan describing the evolution of the 68 per cent confidence bands. As stated above, the innovations to the 3-quarter ahead forecast revisions are the main shock of interest. This is because the more extended time lag makes them more subject to the impact of uncertainty.[20] This set of results are relative to our baseline specification described in section 3, where the marginal tax rate is also included in order to provide a full picture of the behaviour of the main discretionary fiscal policy tools after the spending shock.

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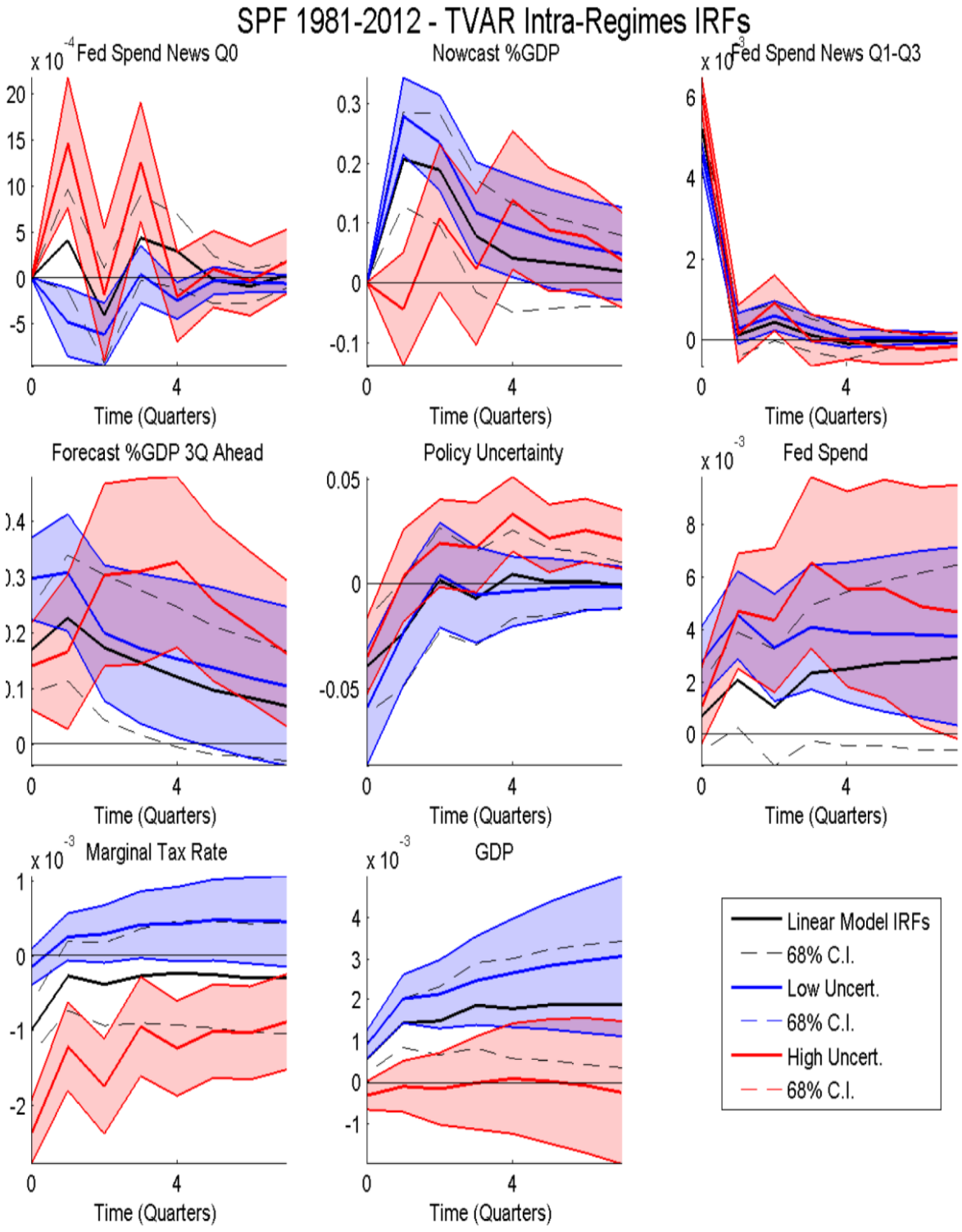
[19] Results are essentially equivalent for all the specifications adopted.

[20] This is especially due to what Leeper *et al.* (2013) define as "inside lag", *i.e.*, the time lag between the announcement and the passing of the law. The forecast revisions are also of particular interest because their time horizon is likely to include the shocks relative to budgetary news (usually impacting a period of one year, *i.e.*, 4 quarters).

Figure 6

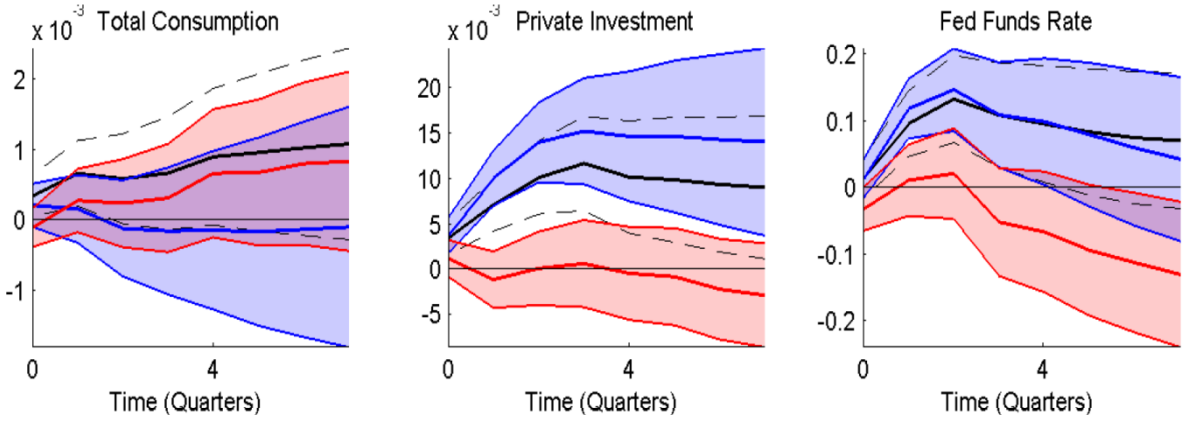
Within-regime Impulse Responses – Impact of Forecast Revisions



The shock corresponds to a one standard deviation change in the revision of the spending forecasts three quarters ahead. The responses are generated under the assumption of constant uncertainty regime. Blue line and fans are relative to the low-uncertainty regime, while the red lines and fans are relative to the high uncertainty regime. Black solid and dotted lines indicate the responses estimated in the linear VAR. Sample: 1981Q3-2012Q4.

Figure 7

Within-regime Impulse Responses – Impact of Forecast Revisions



The shock corresponds to one standard deviation change in the revision of the spending forecasts three quarters ahead. The responses of investments, total consumption and the federal funds rate are generated by adding the variables to our baseline specification. Black solid and dotted lines indicate the responses estimated in the linear VAR. Sample: 1981Q3-2012Q4.

In analysing the results of our Bayesian-TVAR, a useful benchmark is the set of IRFs from the linear VAR with no differentiations from the two uncertainty regimes, as reported by the black lines in Figure 6. The responses to a linear VAR are broadly in line with those of Gambetti (2012) and Ricco (2013). They show that a positive innovation to forecast revisions tends to have a positive and persistent effect on GDP, which can also be ascribed to the accompanying drop in marginal tax rates.

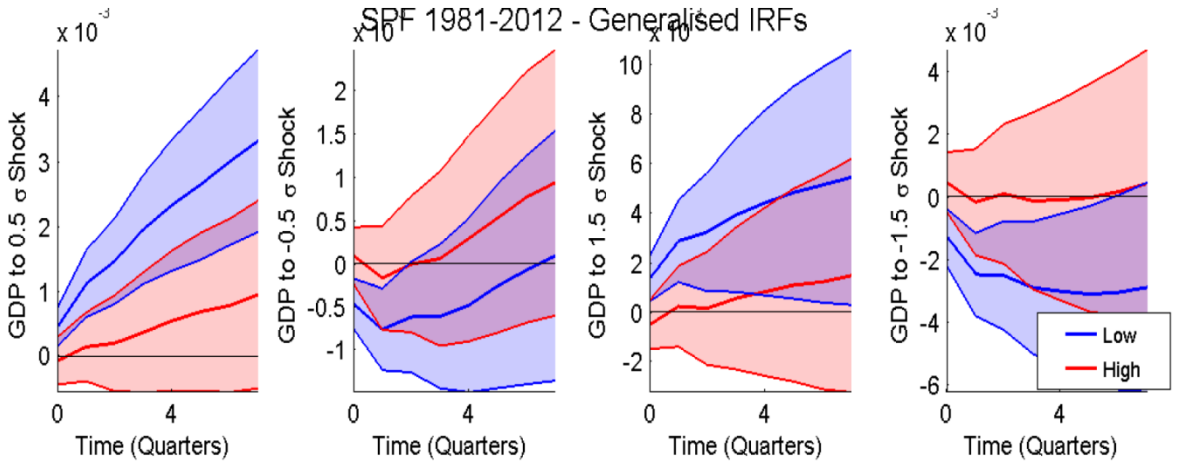
The analysis of the TVAR results, however, reveals two very different transmission mechanisms within the two regimes. While the response of spending to the policy announcement is very similar in the two regimes, in the L-U regime the marginal tax rate response is no longer significative. In the H-U regime, however, the fiscal expansion is also strengthened by a decisive reductions of the marginal tax rate. This additional policy action indicates a stronger activism of the fiscal authorities during period of L-U, as also confirmed by the relatively larger size of the spending news (right panel of the top row in Figure 6).

The GDP response reveals the full extent of the differing impact of the spending shock in the two regimes on the economy. Despite the smaller fiscal impulse generated in the L-U regime, the GDP response is always significant in the L-U regime and higher than in the H-U regime, for at least three quarters following the shock. We also compute the cumulative multipliers: as in the related literature, they are equal to the ratio between the sum of the GDP impulse responses up to the selected horizon (8^{th} quarter in this paper), and the corresponding sum of the responses for federal spending (see also Ilzetzki *et al.*, 2013). The cumulative multiplier in the L-U regime is 2.45 whereas the one in the H-U regime is 0.49. The stronger GDP response in the L-U regime is also reflected in the impact response of 3-quarter ahead forecasted GDP, thus confirming that a fiscal shock is more able to affect economic expectations in the L-U than in the H-U regime.

Figure 7 provides some evidence of the channels through which the different uncertainty regime triggers a different propagation mechanism. While the response of consumption is essentially the same in the two regimes, the response of investment in the L-U regime is always significant and higher than the response in the H-U regime that, on the contrary, is never significantly different from zero. The higher effect on investment in less uncertain times can be

Figure 8

Inter-regime Impulse Responses – Impact of Forecast Revisions



The figure reports the GIRFs of a spending shock on GDP from four different shocks, detailed along the y-axis. These responses are estimated in the context of our baseline 8-variable TVAR. The other responses are not reported here to facilitate the reading, but are available on request. Sample: 1981Q3-2012Q4.

attributed to agents' tendency to increase investment decisions in these periods, in line with the prediction of the option value theory in Bernanke (1983).

Although not as decisively as in the case of investment, also the response of the Fed funds rate is also stronger in the L-U than in the H-U case, at least for the first three quarters.[21] This response, which tends to partially offset the impact of the spending shock on GDP, is consistent with the response on expected GDP and the higher ability of fiscal authorities to influence agents' expectation in periods of low policy uncertainty.

Finally, the analysis of the Generalized Impulse Response Functions (GIRFs) can help us understand how the impact on GDP changes with a different size and sign of the shocks, once we account for the possibility of endogenous regime shifts after the fiscal spending shock (which are neglected in the within-regime analysis presented in Figure 7). Figure 8 includes the GIRFs generated by four different shocks: a small positive fiscal shock of half standard deviation along with its symmetric negative shock (first two panels) and a large fiscal shock of 1.5 standard deviations along with its symmetric negative shock (last two panels). Unsurprisingly, the inclusion of possible regime shifts reduces the difference of the IRFs across the two regimes, though in a rather limited way, especially for small and positive shocks. In the case of negative spending shocks, however, the difference between the two IRFs is less significant, as confirmed by the largely overlapping impulse-response functions. In addition, the impulse responses in the case of negative shocks tends to revert to zero after an initial negative effect, thus revealing that fiscal retrenchments tend to have positive medium-run effects on output following an initial contraction. In summary, the evidence presented by the GIRFs suggests caution in transposing the conclusion inferred in the case of the spending stimulus to the case of spending consolidations given the non-linearities in the GDP effect. Finally, Table 1 reports the regime switching probabilities between the two regimes. It appears that – in the two years following the shock – there is a probability of around 70 per cent that the L-U regime switches to the H-U regime, and vice versa.

[21] See also Coenen *et al.* (2012) for a discussion of how the monetary policy stance may affect the size of fiscal multipliers.

Table 1

Regime Crossing Probabilities from GIRFs

Crossing Probabilities from GIRFs							
Low Uncertainty				High Uncertainty			
0.5 σ	–0.5 σ	1.5 σ	–1.5 σ	0.5 σ	–0.5 σ	1.5 σ	–1.5 σ
0.68	0.70	0.66	0.72	0.72	0.73	0.72	0.74

The probabilities of regime switching are computed using the GIRFs algorithm and evaluating the frequency of switching.

All in all, the evidence reported in Figures 6 and 7 highlights relevant differences between the responses under the two regimes and with the estimates produced by the linear VAR. This confirms the importance of taking the degree of policy uncertainty into account when analysing the transmission mechanism of spending shocks. In particular, despite a reduction in the marginal tax rates usually accompanying the spending shock in the L-U regime, the GDP response in the short-term is stronger than in the H-U regime. The stronger GDP response is mainly driven by an increase in investment and partially offset by the response of monetary authorities. These responses tend to align well with the option-value theory first proposed by Bernanke (1983), while providing further evidence that it is only in a low uncertainty regime that a fiscal announcement has the credibility required to influence agents' expectations.

5.1 Additional results

In order to give a complete overview of the results implied by our econometric model, Figure 9 shows the responses to a one standard deviation innovation on the nowcast revision, as defined in equation 11.

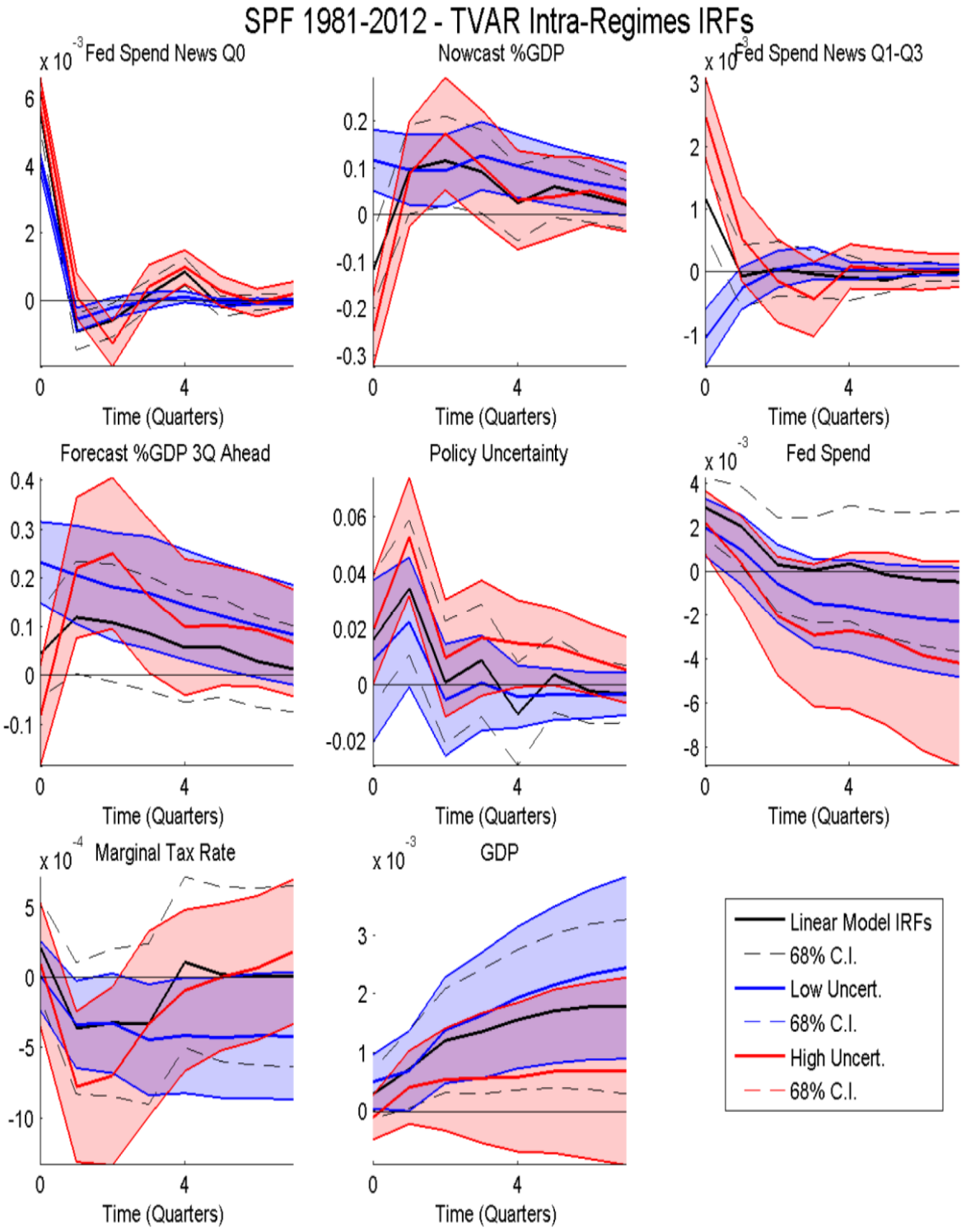
The pattern of the responses in the two regimes is consistent with what has been observed for news shocks relative to future changes in spending. Even though the point estimate of the L-U regime for GDP is generally outside the bands of the H-U regime, unsurprisingly, the responses do not show a strongly significant difference across regimes. The unresponsiveness of nowcast revision shocks to the uncertainty regimes can be rationalized by noting that uncertainty influences the propagation of fiscal shocks mainly through the investment channel (see Figure 7). The enacting of the measure inside the quarter provides little scope for reallocating productive investments in order to expand capacity and accommodate the fiscal expansion.

6 Conclusions

This paper offers new insights into the US economy's fiscal transmission mechanism. In particular, we study the role of fiscal policy uncertainty in the propagation of government spending shocks. We contribute to the existing literature in two main directions. First, we propose a new index focused solely on spending policy which is directly related to the dispersion of economic agents' expectations. Using the US Survey of Professional Forecasters (SPF) dataset, this new index is based on the dispersion of forecasts about future spending growth. The main idea is that disagreement about future government spending is indicative of poor signalling from the

Figure 9

Within-regime Impulse Responses – Impact of Nowcast Revisions



The shock corresponds to one standard deviation change in the revision of the spending forecasts for the current quarter. The responses are generated under the assumption of constant uncertainty regime. Blue line and fans are relative to the low-uncertainty regime, while the red line and fan are relative to the high uncertainty regime. Black solid and dotted lines indicate the responses estimated in the linear VAR. Sample: 1981Q3-2012Q4.

government about the future stance of fiscal policies. Our fiscal policy uncertainty index is as much as possible immune from general macroeconomic uncertainty influence. This has not been accounted for in previous attempts to measure policy uncertainty. Second, we provide stylized facts about the role of fiscal policy signalling and uncertainty in the propagation of government spending shocks on output and other macroeconomic variables.

Our results suggest that, during periods of high fiscal policy uncertainty, fiscal interventions are less stimulative. In these phases, fiscal authorities tend to accompany announcements about future spending growth with reductions in marginal tax rates. However, despite this higher activism, output does not respond to the policy news. At the same time, under low uncertainty, the output response to the spending news is positive and significantly different from zero, reaching a cumulative multiplier of about 2.45 after 8 quarters.

These results cannot be fully transposed to the case of negative fiscal shocks, *i.e.*, to fiscal consolidations. In fact, our Generalized Impulse Response analysis shows that, following a negative spending shocks, the difference between the two IRFs in the two regimes is less significant than in the case of a positive fiscal shock. In addition, the output response in the case of negative shocks tends to revert to zero, after an initial negative effect, thus revealing that fiscal retrenchments tend to have neutral medium-run effects on GDP, following an initial contraction.

With respect to positive fiscal shocks, we show that the strong stimulative effects in less uncertain times is essentially the result of agents' tendency to increase investment decisions, in line with the prediction of the option value theory of Bernanke (1983). We also find that, in presence of clear policy signals (*i.e.*, in the low uncertainty regime), the Federal Reserve tends to be more reactive to spending increases than in periods of high uncertainty.

Overall, these results indicate that fiscal communication can be used as a forward guidance tool. In other words, by committing to a future path of policies, fiscal authorities tend to generate stronger effects on the economy.

APPENDIX A
BAYESIAN PRIORS FOR VAR AND TVAR MODELS

In our empirical model, we adopt Bayesian conjugate prior distributions for VAR coefficients belonging to the Normal-Inverse-Wishart family:

$$\Sigma_\varepsilon \sim IW(\Psi, d) \ , \tag{20}$$

$$\beta|\Sigma_\varepsilon \sim N(b, \Sigma_\varepsilon \otimes \Omega) \ , \tag{21}$$

where $\beta \equiv \text{vec}([C, A_1, \dots, A_4]')$ and the elements Ψ, *d, b,* and Ω embed prior assumptions on the variance and mean of the VAR parameters. These are typically functions of lower dimensional vectors of hyperparameters. This family of priors is commonly used in the BVAR literature because the posterior distribution can be analytically computed.

As for the conditional prior of β, we adopt two prior densities used in the existing literature for the estimation of BVARs in levels: the Minnesota prior, introduced in Litterman (1979), and the sum-of-coefficients prior proposed in Doan *et al.* (1983).

- **Minnesota prior**: This prior is based on the assumption that each variable follows a random walk process, possibly with drift. This is quite a parsimonious though reasonable approximation of the behaviour of economic variables. Following Kadiyala and Karlsson (1997), we set the degrees of freedom of the Inverse-Normal-Wishart distribution to $d = n + 2$ which is the minimum value that guarantees the existence of the prior mean of Σ_ε.[22] Moreover, we assume Ψ is a diagonal matrix with n × 1 elements ψ along the diagonal. The coefficients *A1, ... , A4* are assumed to be a priori independent. Under these assumptions, the following first and second moments analytically characterise this prior:

$$E[(A_k)_{i,j}] = \begin{cases} \delta_i & j = i, \ k = 1 \\ 0 & \text{otherwise} \end{cases} \tag{22}$$

$$V[(A_k)_{i,j}] = \begin{cases} \frac{\lambda^2}{k^2} & j = i \\ \vartheta \frac{\lambda^2}{k^2} \frac{\psi_i}{\psi_j/(d-n-2)} & \text{otherwise.} \end{cases} \tag{23}$$

These can be cast in the form of (21). The coefficients δ_i that were originally set by Litterman were $\delta_i = 1$ reflects the belief that all the variables of interest follow a random walk. However, it is possible to set the priors in a manner that incorporates the specific characteristics of the variables. We set $\delta_i = 0$ for variables that, in our prior beliefs, follow a white noise process and $\delta_i = 1$ for those variables that, in our prior beliefs, follow a random walk process. We assume a diffuse prior on the intercept. The factor $1/k^2$ is the rate at which prior variance decreases with increasing lag length. The coefficient ϑ weights the lags of the other variables with respect to the variable's own lags. We set $\vartheta = 1$. The hyperparameter λ controls the overall tightness of the prior distribution around the random walk or white noise process. A setting of $\lambda = \infty$ corresponds to the ordinary least squares estimates. For $\lambda = 0$, the posterior equals the prior and the data does not influence the estimates.

The Minnesota prior can be implemented using Theil mixed estimations with a set of T_d artificial observations – *i.e.*, *dummy observations*:

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[22] The prior mean of Σ_ε is equal to $\Psi/(d - n - 1)$.

$$y_d = \begin{pmatrix} \text{diag}(\delta_1\psi_1, ..., \delta_n\psi_n)/\lambda \\ 0_{n(p-1)\times n} \\ ..... \\ \text{diag}(\psi_1, ..., \psi_n) \\ ..... \\ 0_{1\times n} \end{pmatrix}, \quad x_d = \begin{pmatrix} J_p \otimes \text{diag}(\psi_1, ..., \psi_n)/\lambda & 0_{np\times 1} \\ ..... & ..... \\ 0_{n\times np} & 0_{p\times 1} \\ ..... & ..... \\ 0_{1\times np} & \varepsilon \end{pmatrix},$$

where $J_p = diag(1, 2, ..., p)$.[23] In this setting, the first block of dummies in the matrices imposes priors on the autoregressive coefficients, the second block implements priors for the covariance matrix and the third block reflects the uninformative prior for the intercept (ε is a very small number).

- **Sum-of-coefficients prior**: To further favour unit roots and cointegration and to reduce the importance of the deterministic component implied by the estimation of the VAR conditioning on the first observations, we adopt a refinement of the Minnesota prior known as a sum-of-coefficients prior (Sims, 1980). Prior literature has suggested that with very large datasets, forecasting performance can be improved by imposing additional priors that constrain the sum of coefficients. To implement this procedure, we add the following dummy observations to the ones for the Normal-Inverse-Wishart prior:

$$\begin{aligned} y_d &= \text{diag}(\delta_1\mu_1, ..., \delta_n\mu_n)/\tau \\ x_d &= ((1_{1\times p}) \otimes \text{diag}(\delta_1\mu_1, ..., \delta_n\mu_n)/\tau \;\; 0_{n\times 1}) \,. \end{aligned} \tag{24}$$

  In this set-up, the set of parameters μ aims to capture the average level of each of the variables. The parameter τ controls for the degree of shrinkage and as τ goes to ∞, we approach the case of no shrinkage.

The joint setting of these priors depends on the set of hyperparameters $\gamma \equiv \{\lambda, \tau, \psi, \mu\}$ that control the tightness of the prior information and that are effectively additional parameters of the model.

The adoption of these priors has been shown to improve the forecasting performance of VAR models, effectively reducing the estimation error while introducing only relatively small biases in the estimates of the parameters (e.g., Sims and Zha, 1996; De Mol *et al.*, 2008; Banbura *et al.*, 2010). The regression model augmented with dummies can be written as a VAR(1) process:

$$y_* = x_* B + e_* \,, \tag{25}$$

where the starred variables are obtained by stacking $y = (y_1, ..., y_T)'$, $x = (x_1, ..., x_T)'$ for $x_t = (y'_{t-1}, \dots, y'_{t-4}, 1)'$, and $\varepsilon = (\varepsilon_1, \dots, \varepsilon_T)$ together with the corresponding dummy variables as $y_* = (y' y'_d)', x_* = (x\, x'_d)'$, $e_* = (e\, e'_d)'$. The starred variables have length $T_* = T + T_d$ in the temporal dimension, and B is the matrix of regressors of suitable dimensions.

The resulting posteriors are:

$$\Sigma_\varepsilon | y \sim IW\left(\tilde{\Psi}, T_d + 2 + T - k\right) \tag{26}$$

$$\beta | \Sigma_\varepsilon, y \sim N\left(\hat{\beta}, \Sigma_\varepsilon \otimes \left(x_*{}' x_*\right)^{-1}\right) \,, \tag{27}$$

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[23] This amounts to specifying the parameter of the Normal-Inverse-Wishart prior as:

$$b = (x'_d x_d)^{-1} x'_d y_d,\ \Omega_0 = (x'_d x_d)^{-1},\ \Psi = (y_d - x_d B_0)'(y_d - x_d B_0)$$

where $\hat{\beta} = \text{vec}(\hat{B}), \hat{B} = (x_*' x_*)^{-1} x_*' y_*$, and $\widetilde{\Psi} = (y_* - x_* \hat{B})'(y_* - x_* \hat{B})$. It is worth noting that the posterior expectations of the coefficients coincide with the OLS estimates of a regression with variables y_* and x_*.

We adopt the pure Bayesian method proposed in Giannone *et al.* (2012) to select the value of the hyperparameters of our priors. However, we make additional assumptions to reduce the number of hyperparameters to be estimated and the uncertainty in the estimation of the VAR coefficients. Following the empirical BVAR literature we fix the diagonal elements ψ and μ using sample information. Although from a Bayesian perspective the parameters ψ should be set using only prior knowledge, it is common practice to pin down their value using the variance of the residuals from a univariate autoregressive model of order p for each of the variables. In the same way, the sample average of each variable is chosen to set the μ parameters.

Finally, we set a very loose sum-of-coefficients prior choosing $\tau = 50\lambda$. In this way, the determination of a rather large number of hyperparameters is reduced to selecting a unique scalar that controls for the tightness of the prior information.

Following Giannone *et al.* (2012), we adopt a Gamma distribution with mode equal to 0.2 (the value recommended by Sims and Zha, 1996) and standard deviation equal to 0.4 as hyperprior density for λ.

APPENDIX B
GENERALISED IMPULSE RESPONSE FUNCTIONS

Generalised impulse response functions are computed by simulating the model, using the following algorithm:

1) Random draws are made for the initial conditions (history) $\omega_{t-1}^{r} = \{y_{t-1}^{r}, \dots, y_{t-1-p}^{r}\}$.
2) Random draws with replacement are made from the estimated residuals of the asymmetric model, $\{\varepsilon_{t-1}^{b}\}_{j=0}^{h}$. The shocks are assumed to be jointly distributed, so if date the *t* shock is drawn, the entire n-dimensional vector of residuals for date t is collected.
3) Given the draws for the history ω_{t-1}^{r} and the residuals $\{\varepsilon_{t-1}^{b}\}_{j=0}^{h}$, the evolution of y_t is simulated over $h + 1$ periods using the estimated parameter of the model and allowing for switches between regimes, obtaining a baseline path $y_{t+k}(\omega_{t-1}^{r}, \{\varepsilon_{t-1}^{b}\}_{j=0}^{h})$ for $k = 1, \dots, h$.
4) Step three is repeated, substituting one of the residuals at time zero with an identified structural shock of size ι but leaving the remaining contemporaneous residual and the rest of the sequence of residuals unchanged. A new path for $y_{t+k}(\omega_{t-1}^{r}, \{\varepsilon_{t-1}^{*,b}\}_{j=0}^{h})$ for $k = 1, \dots, h$ is generated.
5) Steps 2 to 4 are repeated R times, obtaining an empirical average over the sequence of shocks.
6) Steps 1 to 5 are repeated B times, obtaining an empirical average over the initial conditions.
7) The GIRF are computed as the median of the difference between the simulated shocked sequence $y_{t+k}(\omega_{t-1}^{r}, \{\varepsilon_{t-1}^{*,b}\}_{j=0}^{h})$ and the baseline path $y_{t+k}(\omega_{t-1}^{r}, \{\varepsilon_{t-1}^{b}\}_{j=0}^{h})$.

Coverage intervals for the TVAR parameters are computed as follow:

1) A draw for the TVAR parameters $\{C^{i}, A_{j}^{i}, \Sigma_{\varepsilon}^{i}\}_{i=\{l,h\}}$ is made from the estimated posterior distributions. New sequences of residuals are drawn.
2) Using the coefficients and errors from step 1 and initial conditions from the original dataset, GIRFs are computed.
3) Steps 1 to 3 are repeated Q times to generate an empirical distribution for the GIRFs, from which the coverage intervals are selected at the desired percentage level.

In our study, we set R = 200, B = 300 and Q = 1000.

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COMMENT TO "SIGNALS FROM THE GOVERNMENT: POLICY UNCERTAINTY AND THE TRANSMISSION OF FISCAL SHOCKS" BY GIOVANNI RICCO, GIOVANNI CALLEGARI AND JACOPO CIMADOMO

Enrico D'Elia[*] *and Filippo Pericoli*[*]

The main conclusion of this paper is that the fiscal policy should be well communicated to the public in order to be more effective. It follows that policy effectiveness depends to a large extend on its expectedness, rather than on its unpredictability, in sharp contrast with the literature on the rational expectations.

As a consequence, this paper provides a number of lessons and recommendations for the policy makers. First of all, the government should send clear and unambiguous signals about its plans to firms, households and foreign investors, and policies, once decided, must be coherently implemented. Otherwise the uncertainty could weaken and delay the adjustment process of economic agents.

Nevertheless, the role of uncertainty is not symmetric. In fact, credible policies arguably make more effective a fiscal stimulus, since households and firms tend to spend more if they believe that their revenues are going to increase in the medium and short run as a consequence of stronger public expenditure. This fact may even increase the size of fiscal multipliers.

For the same reason, some policy ambiguity may contribute to reduce the cost of austerity, since private demand may decrease less if the fiscal restriction is underestimated.

In any case, exploiting the asymmetric role of signalling too much may be counterproductive, since policy instability brings large costs – as the Italian experience teaches – while the social and political cohesion grants a "peace dividend" – as the German experience shows. Excellent examples of worst practices in policy signalling are provided by the unnecessary perturbations related to the Fiscal Cliff in the US and by the hesitating stance of the ECB in adopting "unconventional measures" in the EU.

Ultimately, if the quality of signals coming from the government was better, the way out from the world crisis could be faster and less costly, as the economic agents were more confident on the commitment of governments and central banks to reduce the unbalances that caused the recession.

Measuring the degree of policy unpredictability is an hard task, and deciding the right dose of signal ambiguity is even harder. The authors of this paper elaborated on the variance of economic forecasts of public spending collected within the US Survey of Professional Forecasters (SPF). However the policy uncertainty is something different from the general macroeconomic uncertainty. The paper tried to disentangle the contribution of general macroeconomic uncertainty from that of pure ambiguity of policy signals taking the residuals of the regression of the dispersion of spending forecast against the dispersion of GDP future growth. Nevertheless, this measure of policy uncertainty may be subject to some criticisms.

First of all, the authors correctly acknowledge that the dispersion of forecasts measures the uncertainty only if professional forecasts are not influenced too much by private information, but arguably professional forecasters cannot survive on the market if they do not pretend to exploit private information! Secondly, the dispersion of professional forecasts may depend on strategic

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signalling, rather than on pure uncertainty. For instance, some analyst may voluntary overestimate GDP growth in order to boost the economic activity or to bias unduly upward the forecasts of his competitors as well. As long as this optimistic forecaster is very influential, his prediction could even be self-fulfilling.

Last but not least, the dispersion of forecasts could fall just when policy signals become more confusing because of the well-known "herd behaviour" of professional forecasters, that usually prefer being wrong all together instead of being right alone when the general scenario is less clear. The repeated overestimation of growth in most European countries is a good example of such behaviour. Thus the equivalence between forecasts variance and **true** policy uncertainty is ultimately questionable.

The effect of policy uncertainty is verified by comparing the IRFs of a simple Bayesian VAR model with a TVAR model where the regime is driven by the policy uncertainty proxy. Nevertheless, the effects of policy uncertainty plausibly vary according to a strong non-linear pattern. Considering only a single trigger threshold – the same over the full sample! – is probably less appropriate.

Maybe the paper may benefit from a non-parametric approach, although we realise that more flexible models would provide less robust results and fewer clear-cut conclusions as well. In any case, the threshold model simulations show that the economy reacts to the government signals faster and stronger in "normal" times, when policy (and general) uncertainty is moderate, than in "troubled waters" (even though the confidence bands of the IRFs are quite large). This is a valuable result, that should suggest the policy makers to be less cautious just during a crisis, when the economic agents are more confused and possibly would welcome some credible "anchor" for their plans.

We appreciated very much that the authors correctly make a distinction between the influence of "nowcast revisions" and "forecast revisions" on government spending. As expected, the latter have larger effects on GDP and private demand components, but not on Federal spending. It implies that credible long term public expenditure plans are more effective than short term (and probably transitory) measures. In contrast, larger Federal expenditure is "required" when policy is uncertain. Also, unexpected changes of current government expenditure in the short run have larger (negative) effects on the public balance.

PUBLIC DEBT DYNAMICS: THE EFFECTS OF AUSTERITY, INFLATION, AND GROWTH SHOCKS

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We study how macroeconomic shocks affect U.S. public debt dynamics using a VAR with debt feedback. Following a fiscal austerity shock, the debt ratio initially declines and then returns to its pre-shock path. Yet, the effect is not statistically significant. In a weak economic environment, the likelihood of a self-defeating austerity shock is much higher than in normal times. An inflation shock only slightly reduces the debt ratio for a few quarters. A positive growth shock unambiguously lowers debt. In our specification, the debt ratio is stationary, whereas a VAR excluding debt may imply an explosive debt path.

1 Introduction

The 2008 global financial crisis caused widespread large deficits and swelling public debt as output collapsed in many countries. The IMF (2012) estimated that the level of public debt for advanced countries increased from about 75 per cent of GDP before the crisis to above 100 per cent of GDP in 2011, a level unseen since the Second World War. A possibility of another Great Depression triggered expansionary fiscal policies in many countries in 2009. However, fiscal stimulus accounted for only a small fraction of the increase in debt, whereas collapsing revenues and higher unemployment and social benefits contributed the largest share (IMF, 2011).

In the wake of the Great Recession in the U.S., the policy debate shifted from high unemployment to fiscal consolidation. Growth was not large enough to stimulate sufficient employment, and by mid-2012, the unemployment rate has only gradually declined to 8.3 per cent from the end-2009 peak of 9.9 per cent. Nevertheless, the focus of the policy debate switched to fiscal consolidation as public debt and deficit have soared since the crisis began. The Congressional Budget Office (CBO) estimates that federal public debt would rise to above 70 per cent of GDP by end-2012 from 36 per cent at end-2007. The federal deficit has skyrocketed from about 1 per cent of GDP to 10 per cent in 2009 and is estimated at about 7.5 per cent in 2012.[1] Many would argue that big debt and deficit levels carry high vulnerabilities and reducing public debt and deficit is important.

Choosing the optimal timing, pace, and tools to reduce public debt are the main challenges confronting policymakers faced with high public debt. From the debt dynamics equation, fiscal consolidation, high growth, large inflation, or low interest rates constitute the elements of a debt-reduction strategy. In the current environment of weak domestic growth and the zero-interest rate bound, fiscal consolidation, or austerity, could prove to be self-defeating.[2] In contrast,

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We are particularly grateful to David Romer for valuable comments. We also thank Ales Bulir, Reinout De Bock, Gaston Gelos, Jiri Jonas, Charles Kramer, Mico Loretan, Paolo Mauro, Alex Mourmouras, Sam Ouliaris, Adrian Pagan, Rafael Romeu, Martin Sommer, Evan Tanner, Jaejoon Woo, and participants at IMF seminars for helpful suggestions. Any remaining errors or omissions are ours. The views expressed herein are those of the authors and should not be attributed to the IMF, its Executive Board, or its management.

[1] The CBO's baseline projections are at current law as of June 2012 (http://www.cbo.gov/publication/43288). The IMF (2012), using general government data, estimates the debt ratio to increase to about 107 per cent of GDP in 2012 from 67 per cent at end-2007.

[2] See DeLong and Summers (2012). Furthermore, the IMF (2010) has shown that a one percentage point reduction in the fiscal balance leads to about ½ per cent reduction in the growth rate. Cottarelli (2012) argues that lower growth may in fact increase the interest rates, further offsetting the impact of consolidation. In addition, Blanchard (2012) points to the "schizophrenic" behavior of markets with respect to growth and consolidation.

stimulating growth could improve both debt dynamics and fiscal balance, bringing more revenues to government coffers.[3] Increasing growth in the short run without adding substantially to public debt would require "bang for the buck" strategies.

Higher inflation and "financial repression" measures – such as regulations on capital movements and interest rates (Reinhart and Sbrancia, 2011) – are other possibilities to reduce debt. A dose of inflation would reduce the real value of debt and financial repression can keep the interest rate low.[4] Financial repression was also found to be more successful in reducing debt when accompanied by inflation. However, allowing for a higher inflation target, even temporarily, would require a radical change in monetary policy.

In this paper, we provide an empirical framework to analyze debt dynamics and focus on the effects of austerity, inflation, and growth shocks on reducing public debt using the US data. To study the relationship between public debt and major macroeconomic variables, we use a modified VAR framework in the tradition of Sims (1980) that includes a separate debt equation as in Favero and Giavazzi (2007, 2009). The VAR model includes the debt-to-GDP ratio (and its lags) as an exogenous variable and the macro aggregates that are part of the debt equation as endogenous variables. Thus, we account for the reaction of agents to changes in the level of public debt as argued by Sims (2011).[5] A separate deterministic debt equation keeps track of the debt dynamics. Computed impulse responses incorporate the dynamic effect of the debt-to-GDP ratio, feeding from the debt equation, on macro aggregates that in turn affect the debt ratio going forward. We show that in our specification – a VAR with debt feedback – the debt ratio is stationary, whereas VARs excluding debt could imply an explosive debt path.

If the economy continues to behave as in the recent past (1980-2007 period), the debt ratio is expected to converge to its long-term average of about 40 per cent of GDP, and deviations resulting from macroeconomic shocks are temporary.[6] Moreover, taking into account the effect of debt on macroeconomic aggregates introduces nonlinearity into VARs, implying that the economic environment could matter. We find that the median impulse responses are not substantially altered by changes in initial economic conditions. However, the uncertainty or risk around the median path could be dramatically affected.

We find that the public debt ratio falls in response to primary surplus shocks, then returns to its pre-shock path. Following an exogenous primary surplus shock of 1 per cent of GDP, the debt ratio falls by about 4.5 per cent of GDP in about 3 years. Fiscal consolidation would continue beyond the initial shock – primary surpluses of cumulative 5.5 per cent of GDP are run within 3 years, thus lowering the debt ratio. The resulting lower growth counteracts the austerity efforts. Furthermore, the debt ratio goes back to its pre-shock baseline after a period of time, implying that in the long run, the debt ratio reverts to its stationary level. In our model, the debt ratio eventually declines over time when starting at a high level of debt. The austerity shock may be unnecessary as the future debt path already incorporates the debt-reducing dynamics of the past.

The effect of austerity is not statistically significant, and the uncertainty around the median path is substantial, especially in a weak economy. In the narrative identification of primary balance shocks the austerity shock does not have a statistically significant effect on the debt ratio. This is true even under average or "normal" conditions. Moreover, the confidence interval suggests that there is a 25 per cent chance that the debt ratio could increase in the first few years as growth

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[3] Hall and Sargent (2010) show that about 80 of the 85 per cent of GDP debt reduction in 1946-1974 in the US is attributed to growth and primary surpluses (about equally split). The rest is due to inflation.

[4] With the short rate at the zero bound and a weak economy, high interest rates are not likely to be problematic in the short run.

[5] Fiscal reaction functions estimated in the literature include the debt ratio. The debt ratio can also affect growth (Kumar and Woo, 2010) and interest rates (Baldacci and Kumar, 2010) and thus should be included in all VAR equations.

[6] The projected debt ratio does not take into account future aging or health care related costs.

deteriorates. In recessionary times, when fiscal multipliers are larger than in normal times (as shown by Auerbach and Gorodnichenko, 2011), an austerity shock might result in an increasing debt ratio. In other words, austerity shocks could be self-defeating. Under the initial conditions prevailing in 2011 – a weak economy, low interest rates and inflation, large deficit, and rising debt – confidence bands are wider for all identification methods than those under "normal" economic times. Consequently, risks to a self-defeating austerity shock are much higher in the weak economic environment than in normal times.

An inflation shock results in an increasing debt ratio after only a few quarters, whereas a positive growth shock lowers debt substantially. We contend that the positive or negative response of debt to inflation, or for that matter, interest rate shocks, depends largely on the monetary and fiscal policy regimes in place. A more conservative monetary authority, as in the post-Volcker era, would most likely respond aggressively to inflation shocks. The fiscal policy regime also matters in determining the relationship among inflation, interest rate, and ultimately debt (Sims, 2011). If monetary and fiscal policy reacted to higher inflation as observed in the recent past (post-1980), a 1 percent inflation shock could lead to a rise of the debt ratio within a few quarters despite falling by about 0.5 per cent of GDP on impact. As a result of an inflation shock, the interest rate rises, and growth falls. These responses are consistent with a supply shock such as a hike in oil prices. The debt ratio starts increasing as higher interest rate, lower growth, and eventually higher primary deficit counteract the effect of higher inflation.[7] A positive shock to growth has a large impact on reducing public debt as both higher growth and primary surpluses contribute to lower debt – a 1 percentage point increase in growth rate reduces the debt ratio by around 1.5 per cent of GDP in 3 years.

The paper is structured as follows. Section 2 discusses related literature, and Section 3 presents an empirical methodology and data. Section 4 is the main section of the paper, which analyzes the U.S. public debt dynamics. Section 5 concludes.

2 Related literature

If one uses the VAR methodology in debt and fiscal policy empirical analysis, we contend that the VAR with debt feedback is the recommended approach to take. Favero and Giavazzi (2007, 2009) emphasized the importance of using the debt feedback equation since excluding debt in the VAR could result in an omitted variable bias.[8] The linear approximation of debt-to-GDP implicit in standard VARs may be misleading. The post-1980 U.S. sample suggests that excluding debt feedback in the VAR results in explosive debt dynamics and persistent impulse responses of debt to shocks. If the underlying debt dynamics are not on a stable path, the estimated effects of fiscal policy on macroeconomic aggregates may no longer be meaningful, and the question of the magnitude of a deviation from the explosive path would take the back seat.

Our specification is robust to changing sample periods, whereas other specifications are not. As a result, it is not possible to identify whether these models imply that current policies are unsustainable or that the models are misspecified. We thus add another angle to the misspecification problem discussed in Favero and Giavazzi (2007, 2009). Lastly, another approach used in the literature is to include debt as part of the VAR's endogenous variables. However, this

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[7] Our result is consistent with the study of Hamilton and Herrera (2004) analyzing the response of U.S. real GDP to changes in oil prices. They find that the effect of an oil price hike on the economy takes 3 to 4 quarters to peak.

[8] Favero and Giavazzi (2007, 2009) analyzed the effects of expenditure and revenue shocks on growth using the narrative approach of Romer and Romer (2010) and the structural approach of Blanchard and Perotti (2002). Our paper's emphasis is, however, on public debt dynamics. In general, impulse responses of the main macroeconomic aggregates are not substantially altered in the post-1980 sample by excluding debt feedback as shown by Favero and Giavazzi (2007, 2009).

specification ignores the nonlinearity part of the debt equation, which may be sizeable. Moreover, the impulse responses do not depend on initial conditions. In contrast, we show that initial conditions affect the width of confidence bands and thus risk.[9]

Several papers incorporate public debt in VAR estimations, but they do not extensively analyze impulse responses of debt to macroeconomic shocks. For the most part, these papers test for the sustainability of debt, examine fiscal policy effects on growth, or study other countries than the U.S.[10] In addition, Bohn (1998) in a single regression, incorporating the tax smoothing model of Barro (1979), shows that the U.S. public debt is stationary as the primary surplus reacts to higher levels of debt. Celasun, Debrun, and Ostry (2007) simulated debt paths for emerging countries based on combining an estimated fiscal reaction function from a panel regression and country-specific VARs of other macroeconomic variables without debt feedback.[11] Focusing on debt forecasts, Kawakami and Romeu (2011) apply the VAR with debt feedback to the Brazilian data. Many others use cross-country data to study the link between the level of debt and macroeconomic variables such as growth (e.g. Reinhart and Rogoff, 2010, and Kumar and Woo, 2010).

Two recent papers by Hall and Sargent (2010) and Aizenman and Marion (2009) explore the role of inflation in reducing debt. Hall and Sargent (2010) show that about 23 per cent of the debt reduction from 1946 to 1974 was due to inflation. They indicate that the average maturity of public debt shortened to about three years in the late 2000s from seven in the aftermath of the Second World War, hence reducing the benefit of inflation in lowering the debt ratio. Aizenman and Marion (2009) point out that although the maturity of debt is shorter now, a higher proportion of debt held by foreigners creates an incentive to inflate. They find that an inflation of 6 per cent could reduce the debt-to-GDP ratio by about 20 per cent over 4 years. Yet the authors caution that the result depends on model parameters, especially the parameter determining the cost of inflation, and that modest inflation may result in unintended consequences in terms of inflation acceleration. Our findings show that the response of debt to a positive inflation shock, using the dynamics observed post-1980, would generate higher debt after about a year, driven mostly by higher interest rate and lower growth.

3 Empirical model, estimation, and data

3.1 Empirical model

To keep the model parsimonious, the VAR is based on the following four variables in the endogenous vector Y specified in equation (1): primary deficit-to-GDP ratio (primary expenditures minus revenues, pb), real GDP growth rate (g), inflation rate based on the GDP deflator (π), and nominal average interest rate based on interest payments on debt (i). The variables used are exactly

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[9] In the post-1980 US sample, the nonlinearity part of the debt equation does not matter substantially. In the VAR model with endogenous debt, the out-of-sample debt forecast deviates by about 5 per cent of GDP.

[10] Some of these papers use one lag of debt in the VAR (Afonso and Sousa, 2009) or incorporate public debt as one of the endogenous variables (Hasko, 2007, and Corsetti, Meier, and Muller, 2009), which may result in misspecification. Others employ long-term cointegration approach (Boisinnot, L'Angevin, and Monfort, 2004, and Polito and Wickens, 2007) or do not include debt in the VAR (Tanner and Samake, 2008). Chung and Leeper (2007) use a VAR with cross-equation restrictions arising from the present-value condition of debt sustainability. Barro (1980) studied the effect of US public debt shocks on output and unemployment using regressions without the VAR dynamics.

[11] See Celasun and Keim (2010) for an application to the U.S.

those that enter equation (2) describing the debt dynamics.[12] The VAR specification also includes the debt-to-GDP ratio (d) as an exogenous variable:

$$Y_t = \sum_{i=1}^{k} A_i Y_{t-i} + \sum_{i=1}^{l} \gamma_i d_{t-i} + \varepsilon_t \tag{1}$$

where k and l are the number of lags used ($k = 4; l = 2$). Equation (2) describes the debt dynamics:[13]

$$d_t = \frac{(1 + i_t)}{(1 + \pi_t)(1 + g_t)} d_{t-1} + pb_t \tag{2}$$

Equations 1 and 2 define our system of equations. Only equation 1 is needed to estimate the parameters of the model. The debt equation 2 keeps track of the debt dynamics, which is needed to compute impulse responses and dynamic forecasts.

3.2 Estimation and impulse responses

The model estimation is straightforward, but the computation of impulse responses (IRs) requires keeping track of the debt feedback in equation 1. The VAR is estimated using OLS. Similarly to Favero and Giavazzi (2007), we find that it is the change in debt that affects VAR dynamics as the coefficients on lagged debt are similar in absolute values but are of the opposite signs in each row of equation 1. Since equation 2 includes all the estimated variables in equation 1 and has no parameters, it does not need any estimation. In computing forecasts or impulse responses, debt at each time period in equation 2 is calculated based on the macro variables obtained from equation 1 and is then inserted back into equation 1. The impulse response is defined as the difference between projections based on equations 1 and 2 with and without an initial shock (a "shock" path and a "no-shock" path, or a baseline, respectively). We use a bootstrap methodology to compute confidence intervals.[14]

The inclusion of the debt-to-GDP ratio in the VAR implies a nonlinear relationship among variables, which may make the interpretation of traditional IRs difficult. We compute IRs similar to generalized impulse responses (GIRs) of Koop, Pesaran, and Potter (1996) to deal with the history and shock dependence inherent to nonlinear models. These IRs provide a natural way to examine out-of-sample forecasts and impulse responses. They are conditional expectations based on history and initial shocks. The computed IRs are defined as the difference between the expectations conditional on history (w) and an initial shock (v) for the response and on history (w) for the baseline:

$$IR(Y; v_t, w_{t-1}, n) = E(Y_{t+n} \mid v_t, w_{t-1}) - E(Y_{t+n} \mid w_{t-1}) \; for \; n = 0, 1, 2, ... \tag{3}$$

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[12] The model does not include the marginal interest rate such as the Treasury bill rate or the fed funds rate controlled by the Federal Reserve. The difference between the average interest rate on debt and the Treasury bill rate would narrow with a short debt maturity, which has been decreasing over time. Moreover, the correlation between the average interest rate on debt and the Treasury bill rate is above 80 per cent, suggesting that our model captures the interest rate dynamics relatively well. In interpreting impulse responses, a shock to the average interest rate would imply a larger underlying shock to the marginal rate.

[13] We ignore the debt residual, including non-deficit financing, in our specification. For the US, the debt residual was historically marginal as shown in Favero and Giavazzi (2007) for the period between 1947 and the end of the century.

[14] The procedure is as follows: (i) Resample residuals from the original VAR and compute new *Y* and corresponding *d*; (ii) Reestimate the VAR, identify shocks, and compute IRs; (iii) Repeat steps (i) and (ii) 1000 times to obtain bootstrapped distributions of IRs and compute confidence intervals.

We use a simple bootstrapping procedure and an estimated variance-covariance matrix of reduced form residuals in equation (1) to generate shocks, compute expectations, and derive IRs based on equation 3.[15] Using the bootstrapped residuals and the estimated VAR, "shock" and "no shock" forecast paths of variables are computed. Expectations are calculated with 1000 iterations. The IR is the difference between "shock" and "no shock" expected forecast paths.[16] In terms of history (w), we condition the calculation of IRs on the most recent observations in our data. Alternatively, we average initial conditions, w_{t-1}, based on the re-sampled data from the estimation sample. That is, we eliminate history from the conditional expectation.

We use the outlined approach to calculate the IRs with three different identification methods to identify a causal shock in the initial period. To tackle the causality issue, we use both narrative and structural methods. We include exogenous tax shocks from the narrative approach of Romer and Romer (2011) as primary balance shocks. We also add the defense news variable of Ramey (2011) as an expenditure shock to tax shocks to get another measure of primary balance shocks. These primary balance shocks are added as a separate exogenous variable in our VAR system.[17] The structural approach of Blanchard and Perotti (2002) is used to identify the contemporaneous relationship among VAR, or reduced-form, residuals. Favero and Giavazzi (2007) use Perotti's (2008) updated elasticities of taxes and spending to growth and inflation. We broadly follow Favero and Giavazzi (2007) in our structural identification scheme.[18]

The third identification method used is GIR methodology. The shocks in the GIR framework are generated from the observed correlations among shocks. In essence, a shock to a variable in this framework is an innovation to the variable that comes together with innovations to other variables that one would expect given sample correlations among innovations. It amounts to ordering the variable "shocked" first each time. For instance, a shock to primary deficit will be accompanied with shocks to growth, inflation, and interest rate as observed empirically. In this particular order, the GIR's formulation of a primary deficit shock would also be identical to a shock derived from Cholesky identification.

3.3 Data and descriptive statistics

The data used are quarterly series and are available from several sources. Total revenues, expenditures, and interest payments (seasonally adjusted) are taken from the Bureau of Economic Analysis's National Income and Product Accounts (NIPA, Table 3.2). Nominal and real GDP and GDP deflator series come from the same source (Tables 1.1.5, 1.1.6, and 1.1.9, respectively). The quarterly data are available from 1947. Federal debt held by public is taken from St. Louis Federal Reserve's FRED database. The quarterly debt series are available from 1970 while the annual data start earlier. To impute quarterly nominal values between the adjacent annual figures, we add up quarterly overall fiscal balance figures and linearly interpolate the residual. Our whole sample

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[15] We also used Monte Carlo normal sampling, and we obtained similar results, which indicate that shocks are likely to be Gaussian.

[16] Koop, Pesaran, and Potter (1996) describe in detail how to compute IRs.

[17] The shocks are scaled by nominal GDP in the previous period.

[18] The reduced form residuals, u, are related to structural residuals, e, in the following way: $Au = Be$. The residual vector lists variables in the following order: primary balance, growth, inflation, and interest rate. B matrix is diagonal, and A matrix (with ones on the diagonal) has the following structure. The first row of A matrix includes the elasticities of primary balance to growth, inflation, and interest rate: (i) 0.1, elasticity of primary balance/GDP to growth, is obtained using tax elasticity of about 2 and spending elasticity of zero with respect to growth and the quarterly spending to GDP ratio of about 5 per cent (post-1980 sample); (ii) 0.07, elasticity of the primary balance ratio to inflation, is computed using tax elasticity of 1.4 and spending elasticity of zero to inflation and 5 per cent spending/GDP ratio; and (iii) zero is assumed for elasticity of the primary balance ratio to interest rate. Other parameters in A matrix are identified recursively (implying zeros above the diagonal in other rows). The free parameters in A and B matrices (10 remaining elements) are then estimated using the variance-covariance matrix of the reduced-form residuals (10 distinct elements in a 4-equation VAR).

Table 1

Descriptive Statistics

	Mean	St. Dev.	Min	Max
Primary deficit	–0.0010	0.0047	–0.0126	0.0066
Growth	0.0073	0.0071	–0.0207	0.0222
Inflation	0.0077	0.0047	0.0017	0.0273
Interest rate	0.0219	0.0055	0.0129	0.0331
Debt	0.3842	0.0694	0.2449	0.4965

Correlation Coefficients

	Primary Deficit	Growth	Inflation	Interest Rate	Debt
Primary deficit	1				
Growth	–0.015	1			
Inflation	0.202	–0.258	1		
Interest rate	0.182	–0.057	0.467	1	
Debt	–0.201	0.183	–0.612	–0.326	1

The table shows descriptive statistics and correlation coefficients among the following quarterly variables: primary deficit (share of GDP), growth rate, inflation rate, average interest rate on debt, and debt ratio (share of GDP).

covers the period from the second quarter of 1947 to the third quarter of 2011. Given a structural break[19] occurring at about 1980 as shown, for instance, in Perotti (2004), we focus our results on the post-1980 sample. The estimation sample ends in the fourth quarter of 2007 due to the availability of exogenous tax shocks data and the advent of the global financial crisis in 2008.

The debt-to-GDP ratio drifted both downward and upward in the latter part of the 20th century (Figure 1). It stood at about 90 per cent of GDP after the Second World War but steadily declined afterward to the mid-20s range by the late 1970s. The debt ratio doubled in the 1980s to about 50 per cent of GDP and decreased to its mean level of about 40 per cent of GDP in the 1990s (Table 1). Another debt buildup has been occurring since late 2008, primarily because of the financial crisis and a subsequent collapse in output. The estimation sample, 1980-2007, shows some interesting correlation patterns in the data. Higher deficit is associated with lower interest rate and debt ratio, whereas the debt ratio is positively correlated with growth. We examine the dynamics of these variables in the next section.

4 Public debt dynamics and impulse responses

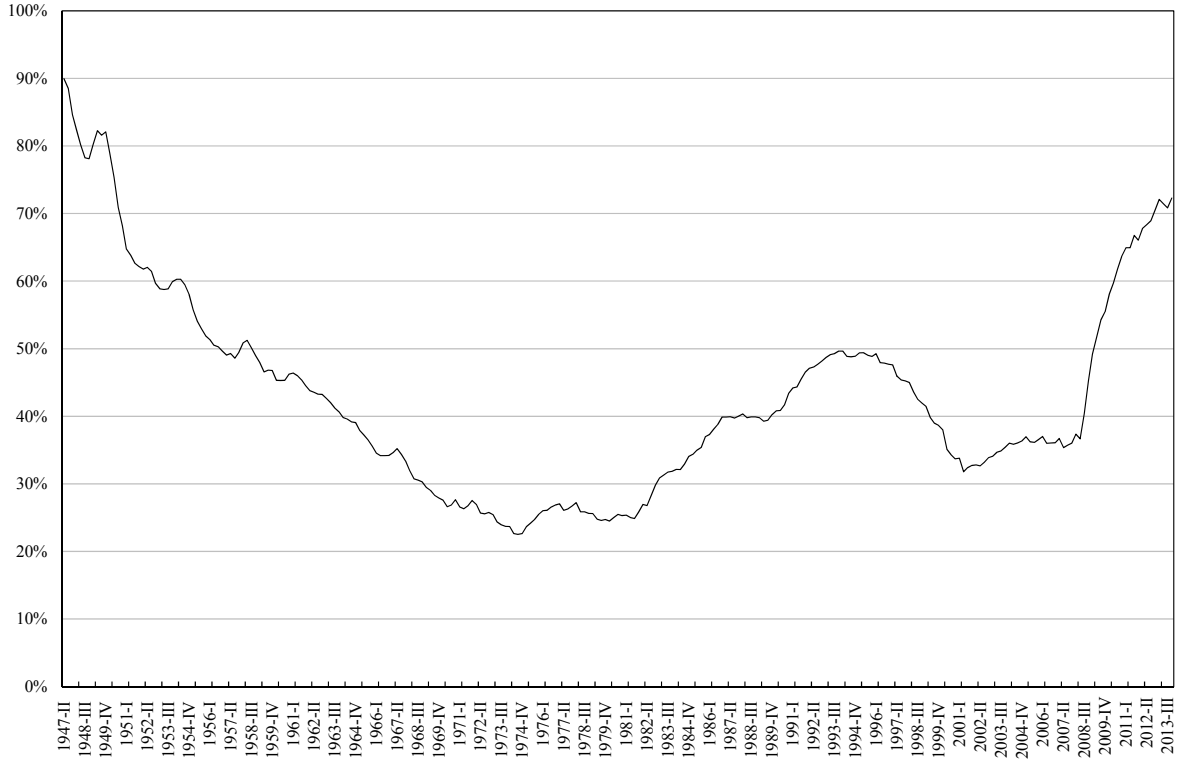
4.1 Debt impulse responses to an austerity shock

The debt ratio falls as a result of an austerity shock (a negative shock to the deficit) but then returns to its pre-shock path. Figure 2 shows responses of the debt ratio to a one standard deviation

[19] Due to possible changes in the economic structure and monetary and fiscal policy regimes.

Figure 1

Evolution of Public Debt
(percent of GDP, 1947:II-2011:III)



The figure shows the dynamics of the federal debt held by public (percent of GDP) in the US over the past 60 years.

increase in the primary surplus (0.11 per cent of GDP).[20] All identification schemes suggest that the debt ratio would fall by about 0.5-0.75 per cent of GDP in about 2.5-3 years before rising and converging to the pre-shock baseline sometime after 10 years. The debt ratio declines and then rises as the primary balance improves in the first years after the shock and then deteriorates in later years. Furthermore, the convergence of the baseline debt ratio is ensured by including the debt feedback in the model, whereas a model without debt in the VAR (an implicit linear approximation) does not capture the feedback effect. As a result, the debt ratio can even evolve along an explosive path, and debt impulse responses can be persistent (Appendix A, Figures 8-10).[21]

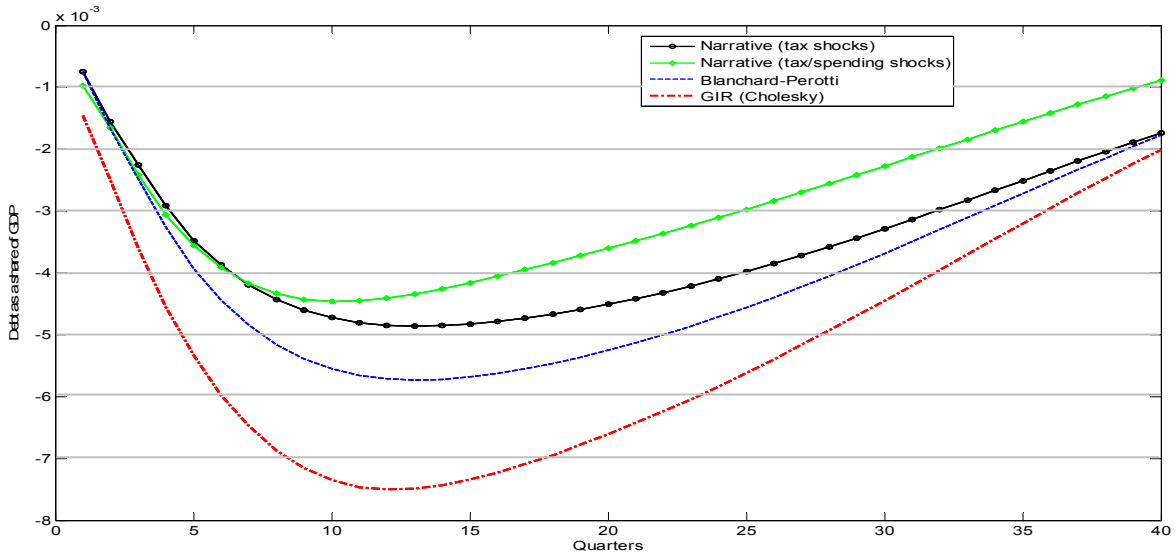
The decline in the debt ratio is primarily driven by the primary surplus and, to less extent, by inflation, whereas growth and the interest rate counteract the fall in the debt ratio (see Figure 3

[20] Based on Blanchard-Perotti approach. We scale the shock in the narrative approach to correspond to the same change in the primary surplus.

[21] Without the debt feedback, the projected debt ratio is on a path that is either unsustainable or nondecreasing. The debt ratio does not decrease using the initial conditions of 2011 and can actually spiral beyond 130 per cent of GDP in ten years when using the initial conditions at the height of the crisis in early 2009. The results are similar irrespective of whether the debt feedback component is shut down in the forecast or whether the debt path is computed based on the VAR that excludes debt completely. The VAR with the debt feedback produces a robust result that the debt dynamics are not explosive unlike the VAR without the debt feedback.

Figure 2

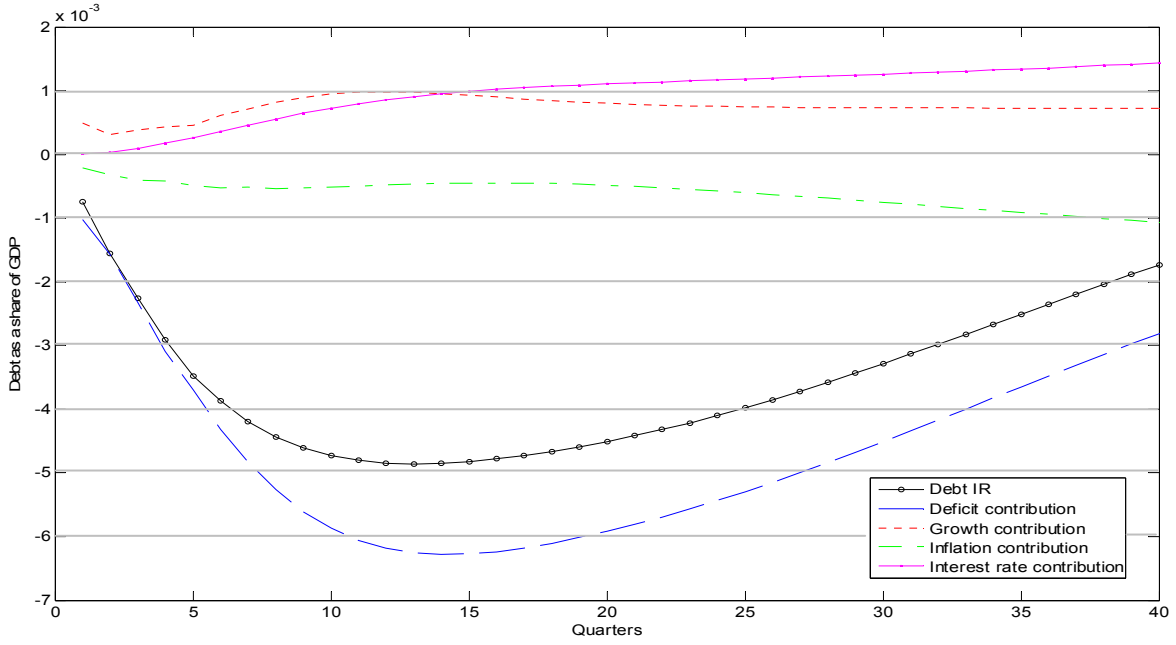
Debt Impulse Response:
The Effect of a One Standard Deviation Primary Surplus Shock on the Debt Ratio



The figure traces the response of the debt ratio (share of GDP) to a one standard deviation austerity shock (0.11 percent of GDP) for four identification strategies.

Figure 3

Decomposition of the Debt Impulse Response under the Narrative Identification Using Exogenous Tax Shocks



The figure decomposes the response of the debt ratio to a one standard deviation austerity shock (under the narrative identification with exogenous tax shocks) into the contributions from primary deficit, growth, inflation, and interest rate (see Appendix B).

and Appendix B for the derivation). Despite the initial shock of about 0.1 per cent of GDP, over the following 3 years, the primary balance continues to increase by another 0.5 per cent of GDP (using the narrative identification). The debt ratio declines by 0.5 per cent of GDP in the same period. Lower growth, as a result of austerity, dampens the debt decline. Growth falls on impact by about 0.1 per cent and decreases further over the 3-year period (a cumulative decline of about 0.3 per cent). A slightly higher inflation rate, probably due to positive tax shocks, lowers the debt ratio. Yet the decreasing effect is countered by higher interest rate that most likely goes up due to higher inflation.

The effect of an austerity shock on the debt ratio is not statistically significant in the narrative identification, and the uncertainty around the median debt ratio path is higher in a weak economy than normal times. Although the austerity shock reduces the debt ratio, the 90 per cent confidence interval under the narrative identification strategy suggests that the self-defeating effect of the shock cannot be ruled out (Figure 4). In fact, the upper confidence band actually increases in the first few years after the shock with about 25 per cent chance that the debt ratio would actually increase. The confidence bands for Blanchard-Perotti and GIR (Cholesky) identification are much tighter and suggest that the effect of an austerity shock on debt is statistically significant for about 8 years. However, given that the model with the debt feedback is nonlinear, the initial conditions may matter. Constructing impulse responses using the latest available observations (the third quarter of 2011), the confidence intervals become much wider (Figure 5) and shows that the debt ratio decline is statistically insignificant within 2 years even for Blanchard-Perotti specification.

In summary, using austerity shocks to reduce the debt ratio may prove counterproductive if the economy is weak and may not be needed since regardless of the shock, debt converges to its long-run value. Driven by improving economic conditions and decreasing deficits as seen in the past, the debt ratio is projected to fall (Figure 6). Yet the uncertainty around the median forecast suggests that the debt ratio decline could be very slow. There are in fact theoretical arguments against a rapid fiscal adjustment.[22] Barro's tax smoothing hypothesis implies that the short run cost of adjusting fiscal policy could exceed its long run benefits if the interest rate is relatively low. Moreover, Kirsanova and Wren-Lewis (2012) show that in a model where monetary policy is determined endogenously, the optimal fiscal feedback is small and the pace of adjustment is slow.

Our results indicate that a 1 percent of GDP austerity shock leads to a cumulative increase in the primary surplus of 5.5 per cent of GDP in 3 years and a decline in the debt ratio by about 4.5 per cent of GDP at the expense of about 3 per cent fall in growth. A short-run pain of lower growth and thus higher unemployment may not be worth a small adjustment in the debt ratio as a result of the austerity shock. Further, the short-run debt reduction may not materialize due to the uncertainty in the estimated macroeconomic relationships. The risks, especially in the weak economic environment, are relatively high. As the goal of policymakers is to decrease the debt ratio in a reasonable time, the debt reduction would require the usual response to the debt buildup as in the past. Historically, economic growth brought in primary surpluses and facilitated the debt reduction. The time to start gradually reducing debt comes when robust economic recovery is underway.

4.2 Debt impulse responses to inflation and growth shocks

An inflation shock reduces the debt ratio slightly for only a few quarters, after which the debt ratio rises above its pre-shock path. It falls by about 0.1 per cent of GDP on impact after a one

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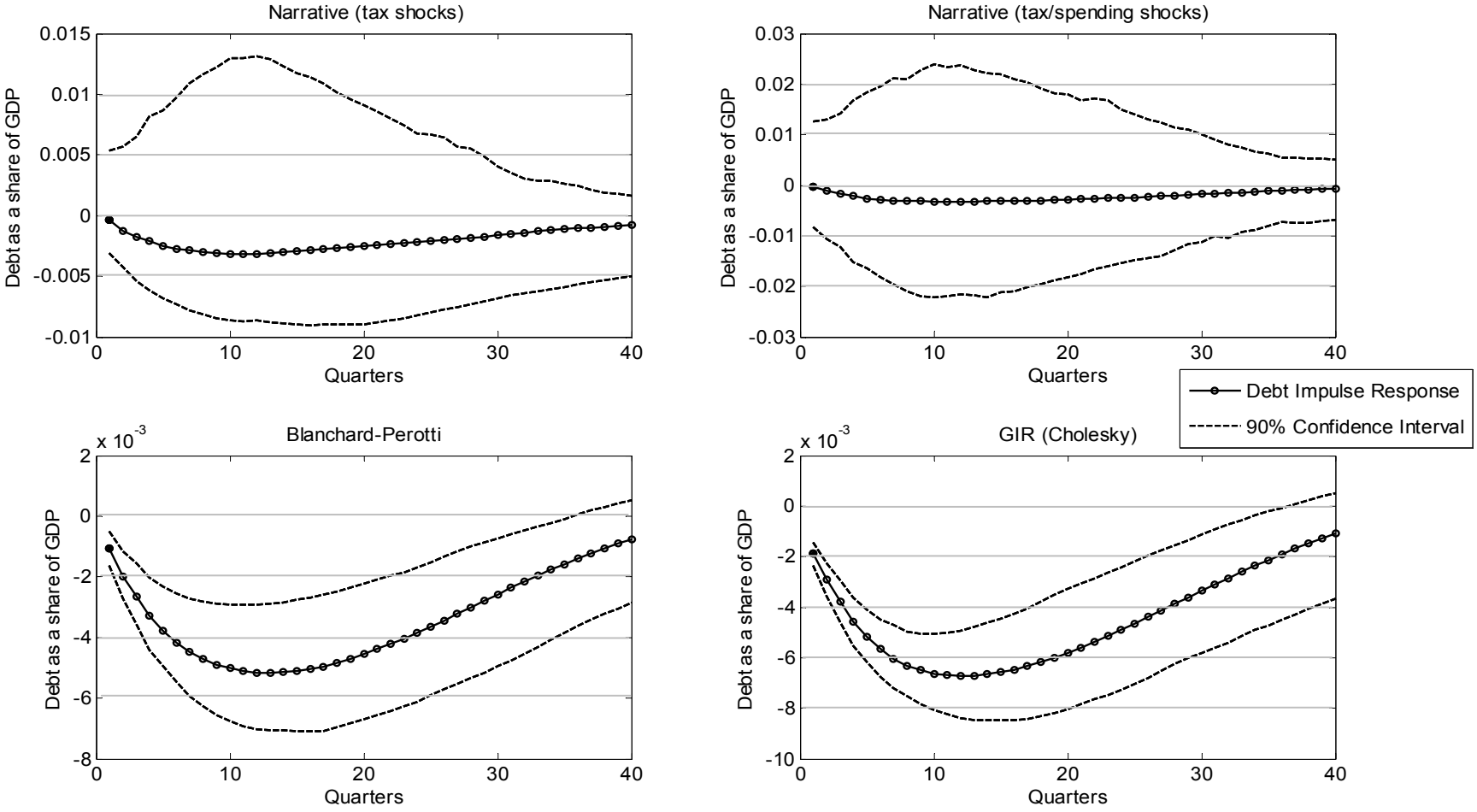
[22] See the discussion "The optimal speed of debt correction" on Simon Wren-Lewis' blog (mainly macro) on March 20th, 2012 (available: http://mainlymacro.blogspot.co.uk/2012/03/optimal-speed-of-debt-correction.html).

Figure 4

Debt Impulse Responses to a One Standard Deviation Primary Surplus Shock: Average Initial Conditions

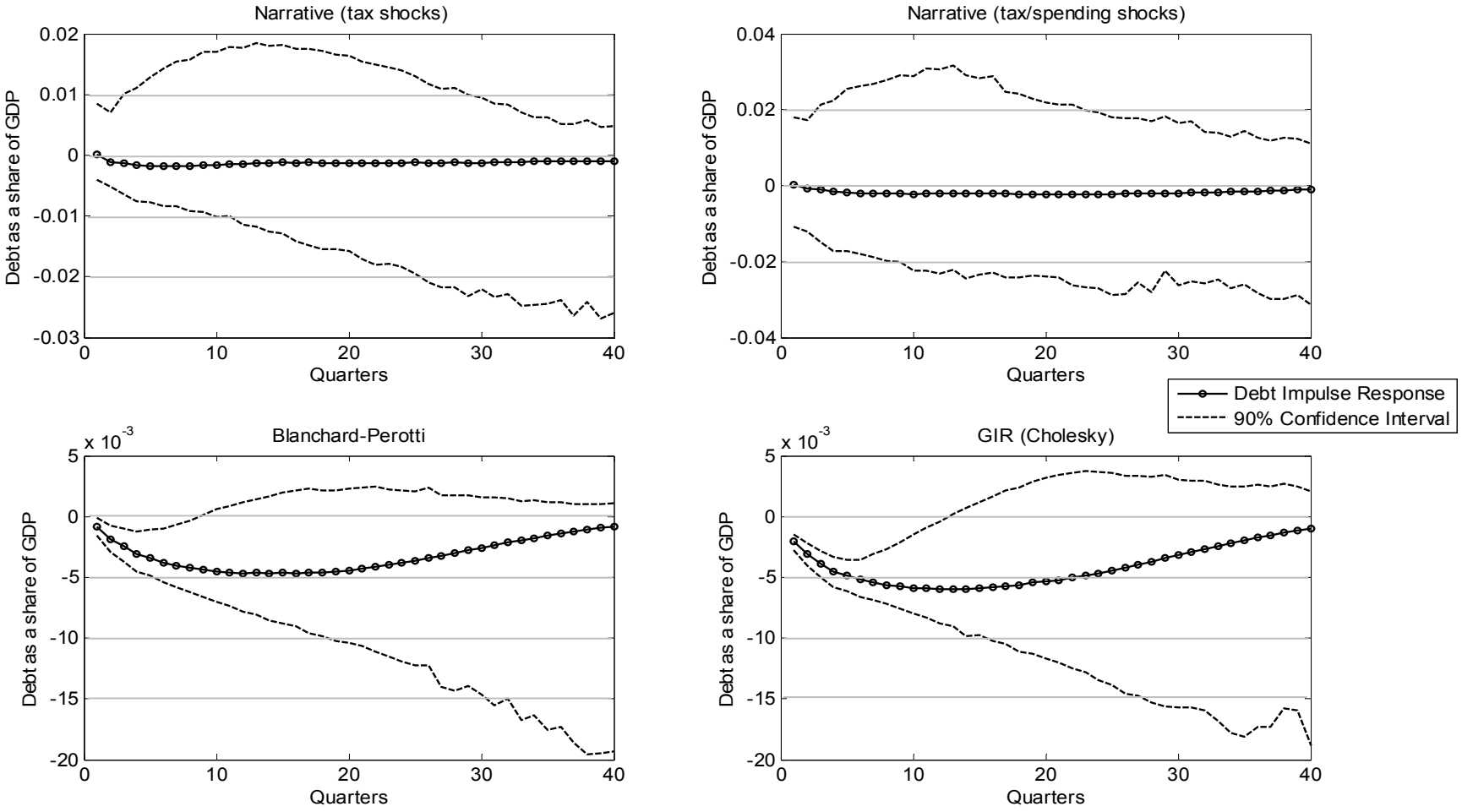
(normal times)



The figure shows median responses and 90 percent confidence bands of the debt ratio due to a one standard deviation austerity shock under the initial conditions of normal times (based on the 1980-2007 sample). The charts for four identification strategies are presented.

Figure 5

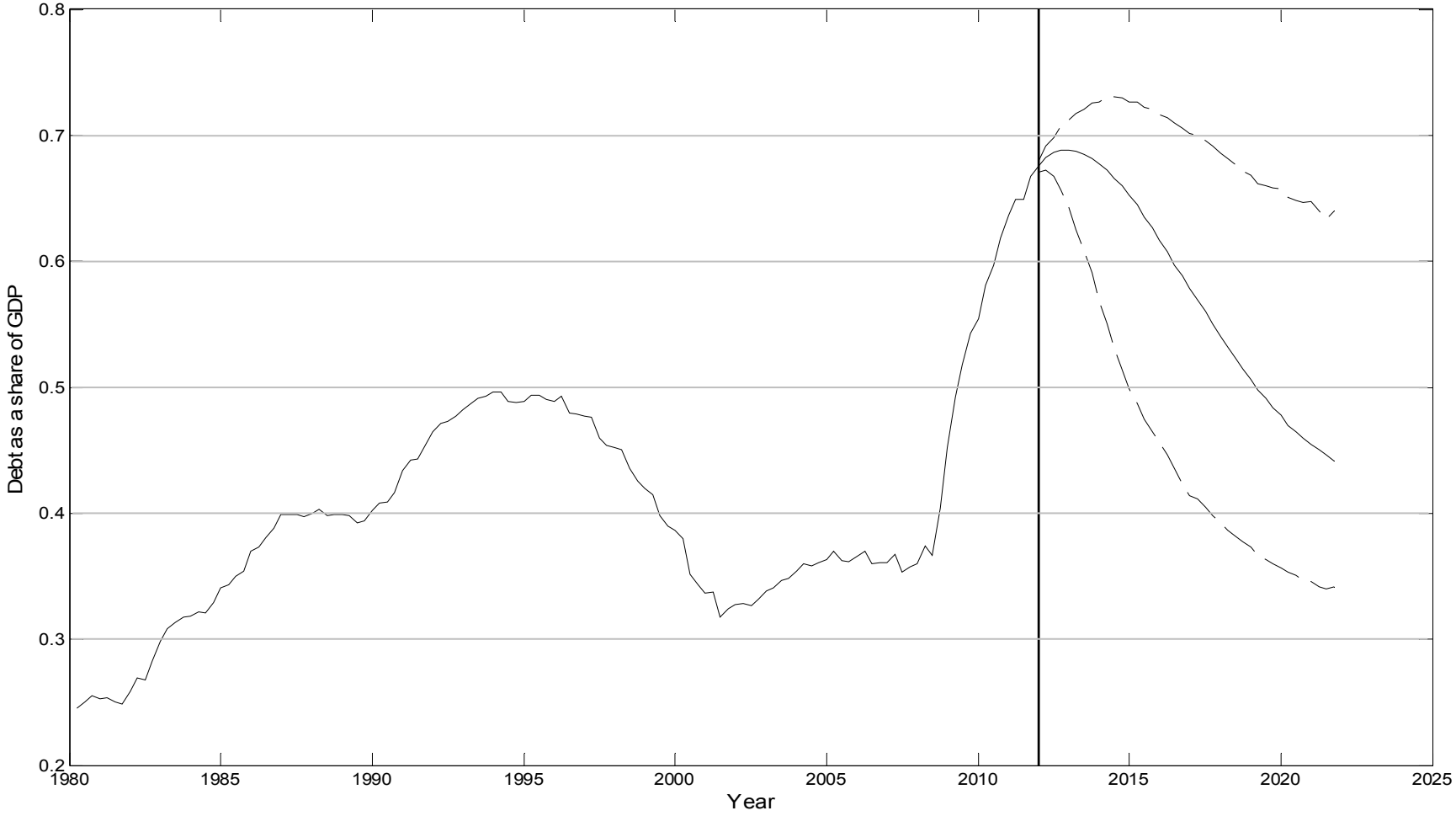
Debt Impulse Responses to a One Standard Deviation Primary Surplus Shock: Initial Conditions of 2011



The figure shows median responses and 90 percent confidence bands of the debt ratio due to a one standard deviation austerity shock under the initial conditions prevailing in the beginning of 2011. The charts for four identification strategies are presented.

Figure 6

A Recent History and Forecast of the Debt Ratio Based on the Past Dynamics (2011:IV-)



The figure shows the debt ratio time series from 1980 onward and a 10-year forecast from the fourth quarter of 2011 based on an estimated VAR model with debt feedback (as described in the text). The 90 percent confidence interval is also presented.

standard deviation inflation shock of 0.16 per cent (Figure 7).[23] The debt ratio starts increasing almost immediately, reaching the peak increase of about 0.3 per cent of GDP in 5 years. The change in debt is driven by a combination of opposing forces – higher interest rate, lower growth, and higher deficit on one hand, and higher inflation on the other hand. These effects are consistent with higher inflation emanating from a supply shock. Growth falls, deficit increases, inflation rises, and interest rates increase. Initially, higher inflation reduces the debt ratio despite lower growth and higher interest rates. Primary deficits rise, and eventually, inflation alone is not enough to compensate for higher deficit and interest rate and lower growth. The debt ratio starts declining after growth turns positive, and primary deficit becomes a surplus.

Reducing debt through an inflation shock may not work unless we expect monetary policy to react differently. With an inflation shock, interest rate is higher than in the baseline, suggesting that the monetary policy is being tightened. Looser monetary policy with less aggressive interest rate hikes may be needed for the inflation shock to play a strong role in reducing debt. For instance, Krugman (1998, 2011), Mankiw (2009) and Rogoff (2009, 2011) have argued for a higher inflation target that the Fed would announce in the times of the zero-interest bound to improve economic recovery and speed up the deleveraging process.

Following a positive shock to growth, the debt ratio would unsurprisingly decline first, and then converge back to its pre-shock path. With a growth shock of one standard deviation (about 0.5 per cent), the debt ratio falls on impact by about 0.2 per cent of GDP (Figure 7). Primary surplus starts contributing with a larger share to the debt decline as growth continues to increase by another 0.3 per cent in the first year. In about 3 years, the debt ratio falls by 0.8 per cent of GDP as primary surplus increases by 0.7 per cent of GDP. Inflation and interest rates increase slightly but their contributions to the debt dynamics are relatively small in the first few years. The debt ratio converges back to the baseline as primary deficit returns. If policymakers wanted to achieve the same medium-term reduction in the debt ratio through austerity, they would need to run surpluses by about 30 per cent larger than those under the growth shock. More importantly, with a positive shock to growth, employment would benefit, too, as opposed to declining growth and employment after an austerity shock.

5 Concluding remarks

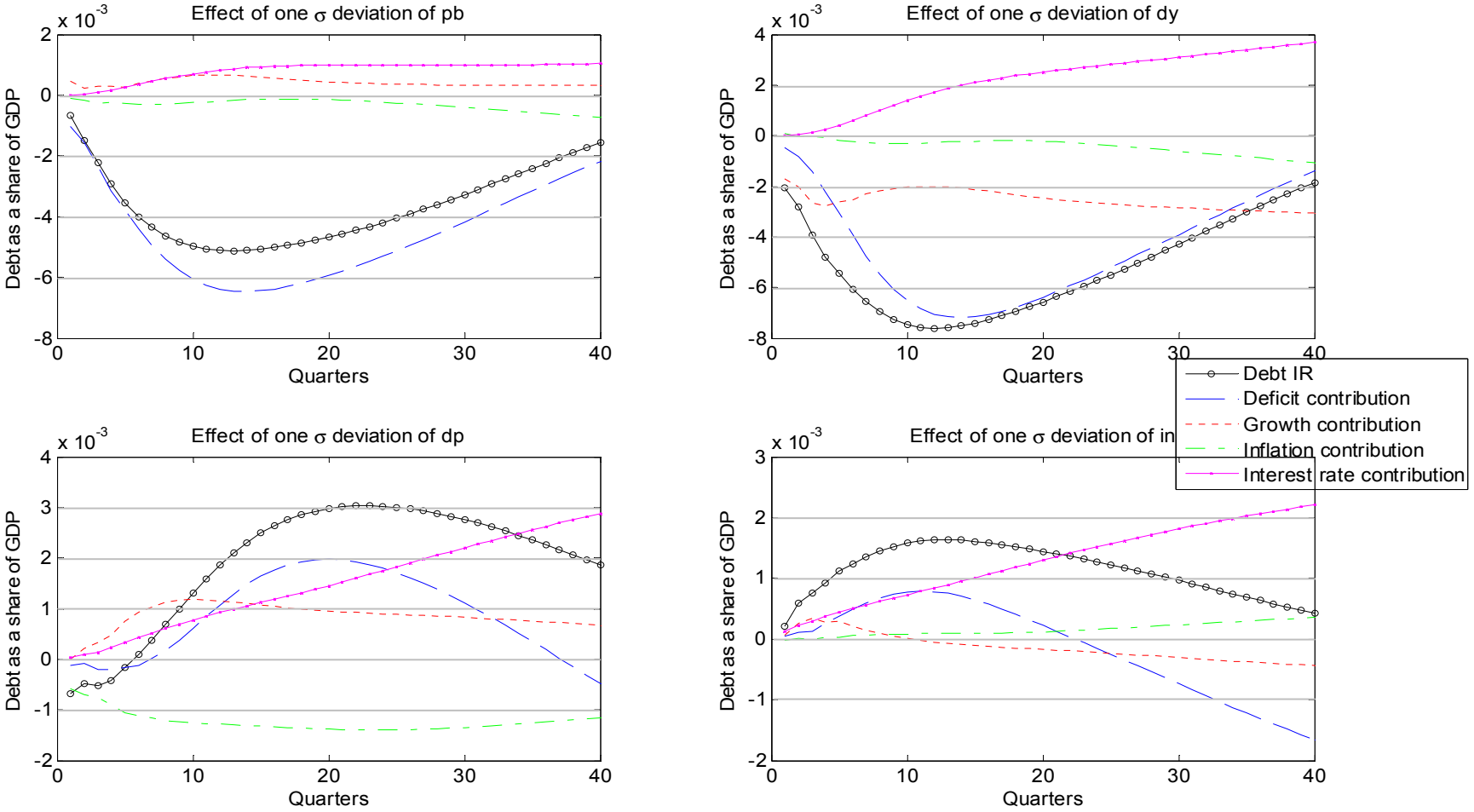
Using a VAR with debt feedback, we study the dynamics of the U.S. public debt in response to shocks from major macroeconomic aggregates. Our results suggest that taking into account relationships among macroeconomic variables and the dynamic effect of debt in assessing the response of debt to shocks is important. In the medium term, an austerity shock reduces the debt ratio on average. However, there is large uncertainty about the projected debt impulse response, especially in a weak economic environment. Reducing debt via austerity in the 2011 environment may lead to the opposite outcome with the debt ratio barely changing or even increasing. The policy regime in place will affect the response of debt to higher inflation. Our findings suggest that given the economic dynamics of the recent past, an inflation shock, for example due to a hike in crude oil price, would in fact increase the debt ratio after only a few quarters. Finally, we find that a positive growth shock can substantially reduce debt with none of the pain associated with austerity.

Since the debt ratio converges to its long run value of about 40 per cent of GDP, a short run fix to debt may not be needed, and a long run view in reducing debt should be taken. Stimulating growth in the short run and reducing deficits when growth has taken a strong hold would be a better policy response, in line with past dynamics. If policymakers and economic agents respond to the

[23] Blanchard-Perotti identification is used, and the results with the GIR identification are similar.

Figure 7

Debt Impulse Responses to Macro Shocks and Decomposition: Blanchard-Perotti Identification



The figure shows responses of the debt ratio to one standard deviation positive shocks in primary deficit (pb), growth (dy), inflation (dp), and interest rate (in) under Blanchard-Perotti identification. The decomposition of the responses to contributions from primary deficit, growth, inflation, and interest rate is also presented.

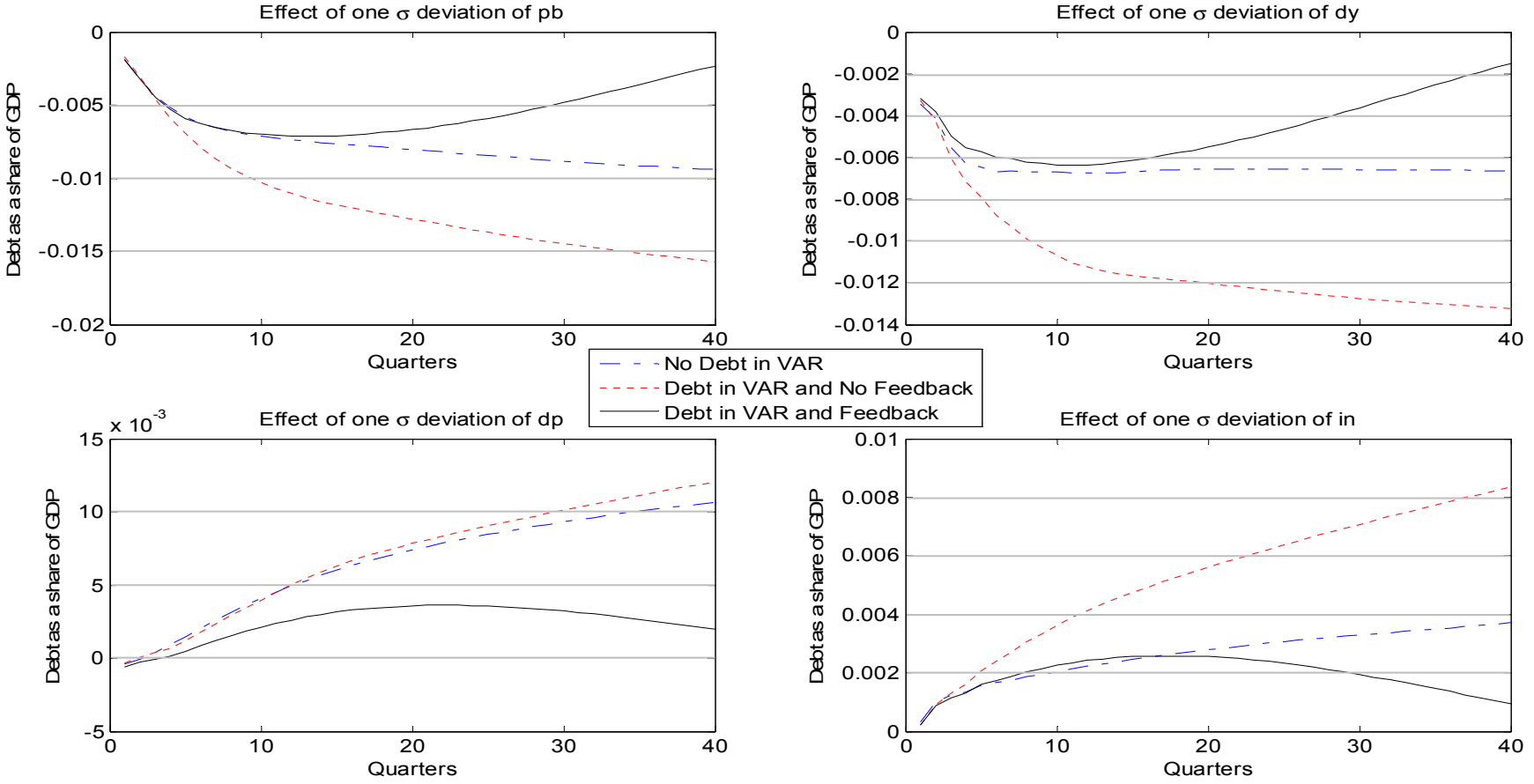
debt build-up and their economic environment as in the past, we should expect lower deficits amid higher growth and eventually a decreasing debt ratio. The post-crisis environment may be saddled with lower potential growth and long term fiscal pressures stemming from rising health care costs and aging population. Nevertheless, reducing debt and deficits in expansionary times may still be easier to implement and less risky in terms of growth and employment effects.

Finally, we argue that it is important to incorporate the debt feedback in VAR models as the forecast debt path may not be stable and the impulse responses of debt could be persistent. Using the linear approximation of debt in standard VARs or using debt as an endogenous variable in the VAR could result in misspecification and does not take account of initial conditions. The simulation of standard VARs could produce stationary paths for the variables explicitly included. Yet, an important but implied variable such as a stock of debt could be building up in an unreasonable fashion in the background. If it is the case, the original model without debt may not be a valid way to study the relationships among variables, especially if it concerns debt. In addition, linear models do not distinguish between different initial conditions in terms of impulse responses and in terms of uncertainty and risk in general. In contrast, we showed that risks to the debt impulse responses are substantially larger in a weak economic environment than in normal times. This paper suggests that when the economy is weak, the safest policy to deal with high debt is to stimulate growth.

Appendix A

Figure 8

A Comparison of VAR Models: Debt Impulse Responses (GIR Identification)



The figure shows responses of the debt ratio to one standard deviation positive shocks in primary deficit (pb), growth (dy), inflation (dp), and interest rate (in) under GIR/Cholesky identification. Each chart in the panel presents debt ratio responses from three models: (i) standard VAR without debt; (ii) VAR with debt but without debt feedback in computing impulse responses; and (iii) VAR with debt feedback.

Figure 9

A Comparison of VAR Models: Debt Forecast, Starting 2011:IV

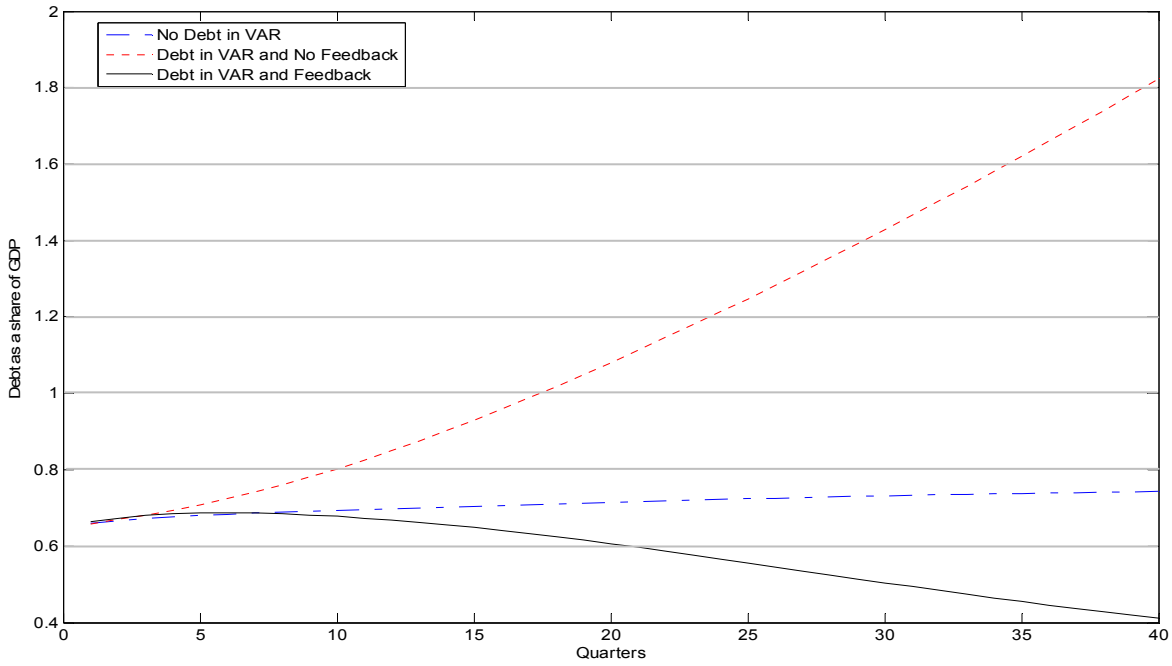
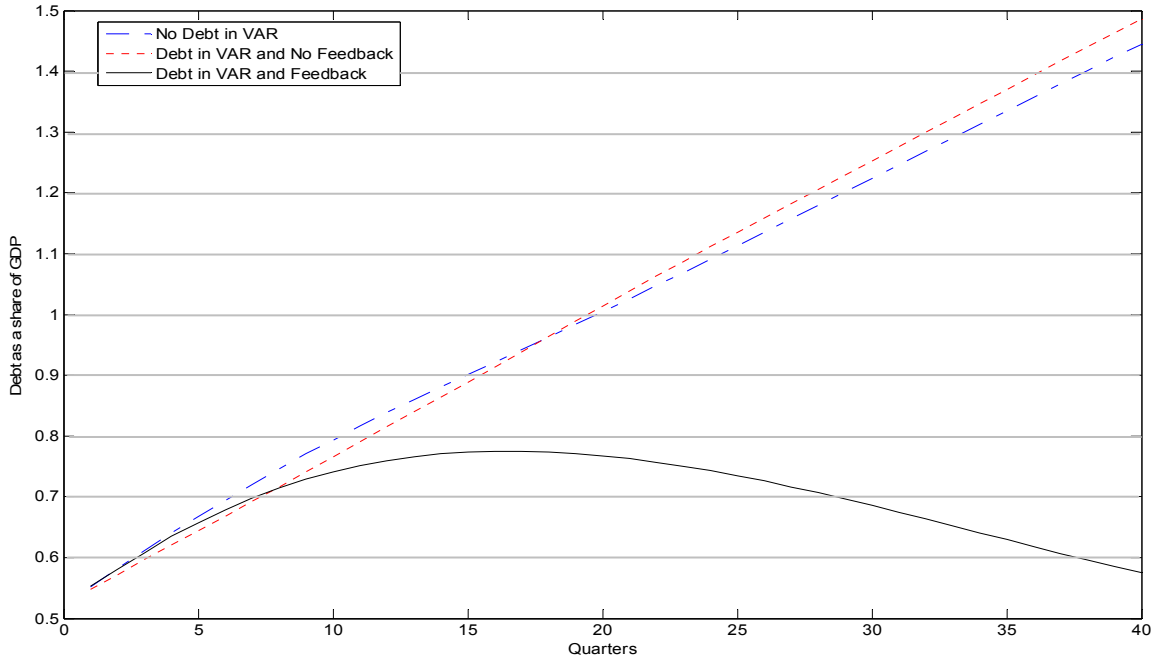


Figure 10

A Comparison of VAR Models: Debt Forecast, Starting 2009:III



The figures show a 10-year forecast of the debt ratio for three different VAR models with two sets of initial conditions: 2011:IV and 2009:III. The estimation sample is 1980-2007 in both figures.

APPENDIX B

We define the decomposition of the debt impulse response, d^{IR}, in terms of the contribution of each macroeconomic aggregate as follows:

$$d_t^{IR} = d_t^s - d_t^n = pb_t^* + i_t^* - \pi_t^* - g_t^*,$$

where s and n stand for "shock" and "no shock" debt paths. Using debt dynamics equation 2 in the text and approximating the nonlinear component, the components of the decomposition at time t are:

$$\begin{aligned}
pb_t^* &= \left(pb_t^s - pb_t^n\right) + \left(1 + i_t^s - \pi_t^s - g_t^s\right) pb_{t-1}^* \\
i_t^* &= \left(i_t^s - i_t^n\right) d_{t-1}^n + \left(1 + i_t^s - \pi_t^s - g_t^s\right) i_{t-1}^* \\
\pi_t^* &= \left(\pi_t^s - \pi_t^n\right) d_{t-1}^n + \left(1 + i_t^s - \pi_t^s - g_t^s\right) \pi_{t-1}^* \\
g_t^* &= \left(g_t^s - g_t^n\right) d_{t-1}^n + \left(1 + i_t^s - \pi_t^s - g_t^s\right) g_{t-1}^*
\end{aligned}$$

The first term in each equation indicates the difference between "shock" and "no shock" paths of the components scaled by the previous "no shock" debt ratio. The second term is the adjusted previous value of the component. Thus, the debt impulse response decomposition is:

$$d_t^{IR} = \Delta^{s/n} pb_t + \left(\Delta^{s/n} i_t - \Delta^{s/n} \pi_t - \Delta^{s/n} g_t\right) d_{t-1}^n + \left(1 + i_t^s - \pi_t^s - g_t^s\right) d_{t-1}^{IR},$$

where $\Delta^{s/n}$ stands for the difference between "shock" and "no shock" paths. Note also that the last term disappears in the initial period, $t = 1$, as the previous (before shock, $t = 0$), debt ratio is same.

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COMMENT TO "PUBLIC DEBT DYNAMICS: THE EFFECTS OF AUSTERITY, INFLATION, AND GROWTH SHOCKS" BY REDA CHERIF AND FUAD HASANOV

Ernesto Rezk[*]

Cherif and Hasanov developed an empirical framework in which the relative performance of public debt was related to diverse macroeconomic variables and enabling in turn the analysis of debt dynamics (that is, the path of the debt-to-GDP ratio); in this connection, they focused on austerity, inflation and growth shocks' capability to reducing the burden of public debt.

For this, an econometric VAR model using US data was resorted to, including lagged values of the debt-to-GDP ratio and of GDP (as exogenous variables) and a set of macro aggregates (entering the debt equation as endogenous variables), all of what permitted the authors to assess the reaction of agents to changes in public debt.

The used VAR is depicted by the equations 1 and 2 below:

$$Y_t = \sum_{i=1}^{k} A_i Y_{t-i} + \sum_{i=1}^{\ell} \gamma_i d_{t-i} + \varepsilon_t \qquad (1)$$

$$d_t = \left[\frac{(1+i_t}{(1+\pi_t)(1+g_t)}\right] d_{t-1} + pb_t \qquad (2)$$

in which variables stood for:

d: the ratio of debt to gross domestic product

i: average nominal interest rates

π: the inflation rate

g: the growth rate

pb: the primary surplus

In relation to equation 2 above, it is evident that the inclusion of a separate deterministic debt equation in the VAR is an outstanding feature of the approach used by Cherif and Hasanov, as debt feedback and "debt dynamics" were thus better reflected and also depicted the debt-to-GDP ratio convergence to its stationary level. Apart from using the resulting "debt dynamics" to draw the Impulse response functions, the authors also averted a common undesired effect of linear VAR model, in which debt feedback is excluded, as they might – in that case – render explosive paths for the debt-to-GDP ratio.

It is necessary to recall, in order to better acknowledge Cherif and Hasanov's contributions, that crises of the so called developed countries produced impacts that severely hit and modified economic environments sprung from economic conditions prevailing in the period 1980-2007 and did economic policies' assumptions useless at least on the following two accounts: the idea that debt ratios would converge to their long term average values of around 40 per cent of GDP and that linearity in estimation models would not matter much as deviations due to macroeconomic shocks would expected to be only temporary. Needless to say, one main reason for this not happening was

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the evidence that in the new scenario- traditional monetary and fiscal policies did not suffice as measures put forward by conservative monetary authorities in their reaction to inflationary shocks (and accompanied from the fiscal side) rather induced the emergence of a not virtuous path characterized by Δ interest rates followed by temporary –Δ debt ratio, –Δ growth conducive to Δ primary deficits and finally to a new Δ debt ratio.

In the context of a weak economic environment brought about by the 2008-2009 crises in main developed economies, and characterized by nominal interest rates' lower bound close to zero, low inflation and contraction of economic activity, large deficits and rising public debt, Cherif and Hasanov wondered whether austerity shocks (fiscal consolidation) were sound or, contrariwise, self defeating practices. It is in this connection worth pointing out that the new economic environment could in fact matter, even if median economic responses remained unaltered by changes in initial economic conditions, if uncertainty and risk levels around the median path could yet be affected.

The preceding important considerations leads one to quote other arguments and contributions that would be somehow backing Cherif and Hasanov's assertion that fiscal consolidation (austerity shocks) could be not significant in the economic scenarios brought about by the 2008-09 international crises. In this respect Hall (2009) showed, in a very interesting contribution that while 'fiscal multipliers' from increases in government purchases were in the US about 0.5 for output, and slightly negative for consumption during the post war period, they grew up to 0.7-1.0 (or perhaps above these values) after the 2008-09 international crisis.

Hall sought to explain that by the decline of the mark up ratio as output rose: owing to the fact that prices (price stickiness) stayed constant during an expansion that raised input costs, wages were allowed to increase (or not fall) for what households would supply more labour in response to governments buying more output.

A second key argument explaining why fiscal multipliers would be greater than expected, according to Hall, rested on the higher wage elasticity of labour supply in response to labour demand. Hall's findings were confirmed later by Auerbach and Gorodnichenko (2012) whose findings proved that fiscal shocks had a larger impact when affected countries were experiencing recessions.

On the other side, the authors included valuable numerical evidence for the US economy in the paper submitted, showing that austerity shocks might be not significant when applied to weak economic environments already subject to the severe dampening induced by the international crises. As mentioned above, the key question seems to be whether fiscal consolidation could perform its role without thwarting the economy's growth chances; otherwise, one would be faced to initial primary surplus shocks that could in fact lead – for a limited number of years – to a reduction of the debt-to-GDP ratio but, if fiscal consolidation threatened growth perspectives, the temporal reduction would be reverted and the ratio would go back to its long term stationary level, as suggested above.

Let it be stressed that the review of authors' developed arguments and the analysis of econometric results achieved, as said, from the estimation of a VAR model that included debt feedback, leave one with a number of important lessons, regarding fiscal consolidation practices, in the case of weak economies undergoing changing economic environments and these can be summarized as follows:

- Austerity shocks could – under certain circumstances – fail to reduce the debt-to-GDP domestic product ratio.
- In general, even if inflation shocks reduced the debt-to-GDP ratio on impact, the latter would tend to increase again after a few quarters.

- Contrarywise, positive growth shocks would immediately and noticeably reduce the debt-to-GDP ratio (as tax revenue increases and the resulting primary surplus will contribute to ease the pressure on debt issuing)
- When debt dynamics is explicitly incorporated in the analysis, likelihood of self defeating austerity shocks cannot be ruled out and this requires policymakers to consider also the impact of emerging trade-offs.

Finally, and far from seeking to overshadow the merits of Cherif and Hasanov's contribution, a methodological matter is however worth mentioning concerning the estimation of VAR models:

- VAR models require variables used to be integrated in order that the estimation of coefficients and of impulse response functions do not result affected by the spurious correlation phenomenon.
- As the point has not been mentioned in the paper, one may assume that series are stationary. Should this not be the case, and given that the explicit consideration of debt dynamics (separate deterministic debt equation) makes the debt-to-GDP ratio to converge to long term stationary values, one wonders whether cointegration may be used.
- As known, cointegration asserts that long run equilibrium relations may exist if linear combinations of non stationary series yield stationary ones, in which case the error correction model based on the Johansen approach can be applicable.

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CROSS-COUNTRY SPILLOVERS FROM FISCAL CONSOLIDATIONS

Antoine Goujard[*]

In many OECD countries, government debt reached levels over recent years that call for reduction over the medium to longer term to ensure public finance sustainability. This paper investigates the international transmission of fiscal consolidation shocks via trade flows. Using a measure of exogenous fiscal shocks in export markets, fiscal consolidation spillovers are found to slow domestic growth and decrease employment. When fiscal consolidation efforts are synchronised across partner countries, fiscal policies have large spillover effects on output. Spillovers of fiscal consolidations on growth are found to be initially larger between countries belonging to currency unions, though this larger impact vanishes over the medium term. Larger spillovers of fiscal consolidation coincide with stronger shifts in bilateral trade flows in currency unions in the short term, despite smaller adjustments in relative exchange rates. Spillovers of fiscal consolidation are also found to be more detrimental to domestic growth during economic downturns in export markets.

1 Introduction

Countries have introduced large fiscal stimulus packages in response to the global financial crisis of 2008-09, which left a substantial amount of public debt that now needs to be reduced, at least relative to GDP. Consequently, fiscal consolidation has become a major objective for many governments. With many governments consolidating at the same time, countries face potential headwinds from external demand apart from their own consolidation efforts. The OECD-wide fiscal consolidation effort is projected at around 1 percent of OECD GDP in both 2013 and 2014 (OECD, 2013), rising concerns about spillover effects. Building on previous OECD studies and other work, the present study looks at the channels through which fiscal consolidation in trading partner countries can affect domestic growth.

The paper focuses on short- to medium-term output effects of fiscal spillovers, in particular through trade. Fiscal consolidation may reduce domestic demand for imports and decrease output in other countries. The more important are the trade linkages, the more synchronized fiscal consolidation is likely to lead to significant cross-country spillover effects (Auerbach and Gorodnichenko, 2013). Blanchard and Leigh (2013) report a large negative cross-sectional correlation between trade-weighted fiscal consolidation of other countries and domestic growth in 2010. Moreover, empirical evidence suggests that fiscal multipliers are likely to be higher at the time of financial stress, when interest rates are close to the zero bound and when exchange rates cannot adjust.

However, fiscal consolidation may also have positive spillovers through long-term interest rates. Foreign activity may increase if the reduction of debt-financed government spending leads to a drop in interest rates at home and abroad. This channel may be more evident in the case of countries under direct market pressures and large fiscal consolidation plans. In this case, fiscal

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Thanks are due to Rudiger Ahrend, Boris Cournède, Jean-Luc Schneider, Cyrille Schwellnus and Alain de Serres for useful comments and suggestions.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

The views expressed here are those of the author, and do not necessarily reflect those of the OECD or its member countries.

consolidation could in principle have non-Keynesian effects (Alesina and Ardagna, 2010, 2012). Ultimately, the effects of foreign fiscal policy on domestic growth and their possible variation over time and across macroeconomic and institutional set-ups are an empirical question.

The empirical examination pursued in this paper sheds light on the output effects of international fiscal spillovers across OECD countries over the 1978-2009 period. The analysis identifies the effects of fiscal spillovers on output by isolating changes in foreign fiscal policies that are plausibly unrelated to contemporaneous economic conditions. It constructs new measures of trade-weighted fiscal spillovers by aggregating foreign fiscal shocks over seventeen countries that represent 86 per cent of the OECD countries' imports. Foreign fiscal shocks are measured using the fiscal policy changes identified by Devries *et al*. (2011). The latter isolate discretionary government actions that do not seem to be motivated by short- to medium-term economic developments, at least not according to the narrative approach of Romer and Romer (2010). These discretionary government actions are measured consistently across countries and over time. Using these new measures of exogenous spending- and tax-based spillovers, the analysis estimates dynamic panel data specifications controlling for country and year fixed effects.

The empirical evidence in this paper suggests that domestic growth is reduced when trading partners consolidate. However, the estimated effects depend on country specific and macroeconomic circumstances.

- Taken as a whole, a 1 percentage point of GDP reduction of the fiscal balance in the main export markets is associated with an average contraction of 1.5 percentage point of domestic GDP growth on impact. However, historical fiscal shocks have been typically much more isolated. The estimates imply that an isolated fiscal contraction in Germany by one percentage point GDP is associated with a reduction of output growth by 0.23 percentage points for a typical OECD country. These estimates are in line with recent cross-country evidence in Auerbach and Gorodnichenko (2013), and in the upper range of the model based estimates of OECD (2009) and Ivanova and Weber (2011).
- The effects are differentiated between spending- and tax-based fiscal consolidations. Spending-based consolidations are associated with larger contemporaneous spillovers on output than tax-based consolidations. Over the medium term, the spillovers of spending cuts and tax increases appear to be similar in size.
- In the short term, fiscal spillovers are stronger between countries with limited exchange rate adjustment or within currency unions than among countries with more flexible exchange rate arrangements. Taken at face value, the estimates suggest that simultaneous consolidations of 1 percent of GDP in exports markets are associated with a contemporaneous contraction of domestic GDP growth by 2.2 percentage points in a currency union. The differential impact of fiscal shocks within and outside currency unions appears to be vanishing over the medium term. Medium-term spillovers are economically and statistically significant both within and outside currency unions.
- The large spillovers of fiscal consolidations are confirmed using bilateral trade flows and bilateral real exchange rate movements. Fiscal consolidations in trading partner countries tend to have an effect on domestic growth through a reduction in bilateral exports and an increase in bilateral imports. This finding is consistent with the view that consolidation tends to rebalance production towards servicing external demand (Leigh *et al.*, 2010). Under flexible exchange rate regimes, the bilateral nominal exchange rate appreciates on impact when a trading partner consolidates, while the real exchange rate adjustment occurs through a slower process of price and wage compression in currency unions.
- Trading partners' fiscal policies have larger short-term spillover effects on domestic growth during downturns. The spillovers of tax increases and spending cuts appear to be more

detrimental to growth during downturns in export markets, as measured by large negative output gaps.

- Third-party countries also play a role in the transmission of shocks. When the export markets of one country are hit by fiscal consolidation shocks, the shocks tend to be further transmitted to the country's import partners.
- Once instrumented, spillover of fiscal consolidations measured using cyclically-adjusted revenues and spending have similar effects on domestic growth as in the baseline specification. The analysis is robust to a number of other checks including additional controls for domestic slack (lagged unemployment rate or lagged output gap), and measures of the domestic fiscal stance. Static and dynamic panel data estimators and two measures of bilateral trade linkages also deliver similar results.

The remainder of this paper is divided in four sections. Section 2 briefly reviews the literature. Section 3 describes cross-border developments in fiscal policies and the data used to measure the cross-border fiscal shocks. Section 4 describes the identification of the spillovers of fiscal policies on domestic output. Section 5 presents the empirical evidence. Section 6 examines possible sources of heterogeneity of the estimated effects across exchange rate arrangements and macroeconomic conditions and Section 7 discusses additional robustness checks.

2 Literature review

The literature on economic spillovers across borders has grown in recent years. However, there are only few quantitative studies measuring the impact of domestic fiscal changes on growth in other countries. These studies find conflicting results on the effects of fiscal shocks on foreign countries.

A first strand of the literature calibrates macroeconomic models to quantify the possible spillover effects of fiscal consolidation (Taylor, 1993, OECD, 2009, Ivanova and Weber, 2011). Simulating large macroeconomic models generally leads to weak trade spillovers across countries (Bayoumi and Vitek, 2013). Taylor (1993) and Ivanova and Weber (2011) report that a fiscal spending shock of 1 percentage point of GDP in Germany would increase GDP in France by 0.04 to 0.12 per cent after one year.

A second strand of the literature estimates the effect of domestic fiscal shocks on the rest of the world through the current account and the "twin deficit hypothesis", suggesting that changes in government savings are not offset by domestic private savings and investment and transmitted abroad. The literature relying on quarterly VAR models reports a wide range of estimates for the relationship between the budget balance and the current account (Corsetti and Müller, 2006, Beetsma and Giuliodori, 2008). Kim and Roubini (2008) estimate that a fall of the cyclically-adjusted budget balance is associated with no change or even a small increase of the current account in the United States, contradicting thereby the twin deficit hypothesis. However, Monacelli and Perotti (2010) find that increases in the US budget deficit have negative effects on the current account balance. Ilzetzki *et al*. (2013) also report negative short-run effects of government consumption on the current account in a larger sample of advanced economies. These conflicting estimates of the effect of fiscal policy on the current account obtained with quarterly VAR models have been partly attributed to endogeneity issues (Abiad *et al*., 2011).

Another strand of the literature uses the "narrative approach", a specific methodology based on the examination of policy records, to define exogenous fiscal policy changes and estimate their effects on the current account. Feyrer and Shambaugh (2012) show that shocks to US taxes are transmitted abroad through changes in the current account. They use the tax increases identified by Romer and Romer (2010) to disentangle exogenous tax increases from fiscal responses to

economic conditions. Bluedorn and Leigh (2011) confirm these findings using a larger sample of countries and the exogenous fiscal shocks identified by Devries *et al*. (2011). Both papers find significant positive effects of domestic fiscal consolidations on the current account balance. They estimate that a domestic fiscal contraction of one percentage point of GDP is associated with an improvement of the current account by 0.5 to 0.6 per cent of GDP. Romer and Romer (2010) and Cloyne (2013) find larger effects of tax changes on the trade balance using narrative records in the United States and United Kingdom. The latter estimates that a tax cut of 1 percentage point of GDP in the United Kingdom is associated with a contemporaneous 1.2 per cent increase in imports, rising to 6 per cent after 2 years, while exports remain nearly unchanged.

A final strand of the literature aims at providing a more disaggregated picture of the cross-border effects of fiscal shocks. Beetsma *et al.* (2006) combine VAR and gravity models to estimate the spillovers of fiscal policies. They estimate that a fiscal spending shock of 1 percent of GDP in Germany would increase GDP growth in France by 0.09 percentage point after one year, and by an average of 0.145 percentage point across a sample of European countries. Hebous and Zimmerman (2013) investigate the fiscal spillovers within the euro area through trade linkages. They estimate a multi-country VAR model (Global VAR) and find that, for shocks of similar size, euro area-wide shocks have a much larger effect on domestic output than country specific fiscal policies. Auerbach and Gorodnichenko (2012b, 2013) construct a measure of fiscal spillovers using bilateral trade flows and forecasting errors in government spending at a semi-annual frequency across OECD countries. They estimate a large cross-border effect of government spending on output growth, in particular during periods of economic slack.

3 The data

This paper examines the output effects of international fiscal spillovers in OECD countries by constructing new measures of trade-weighted fiscal spillovers. These measures cover a long time-series 1978-2011 and provide a distinction between spending-based and tax-based spillovers. Spillover shocks are computed using exogenous fiscal changes from "narrative records" and cyclically-adjusted fiscal outcomes from the OECD Economic Outlook database.

3.1 Foreign fiscal shocks

Fiscal spillovers emanate from seventeen OECD countries that cover around 86 per cent of OECD imports over the 1978-2011 period.[1] The countries are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, Portugal, Spain, Sweden, the United Kingdom and the United States. These countries have sufficient fiscal data to construct a balanced panel of fiscal spillovers over the period 1978-2011.[2] Fiscal spillovers are measured at the annual frequency. By using annual data, the measurement of fiscal shocks is facilitated. Generally, there is no quarterly calendar for fiscal policy revisions and yearly data may be less subject to measurement error issues. Furthermore, potential anticipation effects of fiscal policy changes play a smaller role with annual data (Ramey, 2011, Beetsma *et al*., 2008).

For each OECD country, fiscal spillovers from trading partner countries, ΔTF_{it}, are computed as a weighted sum of the fiscal policy stance of the trading partner countries:

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[1] Average 1978-2011 for trade in goods from OECD Main Economic Indicators (MEI) dataset. This share has been steadily declining from 93 per cent to 80 per cent over 1978-2011.

[2] The dataset of Devries *et al*. (2011) ends in 2009. Robustness checks excluding recent years and the global financial crisis (2008-09) present similar results.

$$\Delta TF_{it} = \sum_{j,j\neq i}\left(\frac{1}{20}\sum_{s=1990}^{2009}\frac{exp_{ijs}}{exp_{is}}\right)\Delta F_{jt}\ , \quad (1)$$

where ΔF_{jt} represents the fiscal policy changes of trading partner j in year t. The term exp_{ijs} represents the (merchandise) exports of country i towards country j in year s and exp_{is} represents the total exports of country i in year s towards the rest of the world. Equation 1 weights the foreign fiscal shocks by the long-run importance of the foreign countries in the exports of country i. The first term in brackets is the average share of exports of country i going towards country j. Export flows are averaged over 20 years to mitigate endogeneity and measurement error issues. This long-term measure is uncorrelated with changes in countries' industrial structures or relative trade costs. This identifies fiscal spillover shocks that are solely due to changes in trading partners' fiscal policies (e.g., Nekarda and Ramey, 2011).

The main measure of government fiscal policies in export markets, ΔF_{jt}, comes from the dataset of Devries *et al.* (2011). They use a narrative approach to identify "action-based" episodes of fiscal adjustments that correspond to discretionary policy choices unrelated to short-term economic developments. They focus on fiscal policy changes motivated by the desire to reduce the budget deficit and examine contemporaneous policy documents to establish whether discretionary changes in tax rates and government spending were motivated by a response to the business cycle or not. The estimated budgetary impact of the general government consolidation measures are based on contemporaneous historical sources and records.

Figure 1 Panel A displays the distribution over time and across OECD countries of the constructed action-based spillover shocks. Action-based spillover shocks regroup revenue and spending measures. They present large variations over time. For a typical OECD country, they are equal to an average 0.6 per cent of GDP in 1995 and 1997, while Devries *et al.* (2011) do not report any significant consolidation plan in 2008. These large variations are mostly driven by spending-based consolidation episodes (Panel B). Tax-based consolidations have been comparatively modest and subject to more frequent temporary measures (Panel C). Indeed, Devries *et al.* (2011) record temporary measures as a positive consolidation shock, followed by a negative shock in the following year. The exposure to fiscal spillovers also varies substantially across OECD countries. For example, Austria, Germany and Italy consolidated by more than 1.5 per cent of GDP in 1997 and the export-weighted consolidation shocks range from 0.3 per cent of trading partners' GDP for Japan to 1 and 1.2 for the Czech Republic and Luxembourg, respectively. By contrast, the isolated fiscal consolidation of 0.9 per cent of GDP in the United States in 1988 mostly affected its direct neighbours: Canada and Mexico.

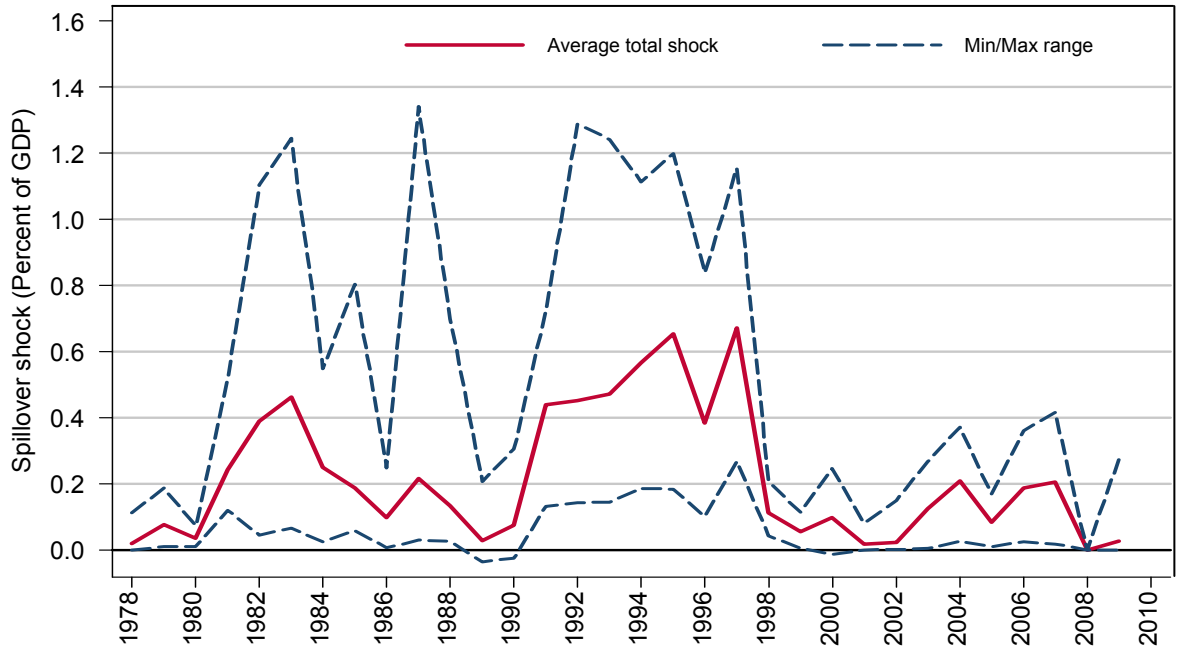
An alternative identification of fiscal policy shocks is based on cyclically-adjusted fiscal outcomes.[3] By using cyclically-adjusted rather than non-adjusted fiscal policy stance, the contemporaneous reactions of fiscal policy to domestic output are substantially reduced. Country-specific cyclical adjustments should reflect policymakers' decisions to change tax rates and spending levels by isolating the action of automatic stabilisers. However, the cyclically-adjusted primary balance does not distinguish discretionary shocks motivated by short-term economic developments and discretionary shocks that are exogenous to the economic cycle. For example, fiscal policy tightening in France in 1983 was primarily motivated by a desire to reduce the current account deficit (Abiad *et al*., 2011). Furthermore, the cyclically-adjusted primary balance classifies periods of consolidation on the basis of successful budget outcomes, while the action-based approach identifies episodes of fiscal policy actions motivated by deficit reduction, regardless of the outcomes. For example, if a country adopts a fiscal consolidation policy at the beginning of the year, but then is hit by an adverse shock and so adopts discretionary

[3] Cyclically-adjusted revenues and spending are taken from the OECD Economic Outlook database. Girouard and André (2005) summarise the methodology.

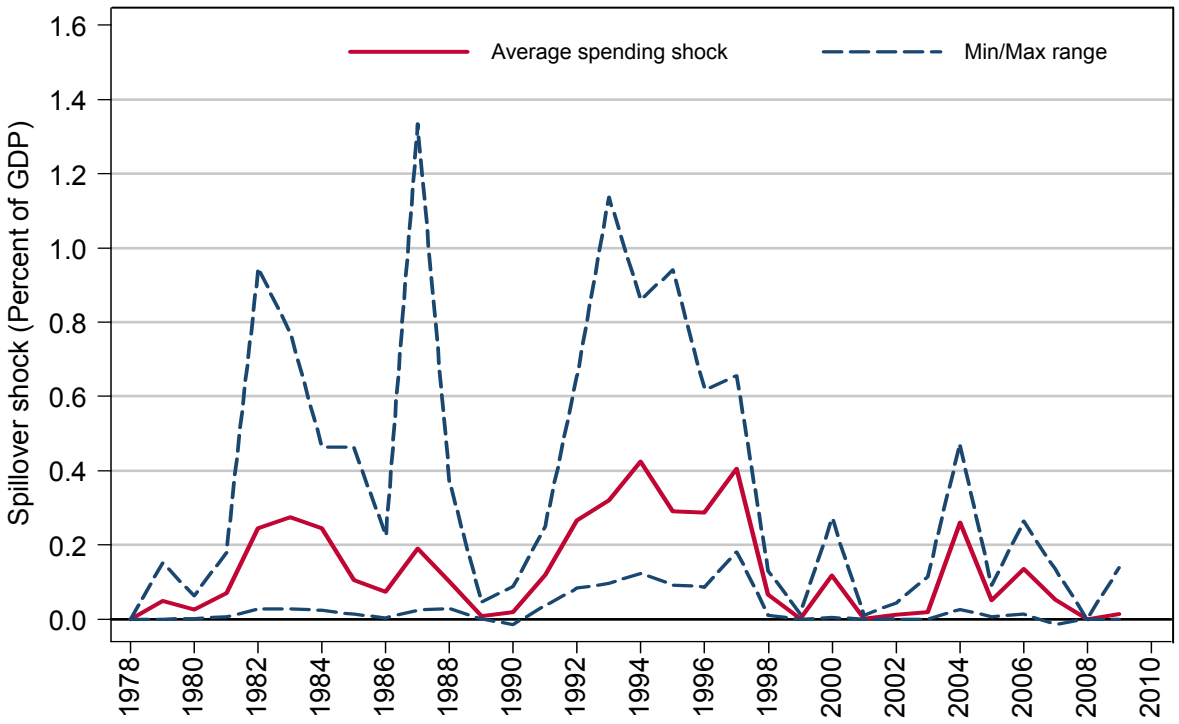
Figure 1

Cross-country and Time Variation of Action-based Cross-border Fiscal Shocks

A. Export-weighted Consolidations Across OECD Countries



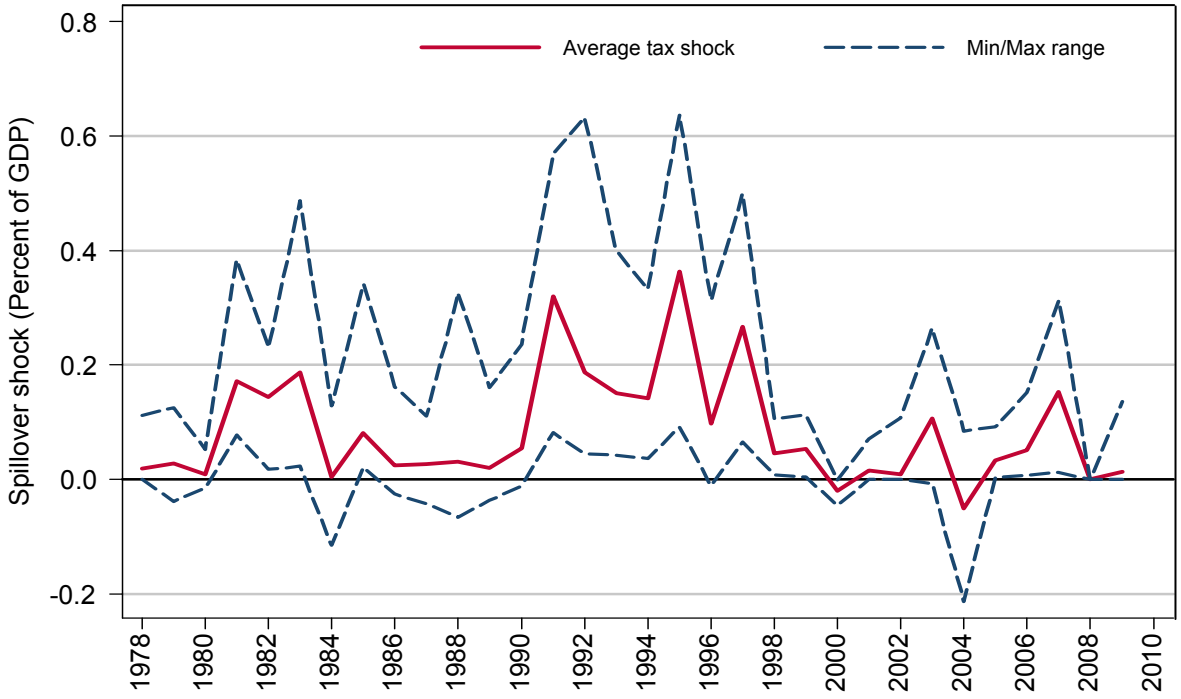
B. Export-weighted Spending Cuts Across OECD Countries



Note: each panel present the evolution of the export-weighted fiscal shocks for the 34 OECD countries over 1978-2009.
Source: Devries *et al.* (2011), UN Comtrade database and OECD calculations.

Figure 1 *(continued)*

Cross-country and Time Variation of Action-based Cross-border Fiscal Shocks
C. Export-weighted tax hikes across OECD countries



Note: each panel present the evolution of the export-weighted fiscal shocks for the 34 OECD countries over 1978-2009.
Source: Devries *et al.* (2011), UN Comtrade database and OECD calculations.

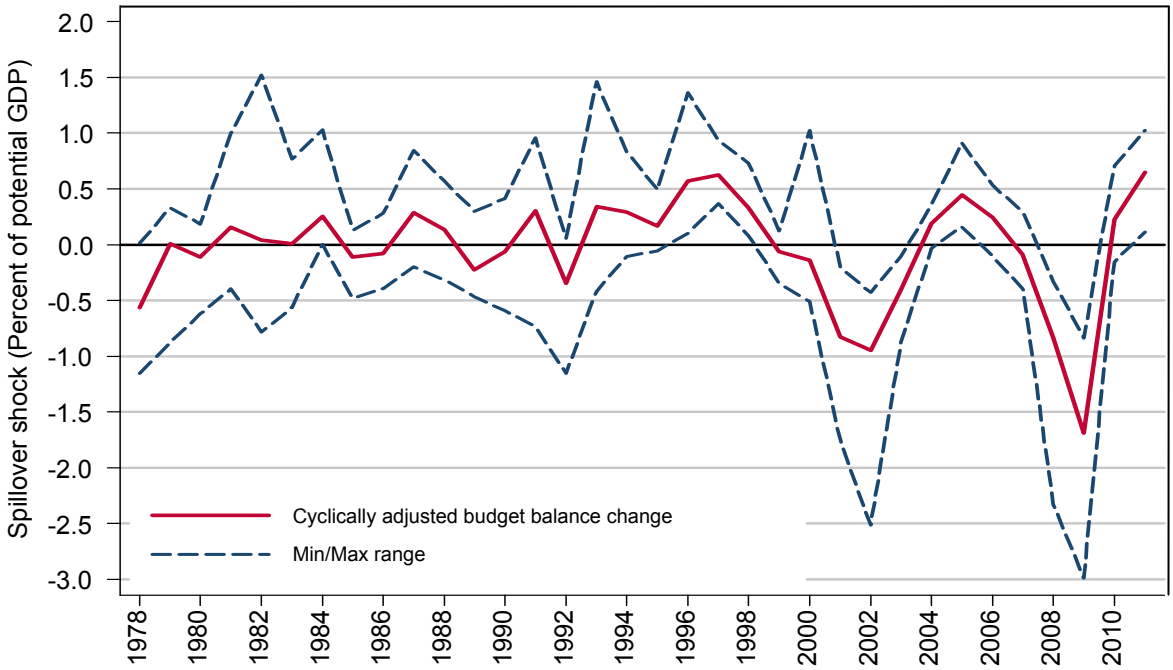
stimulus that completely offsets the fiscal consolidation, it is still recorded in the dataset of Devries *et al.* (2011), while it would be disregarded in the cyclically-adjusted primary budget balance.[4] Therefore, the narrative approach is, in principle, less affected by countries' macroeconomic conditions than measures of the fiscal stance based on cyclical adjustment (Guajardo *et al.*, 2011).

Fiscal spillovers constructed using action-based and cyclically-adjusted shocks tend to coincide. Figure 2 Panel A presents descriptive statistics for the export-weighted changes in cyclically-adjusted primary balance across OECD countries. Panel B displays the export-weighted changes in the cyclically-adjusted primary balance censored at 0 to isolate fiscal consolidation episodes and ease the comparison with Figure 1 Panel A. There is no tendency for large fiscal contractions in some trading partners to be offset by fiscal policy loosening in other trading partners and periods of average improvement of the budget balance are similar in Figures 1 and 2. However, action-based and cyclically-adjusted measures differ in some important aspects. By definition, action-based fiscal consolidations do not capture fiscal policy changes during periods of aggregate loose fiscal policy. Movements in asset prices also lead to measurement errors in cyclically-adjusted budget outcomes (Price and Dang, 2011). For example, the action-based shocks and the cyclically-adjusted ones differ in the early 2000s, where the cyclically-adjusted approach identifies a pronounced fiscal contraction.

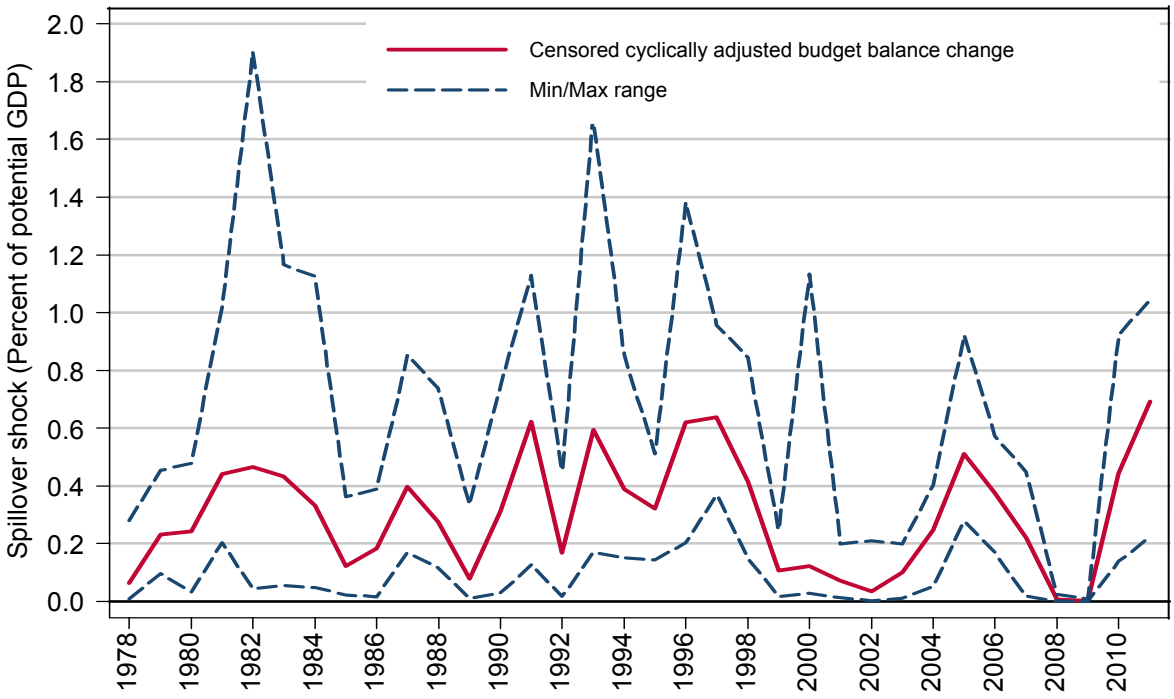
[4] Devries *et al.* (2011) record only consolidation measures that were implemented. See Guajardo *et al.* (2011), Perotti (2011), and Riera-Crichton *et al.* (2012) for a review of the different measures of fiscal changes.

Figure 2

Cross-country and Time Variation of Cross-border Cyclically-adjusted Fiscal Shocks
A. Export-weighted Changes in Cyclically-adjusted Budget Balance



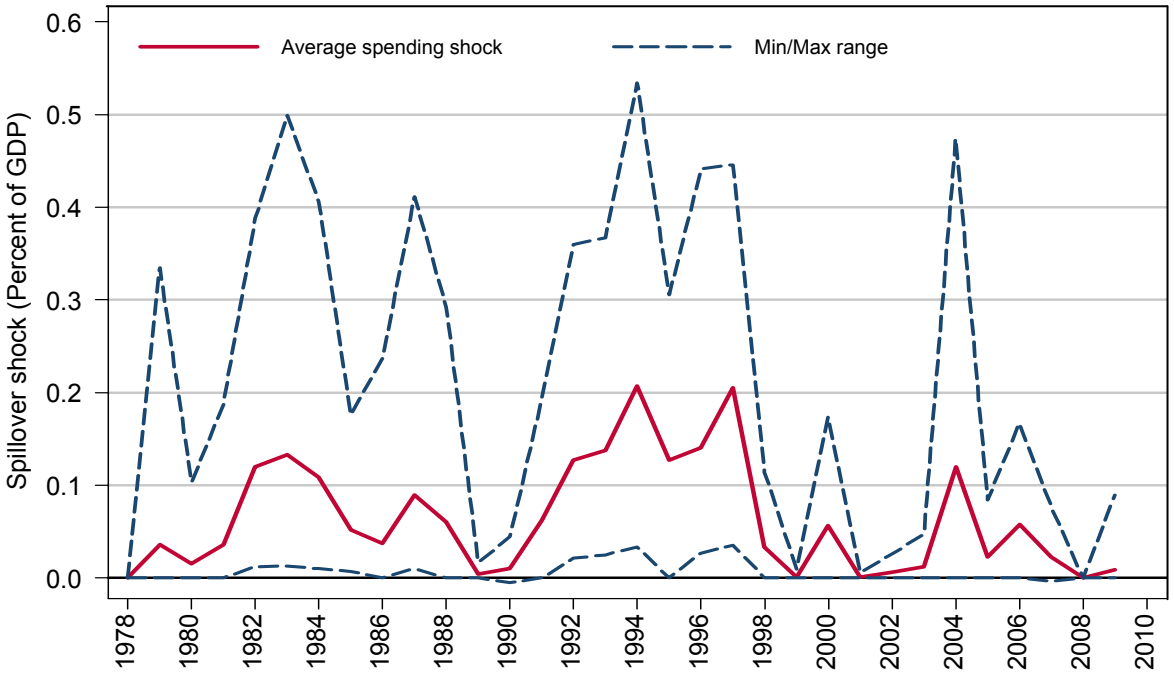
B. Export-weighted Consolidations According to the Cyclically-adjusted Budget Balance



Note: each panel present the evolution of the export-weighted fiscal shocks for the 34 OECD countries over 1978-2009.
Source: OECD Economic Outlook database, UN Comtrade database and OECD calculations.

Figure 3

Cross-country and Time Variation of Action-based Cross-border Spending Shocks
(foreign spending shocks rescaled by domestic GDP)



Note: each panel present the evolution of the trade-weighted fiscal shocks for the 34 OECD countries over 1978-2009.
Source: Devries *et al.* (2011), OECD Economic Outlook database, UN Comtrade database and OECD calculations.

The spillover shocks computed according to Equation 1 represent the average consolidation in export markets and they cannot be directly compared to domestic fiscal shocks. Auerbach and Gorodnichenko (2012b, 2013) propose to scale foreign fiscal shocks to ease the comparison between the estimated spillover effects and the traditional multipliers of domestic fiscal policies:

$$\Delta TF^{*}_{it} = \sum_{j,j\neq i}\left(\frac{exp_{ijb}}{imp_{jb}}\right)\left[\frac{imp_{jb}}{G_{jb}}\right]\left\{\frac{\Delta F_{jt}\times GDP_{jt-1b}\times EXCH_{jb}}{GDP_{it-1b}\times EXCH_{ib}}\right\} \quad (2)$$

where GDP_{jt-1b} is the lagged real GDP in base year b, $EXCH_{ib}$ is country i's US dollar exchange rate in base year b, and the fiscal shocks, ΔF_{jt}, are expressed in percentage point of GDP. The first term in brackets is the share of imports of country j coming from country i in base year b.[5] The second term in square brackets represents the size of the total imports of country j in base year b relative to the government spending of country j in base year b. This term is intended to correct for the fact that a certain part of government purchases will be converted into imports from other countries. The last term in curly brackets represents the size of the government shock in country j as a share of lagged output in country i. More precisely, the numerator is equal to the dollar value of the fiscal shock in country j using a base-year exchange rate b, while the denominator represents the dollar value of real potential GDP of country i in year t and base year b. Exchange rates, the size of government relative to imports and imports weights are kept constant to avoid endogeneity issues. Figure 3 displays the variation of this measure across countries and over time.

[5] In the estimation, the base year is 1995.

Auerbach and Gorodnichenko's measure of fiscal spillovers is directly rescaled by domestic GDP and leads to estimates comparable to domestic multipliers. However, there is no clear theoretical guidance on the exact size of the shocks transmitted abroad. Fiscal consolidation packages could be designed primarily to avoid hurting as much as possible the domestic economy, and the indirect effects of government spending on domestic private spending should be taken into account. An examination of the size of these shocks makes clear that fiscal spillovers have a small impact on domestic output in normal times but this effect may be large when an important trading partner consolidates or when fiscal policies are correlated across countries. During the 1978-2009 period, the average size of foreign spending spillovers is 0.06 per cent of domestic GDP, but the spillover shocks can be as high as 0.5 per cent of domestic GDP.

3.2 Other variables and descriptive statistics

The main variables are taken from the OECD Economic Outlook database. The unbalanced panel dataset covers 34 OECD countries over the period 1978-2012. The final database provides cyclically-adjusted budget components and potential output estimates with a good coverage of the 1980s for all OECD countries and a complete coverage of the 1978-2012 period for the 17 countries analysed by Devries *et al*. (2011). The variables taken from the Economic Outlook database are: real GDP, domestic private consumption, private investment, employment, unemployment rate, output gap, GDP deflator, consumer prices indices, exchange rates and long- and short-term interest rates.

In addition, country-specific exchange rate arrangements are taken from Ilzeztki *et al*. (2011) and de Sousa (2012). Control variables for systemic banking crises come from Laeven and Valencia (2012) and variables characterizing each country political cycle are taken from the 2013 update of Beck *et al*. (2001). Bilateral trade data are taken from the UN comtrade dataset (1990-2009) and the IMF DOTS dataset. In the latter case, a correction for missing values and measurement error is implemented following Head *et al.* (2010). Tables 11 and 12 in the Appendix detail the construction of the main variables and display summary statistics for the panel of countries used in the empirical analysis.

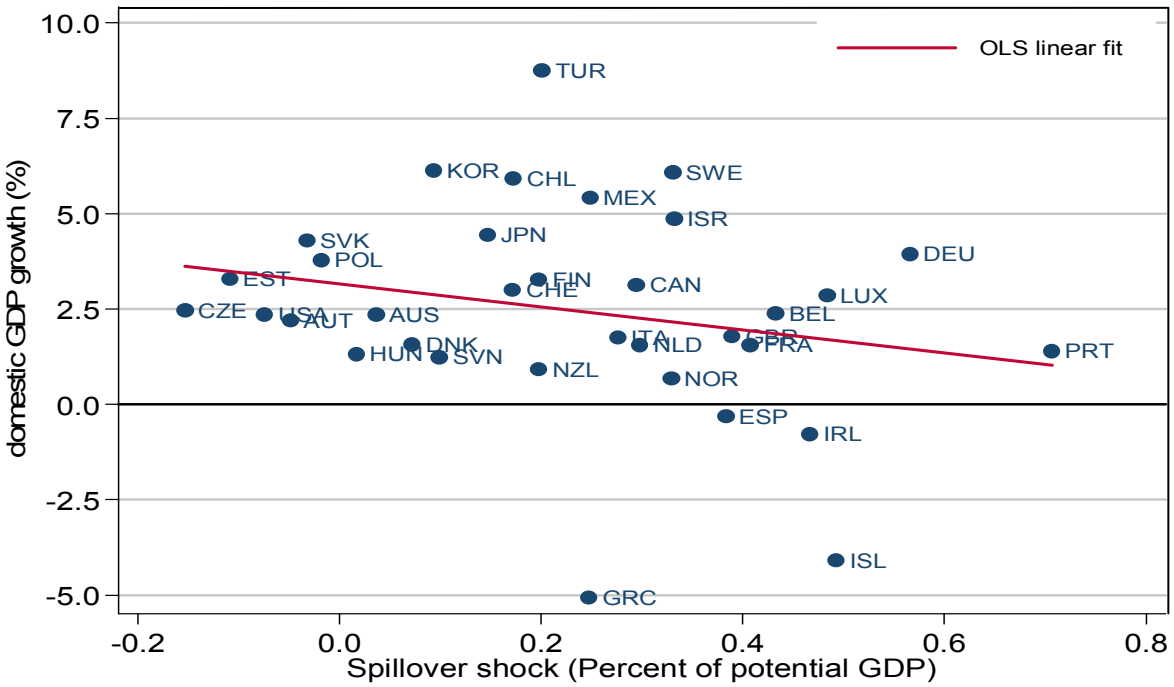
Before turning to the econometric analysis, Figure 4 provides some intuition for the results of the identification strategy. It focuses on the cross-sectional relationship between fiscal spillover shocks, as measured by the cyclically-adjusted budget balance of trading partners in Equation 1 and domestic growth in 2010. In the immediate aftermath of the financial crisis in 2009, governments simultaneously implemented fiscal stimulus packages, while the global tendency was to reduce fiscal deficits already in 2010. Countries for which governments in export markets were drastically reducing public deficits, such as Portugal and Spain, have seen a slower recovery than the United States or other European countries, as Estonia and the Czech Republic (Panel A). This correlation is driven by changes in fiscal policy on the spending side, while the cross-sectional correlation between the intensity of the increase in public revenue of trading partner countries and domestic growth is essentially zero (Panels B and C).[6] These descriptive correlations provide justifications for investigating separately the role of spending and revenue policies and to examine the effects of different macroeconomic conditions on the estimated impacts.

[6] The figures in Panels A and B are statistically significant at the 10 per cent and 1 per cent significance levels, respectively.

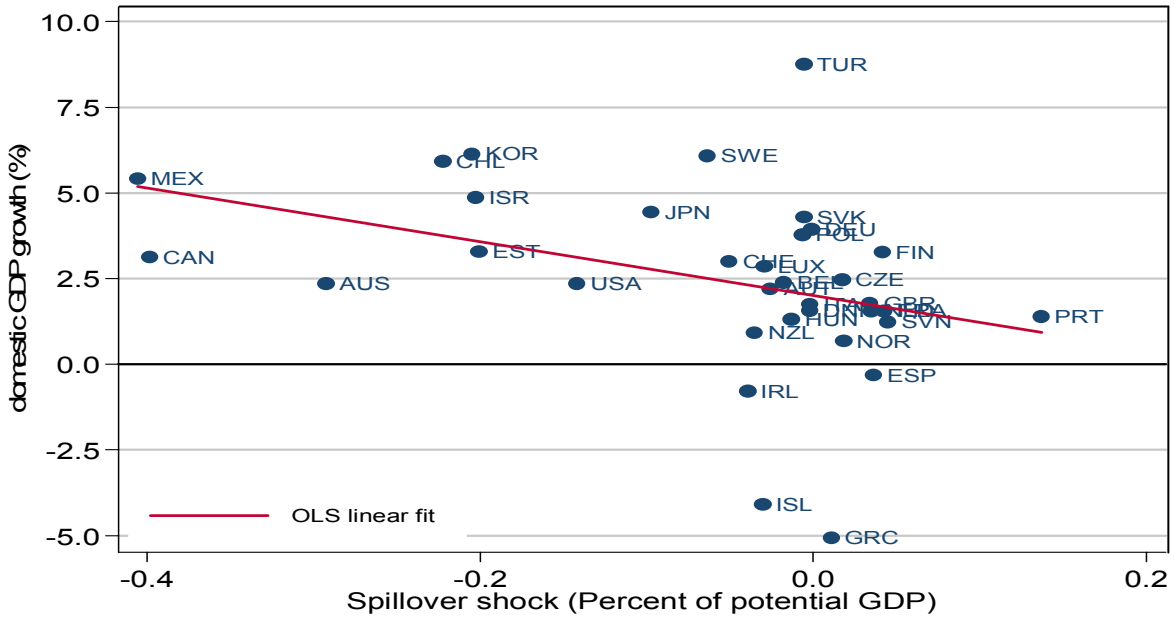
Figure 4

Correlations Between Domestic Growth and Cross-border Fiscal Spillovers in 2010

A. Export-weighted Cyclically-adjusted Budget Balance and Domestic Growth



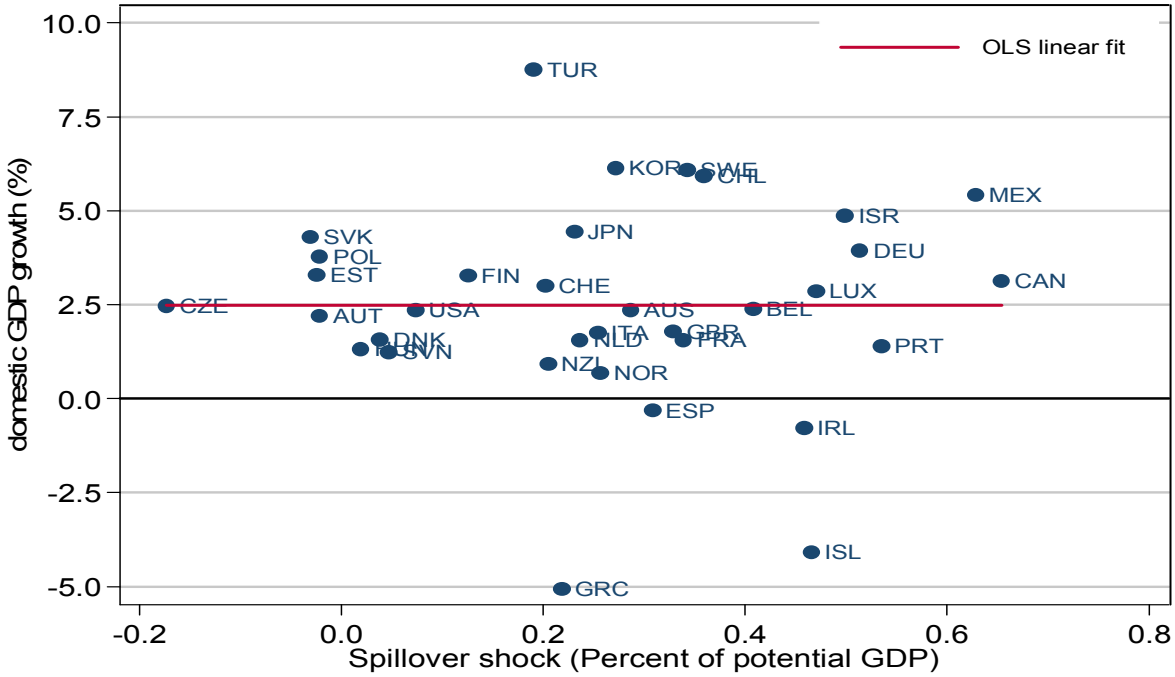
B. Export-weighted Cyclically-adjusted Government Spending



Note: The figure reports the cross sectional correlation between fiscal spillover shocks in 2010 and economic growth.
Source: OECD Economic Outlook 92, UN Comtrade database and OECD calculations.

Figure 4 *(continued)*

Correlations Between Domestic Growth and Cross-border Fiscal Spillovers in 2010
C. Export-weighted Cyclically-adjusted Government Revenue



Note: The figure reports the cross sectional correlation between fiscal spillover shocks in 2010 and economic growth.
Source: OECD Economic Outlook 92, UN Comtrade database and OECD calculations.

4 Identification strategy

The empirical strategy pursued to assess how trading partner fiscal policies affect domestic growth and other outcomes is the following. A baseline equation assumes that domestic economic outcomes at time *t* are determined by:

$$\Delta Y_{it} = \sum_{k=1,2} \rho_k \Delta Y_{it-k} + \sum_{l=0,1,2} \Delta TF_{it-l} \alpha_l + \sum_{m=1,2} X_{it-m} \eta_m + \lambda_i + \delta_t + \varepsilon_{it} \quad (3)$$

where Y_{it} is the logarithm of real domestic output of country i, or another domestic outcome variable and the lagged values ΔY_{it-k} control for the underlying dynamics of domestic outcomes. ΔTF_{it} is one of the measures of fiscal spillover shocks described in Section 3. X_{it-m} is a row vector of additional control variables identified by the literature as key determinants of short- to medium-term economic outcomes (detailed below). λ_i and δ_t capture unobserved country and time specific shocks. ε_{it} are idiosyncratic disturbances. Importantly, the time dummies mostly neutralise the interest rate channel of foreign fiscal policy.[7]

The vector coefficients, α_l, captures the effects of trading partner fiscal policy allowing for a dynamic responses of domestic output and other outcomes. The estimated responses are for the

[7] For example, Beetsma *et al.* (2006) use GDP weighted average of *ex-post* long-term interest rates to capture the spillover of fiscal consolidation through interest rates. This would be nearly collinear to the dummy variables of Specification 3.

level of the logarithm of real GDP to a permanent fiscal consolidation in export markets equivalent to 1 percent of trading partners' GDP in average (equation 1), or a permanent fiscal consolidation in export markets equivalent to 1 percent of domestic GDP (equation 2). For simplicity and to ensure that differences between regressions are not driven by the differences in selected lags, all regressions use the same lag structure. The baseline regression's lag order of 2 for real GDP growth is selected based on serial correlation properties associated with various lag lengths and the literature (Guajardo *et al.*, 2011, and Bluedorn and Leigh, 2011). The results were insensitive to adding up to 4 lags (see Section 7).

The key variable of interest, fiscal policy in trading partners, is likely to be correlated with country time-varying unobserved characteristics. Indeed, yearly data are used to estimate Specification 3 and the identifying assumption that public spending and revenue do not react to output movements within the observation period is unlikely to hold. To deal with the endogeneity of trading partners' fiscal policy, the baseline specification uses action-based measures of trading partners' fiscal policy that are likely to be unrelated to economic developments as described in Section 3. This specification follows Hall (2009) who treats endogenous fiscal policy changes as a source of noise in ε_{it}.[8] As endogenous fiscal policies change smoothly over time, their time-difference has little variability and is partly absorbed through the fixed effects λ_i and δ_t and the averaging across trading partner countries. Another way to estimate Specification 3 is to use exogenous discretionary fiscal policies from narrative records as instruments for export-weighted changes in cyclically-adjusted fiscal outcomes as in Kraay (2012). Specification 3 is the reduced form of this two-stage least-squares estimation. This gives essentially identical results.

However, one additional concern is that even though policymakers may say they are changing taxes and spending for reasons unrelated to current and prospective macroeconomic conditions, perhaps the democratic process causes such changes to be correlated with economic performance. For example, when the economy is weak, all main candidates may be promising to delay tax increases and fiscal consolidations. Thus, seemingly exogenous tax hikes and spending cuts may be rare when output is below trend. The baseline specification controls for lagged output growth (or other dependent variables) and additional control variables, X_{it-m}: the lagged weighted growth in trading partner countries according to Equation 1, the lagged unemployment rate, and the lagged occurrence of systemic banking crises. These variables control for the normal dynamics of output and other omitted factors that may affect output growth and are likely to be serially correlated. These control variables are lagged one and two years to isolate change driven by foreign fiscal shocks. Robustness checks in Section 7 control for additional variables: domestic public debt-to-GDP ratio, domestic changes in fiscal policies, country size, openness to trade and additional lags of output growth and fiscal shocks. As fiscal consolidations are mainly exogenous to domestic economic developments, the different control variables are not found to affect the main results.

To compute impulse response functions of domestic growth to fiscal spillover shocks, this paper uses the projection method (Jorda, 2005) that has been implemented by Auerbach and Gorodnichenko (2012a and b, 2013) and Owyang *et al.* (2013). By contrast to standard VAR methods that solve for the impulse responses recursively based on one estimated equation per variable, so that the response at a given time horizon shares estimated parameters with the responses at other horizons, Jorda's method does not impose any link between responses at different horizons. The estimated response for each variable at each horizon comes from a different estimated equation. In such specifications, lagged dependent variables are intended as control

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[8] Here endogenous fiscal policy changes refer to the cyclical component of fiscal policies through the action of automatic stabilisers, discretionary fiscal policies motivated by short-term macroeconomic conditions, and measurement error in the cyclically-adjusted measure of fiscal policy.

variables and the Nickell bias is a minor concern.[9] Moreover, the Anderson-Hsiao estimator that deals explicitly with the endogeneity of the lagged dependent variables and static panel data models deliver similar estimates of Specification 3, suggesting that lagged domestic economic shocks have only low correlation with current action-based consolidations in trading partner countries. Therefore, the results reported in the main text correspond to the estimation of Specification 3 by ordinary least squares and the standard errors are clustered at the country level to take into account heteroskedasticity and within country auto-correlation.[10]

5 Empirical results

5.1 Fiscal spillovers and domestic output

Table 1 presents the results for the baseline Specification 3. Fiscal consolidations in large economies appear to have a substantial negative impact on trading partners' growth. The first panel displays the contemporaneous effect of fiscal spillovers on output growth. Columns 1 to 3 use the first definition of fiscal consolidation spillovers according to Equation 1. In a typical country, a fiscal consolidation in export markets of 1 percent of GDP on average is associated with a decrease in domestic growth of 1.5 percentage points (column 1). The contemporaneous spillover effects of spending cuts is significantly larger: an average spending cut of 1 percent of GDP in export markets is associated with nearly 3 percentage points reduction in domestic growth (column 2). By contrast, the estimated spillover effect of tax increases in export markets is close to zero and imprecisely estimated (column 3). The difference in short-term spillover effects between spending and aggregate consolidation efforts is statistically significant at the 5 per cent level.

The short-term dynamics of spending-based and tax-based fiscal spillovers are also different, while spending-based spillovers tend to have high contemporaneous effect on domestic output, domestic output tends to react with a lag to tax-based spillovers. The lower panel presents the three year average of the effects of fiscal consolidation spillovers on GDP growth.[11] At this medium-term horizon, an export-weighted fiscal consolidation of 1 percent of GDP appears to have similar spillover effects through spending cuts or tax increases, though in the latter case the impact is again not statistically significant. An average 1 percent of GDP consolidation in export markets is associated with an average decrease of GDP growth of between 2.1 and 2.7 percentage points (Columns 1 to 3). The different timing of tax-based and spending-based fiscal spillovers on GDP growth is visually confirmed through their impulse response functions displayed Figure 5, Panels A to C.

The large spillover effects obtained in Table 1 and Figure 5 are for an average consolidation effort of 1 percent of GDP in export markets. This corresponds to current policy plans (OECD, 2013), but it represents an extremely large and unusual shock relative to the historical measure of fiscal shocks that has a mean and standard-deviation of 0.2 per cent of GDP. The relationship is relatively precisely estimated and of plausible magnitude. Taken at face value, the estimated effects suggest that the average fiscal consolidation of 0.7 per cent of GDP in the trading partners of

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[9] The inclusion of the lagged dependent variable introduces a bias into the fixed effects estimator. The size of the bias is asymptotically decreasing in the number of time-series observations, which in this paper (around 30 years of data) is relatively large for a panel data application.

[10] In practice, once two lags of the dependent variable are introduced in the specification, the absence of AR(1) or AR(2) autocorrelation of the residuals could not be rejected at the 10 per cent or 20 per cent significance level using the heteroskedasticity robust tests described in Wooldridge (2002). As the number of clusters is small (34), block-bootstrapped standard-errors were also computed but led to similar inference.

[11] 1/3 x $(\alpha_{11}+\alpha_{21}+\alpha_{31})$, where α_{hl} is the coefficient α_1 of Specification 3 at horizon h years. The standard-error is computed using seemingly unrelated estimation (White, 1982) with clustered standard-errors at the country level and a small sample adjustment by (N-1)/(N-k), where N is the number of observations and k the number of estimated parameters.

Table 1

Spillovers of Action-based Fiscal Consolidations Across OECD Countries and GDP Growth
(effect of fiscal consolidation in export markets on domestic growth)

Weighting of Fiscal Shocks:	**Dependent Variable: Real GDP Growth**					
	Equation 1			**Equation 2**		
Fiscal Shocks:	**Overall**	**Spending**	**Revenue**	**Overall**	**Spending**	**Revenue**
	(1)	(2)	(3)	(4)	(5)	(6)
Contemporaneous Effect						
Fiscal spillovers	–1.547*	–2.998***	–0.196	–1.564*	–3.361***	0.345
	(0.776)	*(0.568)*	*(1.280)*	*(0.892)*	*(1.130)*	*(1.364)*
3-year Average Effect						
Fiscal spillovers	–2.149***	–2.691***	–2.408	–1.112	–1.977	0.626
	(0.819)	*(0.940)*	*(1.617)*	*(1.262)*	*(1.420)*	*(2.494)*
R^2	0.559	0.563	0.557	0.559	0.561	0.556
Observations	885	885	885	885	885	885
Countries	34	34	34	34	34	34

Note: The Table reports the effect of a trade-weighted consolidation package of an average 1 percent of GDP (columns 1 to 3), or a 1 percentage point of domestic GDP (columns 4 to 6). All specifications control for country and year fixed effects, as well as lagged (real) GDP growth in t–1 and t–2. Baseline controls also include lagged unemployment rate, occurrence of systemic banking crises and real GDP growth in export markets. Standard errors in parentheses are robust to heteroskedasticity and within country autocorrelation. * denotes a significant estimate at the 10 per cent level, ** at 5 per cent, *** at 1 per cent.
Source: OECD calculations.

Portugal in 2010 reduced its contemporaneous output growth by 1 percentage point and its medium-term growth by around 1.5 percentage points. By contrast, the large but isolated (action-based) consolidation in Spain of 1.2 per cent of GDP in 1989 would have had much smaller effects on the growth of Portugal. The estimated relationship implies that GDP growth in Portugal decreased by 0.3 percentage points on impact due to fiscal consolidations in trading partner countries in 1989.

Columns 4 to 6 of Table 1 presents the results of similar regressions using the spillover shocks defined in Equation 2. Rescaling foreign spending shocks to make them more comparable with domestic shocks as in Auerbach and Gorodnichenko (2012b, 2013), a foreign spending contraction of 1 per cent of domestic GDP appears associated with a decrease of domestic output by 3.4 percentage points in the short term and 2 percentage points in the medium term (column 5). Therefore, the two specifications of the spillover shocks in Equations 1 and 2 give qualitatively similar results for spending shocks. Furthermore, the magnitude of the effects measured using Equation 2 is in line with Auerbach and Gorodnichenko (2013). As they use a very different definition of the fiscal shocks, one that focuses on six-month ahead forecast errors and includes expansionary policies, as well as a more limited sample of countries and a shorter time period, these results give confidence that the estimated spillover effects are not driven by a particular specification of the fiscal shocks, a particular sample, or the chosen trade weights.

Figure 5, Panels D to F display a visual robustness check of these findings for the spending based spillover shocks measured as in Equation 1. Panel D reports the impulse response function of the spending shocks controlling for the revenue shocks. Panel E adds further control variables for the domestic fiscal policy stance as measured by the changes in the cyclically-adjusted budget balance. Finally, Panel F includes one-year and two-year ahead fiscal consolidations of trading partners to account for the possibility that fiscal shocks in trading partner countries could be anticipated. If foreign government fiscal policies are anticipated, it may affect growth in the previous year and the estimated response may be biased. For example, firms may begin to reduce inputs and output before the observed government consolidations. Reassuringly, none of these robustness checks alter the main findings.

The results confirm previous evidence using the action-based fiscal contractions to test the effect of fiscal policy on domestic outcomes. Guajardo *et al*. (2011) find that fiscal consolidations are associated with a fall in the real effective exchange rate that partly offsets the direct effect on domestic demand. They estimate that a fiscal contraction of 1 percent of GDP increase exports by 0.9 percents within two years, while real imports decrease sharply by 1.2 percents. Feyrer and Shambaugh (2012) report that an increase of 1 percent of GDP of US taxes is associated with an improvement of the current account by around 0.6 per cent of GDP. The typical country sees a current account decline in excess of 1 percent of its GDP, of around 1.6 per cent of GDP when the United States increases taxes by 1 percent of world GDP. These large spillover effects of fiscal policies are in line with evidence using variation across US states. Nakamura and Steinsson (2012) report a government spending multiplier of approximately 1.5, while Suárez Serrato and Wingender (2011) and Shoag (2012) estimate fiscal policy multipliers around 2 when the tax burden of additional spending in one US state is mainly borne by the other states.

5.2 Comparing action-based and cyclically-adjusted fiscal spillovers

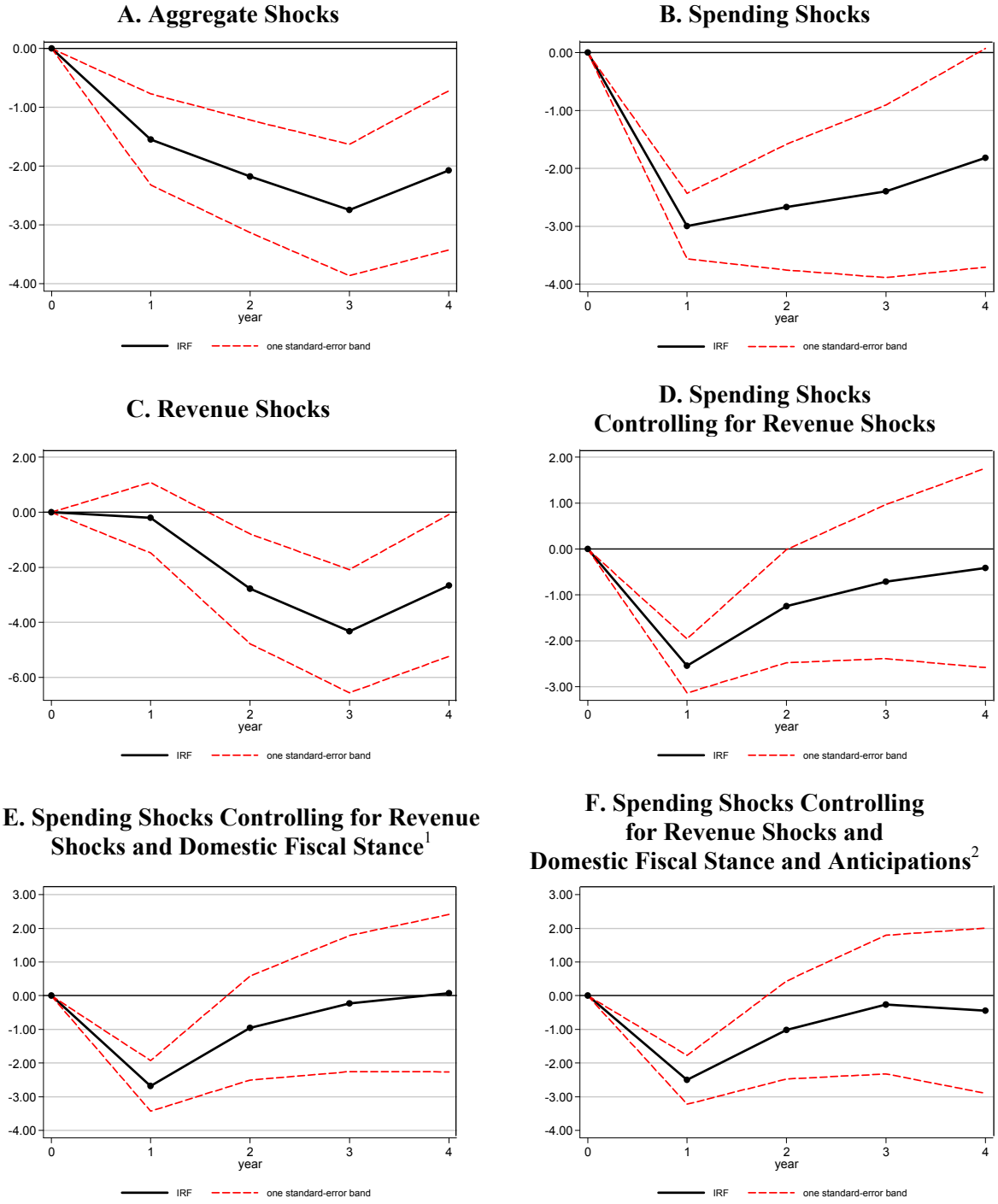
This subsection compares the fiscal consolidation spillovers estimated using the action-based and cyclically-adjusted fiscal shocks in export markets. Action-based and cyclically-adjusted fiscal changes broadly coincide regarding the size of the shocks (Figures 1 and 2), but the estimated spillovers on output differ significantly between the two measures. Figure 6 displays the estimated effects of fiscal spillovers on domestic output when cyclically-adjusted budget changes are used to measure the fiscal policy stance. Panels A to D focus on government primary spending. Using cyclically-adjusted spillover shocks, Panel A reports large positive effects of foreign spending contractions on domestic output contrasting with the negative impact reported earlier from estimates based on action-based measures of fiscal consolidations. This counterintuitive result does not appear to be driven by the fact that Devries *et al*. (2011) select only episodes of fiscal consolidation. The effects of spending-based foreign consolidations also appear expansionary when cyclically-adjusted spending changes are censored at zero to select only episodes of fiscal consolidation (Panel B).

Panel C illustrates the endogeneity of the spillover shocks measured using the cyclically-adjusted primary expenditures. It controls for observable macroeconomic developments using the procedure of Perotti (1999) and Fatas and Mihov (2003). This leads to a clear drop in the short-term positive effects estimated in Panels A and B.[12] This suggests that the endogenous components of the cyclically-adjusted primary spending do not average out across countries but are correlated with the global business cycle, leading to an upward bias in the estimated spillover effects.

[12] More precisely. the new fiscal spending shocks are defined as the residuals of country specific regressions as in Perrotti (1999), Fatas and Mihov (2003) or Corsetti *et al*. (2012). For each country, the specification is: $\Delta F_t=\alpha+\gamma \times t+\rho_1\Delta F_{t-1}+\beta_1 g_t+\delta_1\pi_t+\delta_2\pi_t \times \pi_t+\varepsilon_t$, where ΔF_t is the change in cyclically-adjusted government spending divided by potential GDP, g_t is real GDP growth, π_t is the inflation rate measured by the GDP deflator and g_t is instrumented by an index of oil prices, lagged growth and inflation.

Figure 5

Dynamic Effects of Action-based Fiscal Consolidations on Output Across OECD Countries
(effect of an average one percentage point GDP consolidation in export markets on domestic growth)

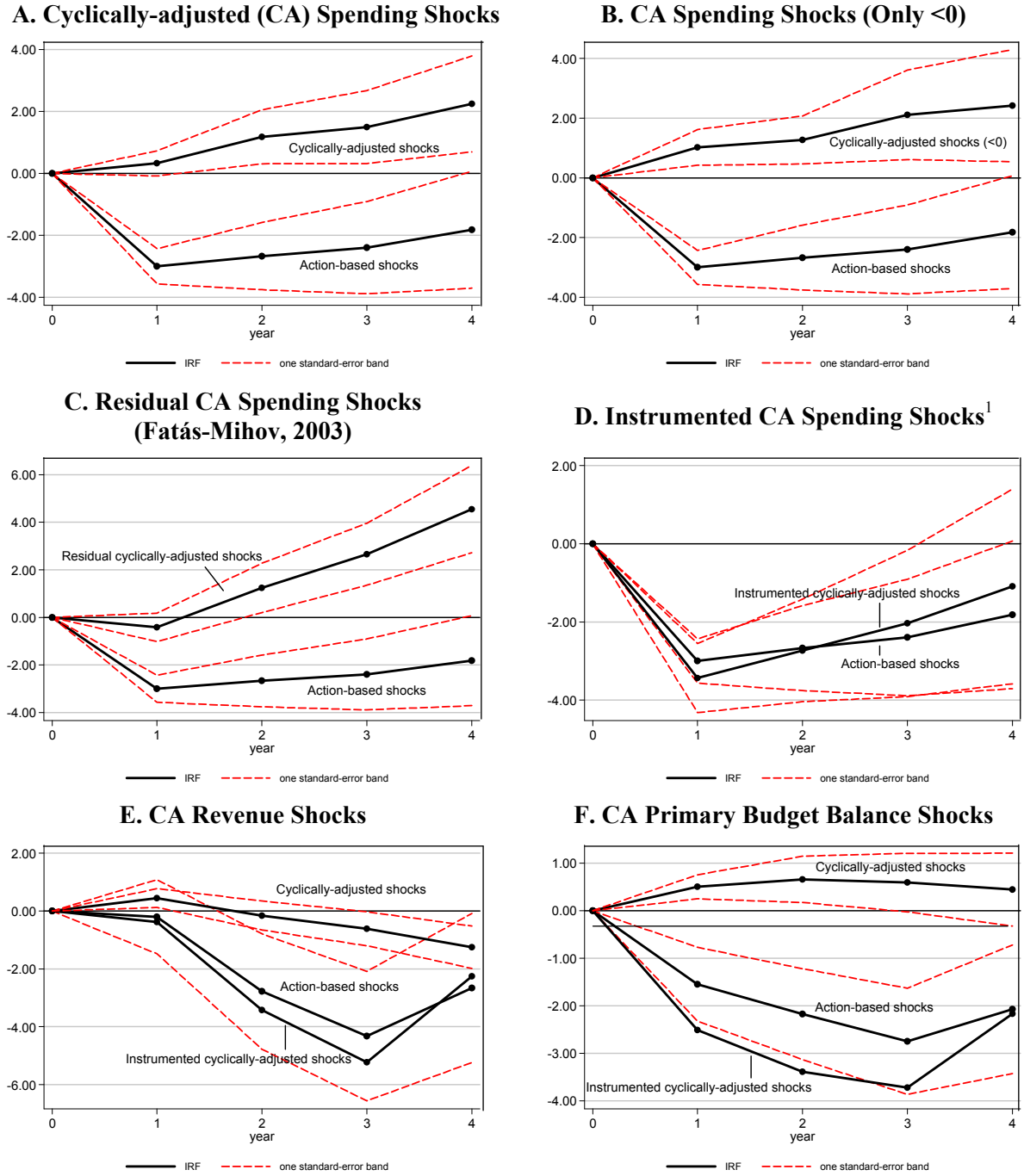


Note: t=1 denotes the year of export-weighted fiscal contraction. Spillovers of fiscal policies are weighted according to Equation 1. The figure reports heteroskedacity and autocorrelation robust one standard-error band clustered at the country level.
1. The controls are the change in the domestic cyclically-adjusted budget balance in t–1 and t–2.
2. The additional controls are the spillover shocks measured in t+1 and t+2.
Source: OECD calculations.

Figure 6

Comparison Between Cyclically-adjusted and Action-based Fiscal Spillovers

(effect of an average one percentage point GDP consolidation in export markets on domestic growth)



Note: t=1 denotes the year of export-weighted fiscal contraction. Spillovers of fiscal policies are weighted according to Equation 1. The figure reports heteroskedacity and autocorrelation robust one standard-error band clustered at the country level. Panels E and F do not report the one standard-error bands of the instrumented cyclically-adjusted shocks.

1. Cyclically-adjusted spillover shocks are instrumented by action-based spillover shocks.

Source: OECD calculations.

Isolating cyclically-adjusted fiscal shocks in election years that are arguably less likely to be endogenous also leads to negative but imprecisely estimated effects of foreign government spending on domestic output (results not reported). This provides indirect evidence that the positive effects estimated in Panels A and B may be driven by endogenous fiscal reactions.

When foreign shocks to the cyclically-adjusted primary spending are instrumented using the action-based measure of Devries *et al*. (2011), the results are in line with Figure 5 (Panel D). This demonstrates that the measure of exogenous fiscal spillover shocks is a strong predictor of the export-weighted cyclically-adjusted changes in primary spending.[13] As argued by Perotti (2011), such instrumental variable approach leads to estimate a specific effect: the effect of discretionary foreign fiscal policies that are not motivated by short- to medium-term economic conditions.

Other measures of the foreign fiscal stance based on cyclical adjustments display a similar pattern. Foreign fiscal contractions appear to have positive effects on output when trading partners' fiscal policies are measured by cyclically-adjusted revenues and primary balances (Panels E and F). However, the estimated effects become negative and close to those reported in Figure 5 when cyclically-adjusted measures are instrumented using the action-based fiscal shocks.[14] Guajardo *et al.* (2011) and Riera-Crichton *et al*. (2012) obtain similar results when they investigate the effect of domestic fiscal policy on domestic output. They estimate an expansionary effect of fiscal consolidations on domestic output when the fiscal stance is measured through cyclical adjustments, while the effects of fiscal consolidations become contractionary when they control for the endogeneity of the cyclically-adjusted fiscal stance.

6 Heterogeneity of fiscal spillovers across countries

This section examines the extent to which fiscal spillovers could be mitigated or exacerbated by country-specific and macroeconomic circumstances. The issue of fiscal shock transmission within currency unions and between countries with fixed exchange rate regimes is of particular interest, given the limited ability of those countries to offset fiscal shocks *via* exchange rate adjustments and monetary policies. The effects of foreign fiscal policies on domestic output could also be larger when the domestic economy or foreign export markets have more slack (Parker, 2011). Therefore, the empirical analysis tests for the impact of exchange rate arrangements, as well as economic downturns, on domestic growth when countries are hit by foreign fiscal shocks.

6.1 Exchange rate policy and fiscal spillovers

The effects of a fiscal consolidation on demand for imports, export competitiveness and real exchange rate adjustments could differ between currency unions and more flexible exchange rate regimes. On the one hand, if a member of a currency union consolidates, other members of the currency union may be less affected than countries outside the currency union by the change in net exports of the consolidating country, owing to the absence of exchange rate adjustment. In a stylized one country Mundell-Fleming model with short-term price rigidity, countries with floating exchange rate regimes are able to "export" their fiscal consolidations through nominal exchange rate depreciations and changes in net exports, leaving their domestic GDP unaffected. By contrast, domestic GDP growth decreases sharply in pegged countries in the short term, while the medium-term adjustment must take place through price compression and internal devaluation (*e.g*., Mankiw, 2012). Consistent with this simple model, Ilzeztki *et al*. (2013) and Beetsma *et al*. (2012)

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[13] The first stage Kleibergen-Paap F-statistics is 120.

[14] The first stage Kleibergen-Paap F-statistics are 29 and 29, respectively.

report larger multipliers of fiscal consolidation plans on domestic output in pegged countries and larger disinflationary effects.

On the other hand, the spillovers of fiscal consolidations on GDP growth and trade flows could be larger within currency unions than among countries with more flexible exchange rate regimes if, following a fiscal consolidation, trade flows are more sensitive to a shift in relative prices in currency unions compared to countries with more flexible exchange rate regimes. Indeed, the (price) elasticity of trade flows may be larger in currency unions since goods traded may be closer substitutes to each other and the uncertainty about the change in competitiveness may be lowered by the absence of nominal exchange rate changes. Furthermore, public spending cuts may also dampen exports of other members of a currency union more directly, if public procurement is designed so that government spending is partly bought from other member countries. Indeed, Bluedorn and Leigh (2011) find that the current account response to domestic fiscal consolidations increased for euro area countries after the euro adoption.

The analysis of the effects of exchange rate arrangements decomposes foreign fiscal shocks into two parts: a first part with limited exchange rate movements and another part with flexible exchange rate movements. Equation 1 becomes:

$$\Delta TF_{it} = \sum_{j,j\neq i}\left(\frac{1}{20}\sum_{s=1990}^{2009}\frac{exp_{ijs}}{exp_{is}}\right)\Delta F_{jt} \times Fix_{ijt} + \sum_{j,j\neq i}\left(\frac{1}{20}\sum_{s=1990}^{2009}\frac{exp_{ijs}}{exp_{is}}\right)\Delta F_{jt} \times (1 - Fix_{ijt}) \quad (4)$$

where Fix_{ijt} is a dummy variable taking value one, if the domestic country (the exporter) and foreign country (the importer) are both subject to some form of fixed exchange rate regime. The dummy variable corresponds to the *de facto* classification of Reinhart and Rogoff (2004) updated to 2009 by Ilzeztki *et al*. (2011), while the *de facto* classification of Shambaugh (2004) led to similar results. The pegged regime corresponds to their coarse classification and includes: no separate legal tender, pre-announced peg or currency board arrangements, pre-announced horizontal bands that are narrower than or equal to +/–2 per cent and *de facto* pegs.[15] The non-pegged regime is defined as the complement of the pegged regime.

Based on the decomposition of Equation 4, fiscal consolidations appear to have larger spillover effects on growth between pegged countries in the short run, contrasting with the expected dynamics of real exchange rates. Table 2 Panel A displays the estimated effect of exogenous foreign fiscal shocks between non-pegged and pegged countries according to Reinhart and Rogoff's classification (2004). The estimated contemporaneous effect of fiscal consolidation between pegged countries is much more negative and precisely estimated than the one between non-pegged countries. This result appears to hold for both tax and spending shocks. However, the differential effects of foreign fiscal shocks between pegged and non-pegged countries appear to be mainly due to short-term dynamics. When looking at the 3 year average effect of fiscal consolidation, the magnitude of the spillovers on growth appear larger between non-pegged countries than between pegged countries.

The different dynamic effects of fiscal spillovers between countries with limited exchange rate movements and those with more flexibility is confirmed using currency unions as defined by Glick and Rose (2002). Glick and Rose's definition regroups three kinds of bilateral currency unions: (1) currency unions which occur when a small and/or poor country unilaterally adopts the money of a larger, richer "anchor" country, (2) multilateral currency unions between countries of more or less equal size and wealth, and (3) country pairs where "money was interchangeable

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[15] The dummy variable is defined as Fix_{jt} x Fix_{it}, where Fix_{it} is the exchange rate regime of country *i* in year *t*. The *de jure* IMF classification was also used, but led to insignificant results. Klein and Shambaugh (2008) and Rose (2011) compare the different exchange rate classifications.

Table 2

Exchange Rate Arrangements and Spillovers of Action-based Fiscal Consolidations on GDP Growth
(effect of an average one point GDP consolidation in export markets)

Exchange Rate Arrangement:	Dependent variable: Real GDP Growth					
	A. Reinhart and Rogoff (2004)			B. Glick and Rose (2002)		
Fiscal Shocks:	**Overall**	**Spending**	**Revenue**	**Overall**	**Spending**	**Revenue**
	(1)	(2)	(3)	(4)	(5)	(6)
Contemporaneous effect						
Fiscal spillovers	–0.718	–2.760**	1.337*	–0.990	–2.893***	1.283
in a non-fixed regime	*(0.941)*	*(1.130)*	*(0.758)*	*(0.860)*	*(0.883)*	*(0.848)*
Fiscal spillovers	–2.214***	–2.900***	–2.466	–2.501***	–3.096***	–2.739
in a fixed regime	*(0.518)*	*(0.447)*	*(1.681)*	*(0.581)*	*(0.525)*	*(1.937)*
3–year average effect						
Fiscal spillovers	–2.196*	–3.484**	–0.822	–2.173**	–2.944**	–0.572
in a non-fixed regime	*(1.276)*	*(1.695)*	*(1.145)*	*(1.082)*	*(1.327)*	*(1.210)*
Fiscal spillovers	–1.368	–1.493*	–0.190	–1.988**	–2.315**	–1.123
in a fixed regime	*(0.862)*	*(0.839)*	*(2.629)*	*(0.881)*	*(1.040)*	*(2.610)*
R^2	0.563	0.564	0.565	0.561	0.563	0.561
Observations	885	885	885	885	885	885
Countries	34	34	34	34	34	34

Note: All specifications control for country and year fixed effects, as well as lagged (real) GDP growth in t–1 and t–2. Baseline controls also include lagged unemployment rate, occurrence of systemic banking crises and real GDP growth in export markets. Standard errors in parentheses are robust to heteroskedasticity and within country autocorrelation. * denotes a significant estimate at the 10 per cent level, ** at 5 per cent, *** at 1 per cent.
Source: OECD calculations.

between the two countries at a 1:1 par for an extended period of time, so that there was no need to convert prices when trading between a pair of countries". The updated currency union classification is taken from de Sousa (2012). In the sample of OECD countries, this definition is very close to a euro area dummy, but it differs significantly from the Reinhart and Rogoff's classification.[16] During the 1978-2009 period, 13 per cent of country-pair observations have limited exchange rate movements according to Reinhart and Rogoff's classification, while only 7 per cent of the country-pair observations belong to bilateral currency unions. Panel B of Table 4 reports the results the estimated effects of foreign fiscal shocks within and outside currency unions. The results are in line with those in Panel A. Currency union members tend to have much larger short-term fiscal spillovers on output than countries with more flexible exchange rate arrangements. However, the differential impact of fiscal spillovers within and outside currency unions is again vanishing over the medium term.

Given the limited variation of bilateral exchange rate arrangements based on currency unions or pegged countries and their possible endogeneity, Tables 13 and 14 in Appendix present further robustness checks. They exploit the bilateral variation of exchange rate arrangements from pegged countries to freely floating country pairs as measured by Reinhart and Rogoff (2004) and different lagged structures. All the results of Table 2 hold unchanged, suggesting that nominal exchange rate rigidity increases short-term consolidation spillovers across OECD countries.

To shed more light on the mechanisms driving the effects of fiscal spillovers on output growth, the analysis relates changes in bilateral trade flows and exchange rates across OECD countries for the different exchange rate arrangements and trading partner countries using Glick and Rose's classification (2002). For example, the export growth from country *i* to country *j* in year *t*, Δe_{ijt}, is related to fiscal consolidation in export market *j*, ΔF_{ijt}, through the following bilateral specification:[17]

$$\Delta e_{ijt} = \sum_{l=1,2}\left(\rho_l + \rho_{Fl} Fix_{ijt-l}\right)\Delta e_{ijt-l} + \sum_{k=0,1,2}\left[\left(\beta_k + \beta_{Fk} Fix_{ijt-k}\right)\Delta F_{jt-k} + \alpha_{Fk} Fix_{ijt-k}\right] + \lambda_{ij} + \delta_{it} + \varepsilon_{ijt} \quad (5)$$

where *i* is an OECD country and *j* is one of the 17 OECD countries for which fiscal consolidations are identified by Devries *et al*. (2011). Fix_{ijt} is a dummy variable taking value 1 if the country pair belongs to a currency union. The specification allows for the export dynamics in currency unions to differ from that among countries with more flexible exchange rate arrangements through the coefficients ρ_{Fl} and α_{Fk}. λ_{ij} is a bilateral fixed effect that captures long-run trends in trade flows. Importantly, the fixed effects, δ_{it}, capture all observable and unobservable shocks to country *i* in year *t*. As argued by Khwaja and Mian (2008), such specification absorbs all demand and supply shocks that are specific to country *i*. Since the comparison is across importing countries *j* for the same exporting country-year (*i, t*), Specification 5 focuses on bilateral trade movement between *i* and *j* that are driven solely by changes in importing countries, *j* and their identified action-based fiscal consolidations.

Table 3 reports the estimate for exports from country *i* to country *j* and the imports of country *i* coming from country *j*. The bilateral panel dataset cover the period 1978-2009 and 561 country-pairs (17 x 33). In all specifications of Table 3, exports towards country *j* contract sharply when country *j* consolidates. A 1 percent of GDP consolidation in country *j* is associated with a decrease in exports from country *i* towards *j* by 1.4 percentage points (column 1). The effect on

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[16] The currency unions between Belgium and Luxembourg and between Ireland and United Kingdom prior to 1979 are the two differences with a simple euro area dummy.

[17] Export growth is calculated as: $\Delta e_{ijt}=[(\log(EXP_{ijt})-\log(EXP_{ijt-1})]$ x 100, where EXP_{ijt} is the exports from country *i* to country *j* in US dollars from the IMF DOTS statistics. The exports of country *i* are deflated by an implicit export deflator for country *i* through the fixed effects, δ_{it}. The growth in imports of country *i* from country *j* is computed similarly using mirror flows ($IMP_{ijt}=EXP_{jit}$).

Table 3

Bilateral Trade, Exchange Rate Regimes, and Action-based Fiscal Consolidations
(effect of a one percentage point of GDP consolidation in country j)

Dependent Variable:	**Growth in Exports from i to j**				**Growth in Imports of i from j**		
	Fiscal Consolidation	**Spending-Based**	**Tax-based**	**Spending / Tax-based**	**Fiscal Consolidation**	**Spending-based**	**Tax-based**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Fiscal consolidation	–1.367***				0.057		
(in export market, j)	*(0.380)*				*(0.309)*		
Fiscal consolidation	–2.286**				2.446***		
x Currency union (CU)	*(1.043)*				*(0.940)*		
Spending cuts		–2.509***		–1.953***		0.917**	
(in export market)		*(0.553)*		*(0.547)*		*(0.454)*	
Spending cuts		–3.551**		–2.488		3.381**	
x Currency union		*(1.775)*		*(1.994)*		*(1.625)*	
Tax hikes			–1.704***	–1.188**			–0.410
(in export market)			*(0.583)*	*(0.592)*			*(0.523)*
Tax hikes			–3.565**	–1.868			4.166***
x Currency union			*(1.781)*	*(1.966)*			*(1.554)*
R^2	0.349	0.349	0.349	0.350	0.436	0.436	0.436
Observations	14,521	14,521	14,521	14,521	14,521	14,521	14,521
Country pairs	561	561	561	561	561	561	561

Note: All specifications control for bilateral fixed effects, destination-year fixed effects, two lags of the dependent variable and two-lags of the explanatory variables and the currency union dummy as in Equation 5. Clustered standard errors in parentheses are robust to heteroskedasticity and within country-pair auto-correlation. * denotes a significant estimate at the 10 per cent level, ** at 5 per cent, *** at 1 per cent.
Source: OECD calculations.

country *i*'s exports is much stronger if *i* and *j* are in a currency union: a 1 percent of GDP fiscal contraction in country *j* is associated with a decrease in bilateral exports by 3.7 percentage points. Trade spillovers of spending cuts appear larger than those of tax hikes in a currency union, though the difference between the effect of tax and spending shocks is not statistically significant at the 10 per cent level (columns 2 to 4).

Domestic GDP growth could be reduced through a contraction in exports and an increase in imports when trading partners' consolidate. Columns 5 to 7 of Table 3 investigates if net exports could explain further the larger effect of fiscal consolidation spillovers in currency unions. A fiscal consolidation of 1 percent of GDP is associated with an increase in exports towards the other members of the same currency union by 2.4 percentage points, while the increase in exports towards other countries is essentially zero (column 5).

Table 4 challenges the finding that a currency union affects the transmission of fiscal shocks in a number of ways. Panel A adds to the baseline specification interaction terms between lagged exports, fiscal consolidation and different measures of proximity and integration between country *i* and country *j*. More precisely, controls for regional trade agreements, direct neighbours and physical distance between the two capital cities are introduced in Specification 5.[18] The estimated additional effect of fiscal consolidation on bilateral exports in a currency union is barely affected by the new interaction terms (columns 1 to 3). Similarly, the effects of a partner country consolidation on bilateral imports in a currency union are unchanged (columns 4 to 6). Panel B decomposes further the effects of exchange rate arrangements. Consolidation efforts in the export market are interacted with two dummy variables taking value one if country *i* or country *j* belongs to any currency union.[19] The larger effect of fiscal consolidation on the imports from trading partners in a currency union appears driven by bilateral exchange rate arrangements (columns 1 to 3). By contrast, the larger effect of fiscal consolidation on the exports towards trading partners in a currency union is mainly driven by the exchange rate arrangements of the consolidating countries (columns 4 to 6).

One possible explanation for the larger contraction of GDP growth and bilateral exports in a currency union than among countries with flexible exchange rate arrangements could be that real exchange rates adjust more in currency union. This could be the case if downward price and wage rigidities are low and if countries outside currency unions partly offset foreign fiscal shocks through monetary policy. However, fiscal consolidations appear to be associated with significant but smaller real exchange rate adjustments between members of a currency union than between countries with more flexible exchange rate arrangements.

Table 5 reports the effects of fiscal consolidations on different measures of bilateral exchange rates and relative prices. When both countries are floating, the bilateral nominal exchange rate appreciates by 2 percentage points for a fiscal consolidation of 1 percent of GDP in the partner country (Table 5, column 1). The change in relative exchange rate is substantially smaller, 0.8 percentage points (2-1.2=0.8), when the partner country is in a currency union, and nearly zero when the two countries are in the same currency union (2-1.2+0.1–0.8=0.2).[20] By contrast, the adjustment in relative prices in currency unions, as measured by the GDP deflator, relative Consumer Price Indices – CPI –, or relative Unit Labour Costs – ULC –, is much larger

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[18] For example, the added terms are: $\sum_{l=1,2} \rho_{rl} \Delta e_{ijt-l} RTA_{ijt-l} + \sum_{k=0,1,2} \left[\beta_{rk} \Delta F_{jt-k} + \alpha_{rk}\right] RTA_{ijt-k}$, in the case of regional trade agreement (RTA_{ijt}). The logarithm of the distance is introduced in deviation from its sample average.

[19] The added terms to Specification 5 are: $\sum_{l=1,2} \rho_{pil} \Delta e_{ijt-l} Peg_{it-l} + \sum_{k=0,1,2} \left[\beta_{pik} \Delta F_{jt-k} + \alpha_{pk}\right] Peg_{it-k}$ for both countries *i* and *j*. Peg_{it} is a dummy variable taking value 1 if country *i* belongs to any currency union.

[20] Changes in bilateral exchange rates are measured as: $\Delta e_{ijt}=[(\log(EXCH_{it}/EXCH_{jt})-(\log(EXCH_{it-1}/EXCH_{jt-1})]$ x 100 where $EXCH_{it}$ is the dollar value of the local currency unit taken from the OECD Economic Outlook database. Positive values of Δe_{ijt} indicate a relative appreciation of currency *i* with respect to currency *j*.

Table 4

Robustness of the Effects of Exchange Rate Regimes and Fiscal Consolidations on Bilateral Trade

(effect of a one percentage point of GDP consolidation in country j)

Dependent Variable:	**Growth in Exports from i to j**			**Growth in Imports of i from j**		
Panel A	(1)	(2)	(3)	(4)	(5)	(6)
Fiscal consolidation	–1.725***	–1.750***	–0.760	0.251	0.258	–0.243
(in export market, j)	(0.630)	(0.632)	(0.641)	(0.614)	(0.616)	(0.698)
Fiscal consolidation	–2.635**	–2.581**	–2.817***	2.520***	2.475***	2.546***
x Currency union	(1.048)	(1.052)	(1.050)	(0.924)	(0.922)	(0.929)
Fiscal consolidation	0.700	0.597	–1.132	–0.281	–0.189	0.776
x Regional trade agreement	(0.724)	(0.738)	(1.001)	(0.683)	(0.685)	(0.936)
Fiscal consolidation		1.009	–0.642		–0.811	0.040
x Neighbour countries		(0.695)	(0.863)		(0.516)	(0.730)
Fiscal consolidation			–1.300**			0.738*
x log distance			(0.572)			(0.441)
R2	0.351	0.352	0.355	0.437	0.437	0.437
Panel B	(1)	(2)	(3)	(4)	(5)	(6)
Fiscal consolidation	–1.793**	–1.831**	–0.853	–0.315	–0.306	–0.738
(in export market, j)	(0.732)	(0.734)	(0.730)	(0.742)	(0.746)	(0.808)
Fiscal consolidation	–3.192**	–3.170**	–3.444***	0.913	0.878	1.054
x Currency union (CU)	(1.316)	(1.319)	(1.311)	(1.100)	(1.098)	(1.093)
Fiscal consolidation	0.250	0.286	0.439	1.487**	1.470**	1.347**
x Export market in CU (j)	(0.719)	(0.716)	(0.713)	(0.601)	(0.604)	(0.590)
Fiscal consolidation	0.360	0.371	0.314	0.764	0.774	0.743
x Country in CU (i)	(0.708)	(0.706)	(0.725)	(0.530)	(0.531)	(0.531)
Control variables[1]	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.353	0.353	0.357	0.438	0.438	0.438
Observations	14,521	14,521	14,521	14,521	14,521	14,521
Country pairs	561	561	561	561	561	561

Note: All specifications control for bilateral fixed effects, destination-year fixed effects, two lags of the dependent variable and two-lags of the explanatory variables and the currency union dummy as in Equation 5. Clustered standard errors in parentheses are robust to heteroskedasticity and within country-pair auto-correlation. * denotes a significant estimate at the 10 per cent level, ** at 5 per cent, *** at 1 per cent.

1. The controls variables are the same interaction terms as introduced in Panel A.

Source: OECD calculations.

Table 5

Bilateral Exchange Rates, Exchange Rate Regimes, and Action-based Fiscal Consolidations

(effect of a one percentage point of GDP consolidation in country j)

	Dependent Variable: Bilateral Growth in…						
	Nominal Exchange Rate	Relative GDP Deflator	Real Exchange Rate	Relative CPI	Relative ULC	Relative Effective:	
						CPI	ULC
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Fiscal consolidation	2.047***	–0.077	2.473***	–0.017	0.193*	1.836***	2.336***
(in export market, j)	*(0.116)*	*(0.173)*	*(0.259)*	*(0.053)*	*(0.116)*	*(0.122)*	*(0.149)*
Fiscal consolidation	–1.178***	0.273*	–1.154***	0.072	0.241*	–0.989***	–1.210***
x Country in CU (j)	*(0.157)*	*(0.149)*	*(0.220)*	*(0.164)*	*(0.135)*	*(0.158)*	*(0.192)*
Fiscal consolidation	0.135	–0.045	–0.001	–0.008	–0.076	0.087	0.050
x Country in CU (i)	*(0.220)*	*(0.143)*	*(0.289)*	*(0.093)*	*(0.120)*	*(0.173)*	*(0.197)*
Fiscal consolidation	–0.791***	0.536***	–0.411	0.485***	0.962***	0.202	0.557**
x Currency union (i,j)	*(0.234)*	*(0.122)*	*(0.282)*	*(0.137)*	*(0.178)*	*(0.205)*	*(0.242)*
Fiscal consolidation	0.213***	0.687***	0.908***	0.531***	1.321***	1.136***	1.733***
in currency union[1]	*(0.070)*	*(0.091)*	*(0.120)*	*(0.056)*	*(0.125)*	*(0.103)*	*(0.138)*
R^2	0.899	0.851	0.488	0.755	0.878	0.720	0.758
Observations	15,232	15,159	15,094	15,279	14,393	14,382	13,719
Country pairs	561	561	561	561	557	561	544

Note: All specifications control for bilateral fixed effects, destination-year fixed effects, two lags of the dependent variable and two-lags of the explanatory variables and the currency union dummy as in Equation 5. Clustered standard errors in parentheses are robust to heteroskedasticity and within country-pair auto-correlation. * denotes a significant estimate at the 10 per cent level, ** at 5 per cent, *** at 1 per cent.

1. Estimated effect of a 1 point GDP in the export market for an exporting country in the same currency union (the sum of the four estimated coefficients in the main panel).

Source: OECD calculations.

than among other countries (columns 2, 4 and 5). This implies a positive adjustment of the bilateral real exchange rate in currency unions by 0.9 percentage point when a trading partner consolidates by 1 percent of GDP.[21] This effect is much smaller than among countries with flexible exchange rates where the bilateral real exchange rate increases by 2.5 percentage points (column 3). This picture is not affected by the use of effective exchange rates. Columns 6 and 7 report the relative growth of competitiveness-weighted consumer prices and unit labour costs for the overall economy in dollar terms. The competitiveness weights take into account the structure of competition in both export and import markets. The relative changes of effective real exchange rates appear smaller between members of a currency union than among countries with more flexible exchange rate arrangements.

Taken together the results of Tables 2 to 5 suggest that the cross-country spillovers of fiscal consolidations are more detrimental to growth in currency unions than among countries with more flexible exchange rate regimes. This result cannot be explained by larger real exchange rate adjustments in currency unions than among countries with flexible exchange rate regimes and the loss of monetary autonomy associated with a pegged exchange rate regime.[22] Following a fiscal consolidation in a currency union, some pegged exchange rates considered as currency unions are re-aligned but nominal exchange rate adjustments remain close to zero. However, changes in relative prices and unit labour costs in currency unions mean that real exchange rate adjustments are significant. Therefore, the larger spillover effects of fiscal consolidations on GDP growth could be explained by a higher price elasticity of trade flows in currency unions than among countries with more flexible exchange rate regimes. In the medium term, the effects of fiscal consolidations on real effective exchange rate arrangements are equalised across currency unions and countries with more flexible exchange rate regimes, while the response of exports to foreign fiscal consolidation increases significantly outside currency unions (Appendix, Tables 15 and 16).

6.2 Economic downturns and fiscal spillovers

The effects of foreign fiscal policies on domestic output could also be larger when the domestic economy or the foreign export markets are experiencing relatively severe slack. This effect is measured by adding to Specification 3 an interaction term between the foreign fiscal shock variable and a dummy variable taking a value of 1 during periods of domestic slack. The latter are defined as periods when the domestic unemployment rate is above its 67th percentile over the 1978-2009 period. Alternatively, periods of slack are defined as periods when the output gap is below its 33rd percentile over the 1978-2009 period. The two indicators, S_{it}, characterise the amount of slack in the exporting economy. The foreign fiscal shocks are decomposed into two parts: a first part occurring during economic downturns and another part during "normal times". Lagged measures of downturns are used to minimize contemporaneous correlation with domestic growth and Equation 1 becomes:

$$\Delta TF_{it} = \sum_{j,j\neq i}\left(\frac{1}{20}\sum_{s=1990}^{2009}\frac{exp_{ijs}}{exp_{is}}\right)\Delta F_{jt} \times S_{it-1} + \sum_{j,j\neq i}\left(\frac{1}{20}\sum_{s=1990}^{2009}\frac{exp_{ijs}}{exp_{is}}\right)\Delta F_{jt} \times (1 - S_{it-1}) \quad (6)$$

Table 6 reports the estimated effects of fiscal spillovers in normal times and during economic downturns. The analysis includes the non-interacted lagged dummy variables characterizing the periods of slack to capture the direct effects of economic slack on domestic output growth.[23] In the short term, the estimated effect of a shock to foreign spending appears

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[21] Bilateral real exchange rates are computed using nominal exchange rates and relative GDP deflators.

[22] Short-term interest rate differentials also appear to react similarly to fiscal consolidations in currency unions compared to countries with more flexible exchange rates (unreported).

[23] More precisely, the estimated equation adds $\gamma_1 S_{it-1}+\gamma_2 S_{it-2}+\gamma_3 S_{it-3}$ to Specification 3.

Table 6

Domestic Downturns and Action-based Fiscal Consolidation Spillovers

(effect of an average one percentage point of GDP consolidation in export markets on domestic growth)

Measure of Slack:	Dependent Variable: Real GDP Growth					
	A. Unemployment Rate			B. Output Gap		
Fiscal Shocks:	**Overall**	**Spending**	**Revenue**	**Overall**	**Spending**	**Revenue**
	(1)	(2)	(3)	(4)	(5)	(6)
Contemporaneous effect						
Fiscal spillovers	–1.458*	–2.804***	–0.201	–0.845	–2.477***	1.650
in normal times	*(0.785)*	*(0.542)*	*(1.387)*	*(0.858)*	*(0.774)*	*(1.457)*
Fiscal spillovers	–1.527	–2.965***	–0.065	–1.448	–3.230***	0.539
in a period of slack	*(1.047)*	*(1.058)*	*(1.720)*	*(0.955)*	*(0.963)*	*(1.522)*
3-year average effect						
Fiscal spillovers	–2.040***	–2.499**	–2.474	–1.193	–1.825	0.006
in normal times	*(0.784)*	*(0.980)*	*(1.626)*	*(0.929)*	*(1.335)*	*(1.617)*
Fiscal spillovers	–1.757	–1.777	–2.057	–1.261	–2.396**	0.290
in a period of slack	*(1.697)*	*(1.973)*	*(3.083)*	*(0.984)*	*(1.160)*	*(2.066)*
R^2	0.564	0.569	0.563	0.605	0.608	0.602
Observations	884	884	884	853	853	853
Countries	34	34	34	34	34	34

Note: All specifications control for country and year fixed effects, lagged (real) GDP growth in t–1 and t–2 and indicators of economic slack in t–1, t–2 and t–3. Baseline controls also include lagged unemployment rate, occurrence of systemic banking crises and real GDP growth in export markets. Standard errors in parentheses are robust to heteroskedasticity and within country autocorrelation. * denotes a significant estimate at the 10 per cent level, ** at 5 per cent, *** at 1 per cent.
Source: OECD calculations.

marginally larger during economic downturns than in normal times (Panel A, column 1). This pattern holds for the two indicators of economic slack, but the differences between the normal times and periods of domestic slack are not statistically significant.

Downturns in export markets may also affect the size of the estimated effects. During economic downturns in export markets, government spending may have a larger effect on foreign economies as public spending partly substitute for private demand. The larger effect of foreign fiscal policy on foreign growth may further dampen imports. However, foreign monetary policy may be more accommodative if fiscal consolidation episodes occur during economic downturns. This would reduce the adverse effects of fiscal consolidations on imports. Therefore, the effects of foreign fiscal consolidations when foreign countries are in periods of slack could be smaller or larger than in "normal times".

Table 7 examines if downturns in export markets have a significant effect on the estimated spillovers on output. The specifications replace the indicator of domestic slack, S_{it-1}, by the same indicator for the seventeen export markets, S_{jt-1}, in Equation 6. When the unemployment rate is used as an indicator of economic slack, there is no marked difference between short-term fiscal spillovers in "normal times" and during period of economic slack (Panel A). By contrast, there is a marked difference between "normal times" and economic downturns when the output gap is used as indicator (Panel B). The estimated spillovers of fiscal consolidations on growth are larger during periods of large negative output gaps. For example, in a depressed foreign economy, spending cuts of 1 percent of GDP in average are associated with a reduction of domestic output by 4 percentage points in the short term. The effects of fiscal consolidations during downturns are also larger on the medium term for spending cuts and revenue increases. Taken at face value, the estimated effects of foreign spending shocks suggest that spending cuts of 1 percent of GDP in average are associated with a 3.5 percentage point decrease in GDP over three years during periods of export market slack.

The interpretation of these results is complicated by the policies associated with fiscal consolidations that may differ in good and bad times. If there are specific monetary and exchange rate policies that systematically accompany cuts in government spending during downturns, their effects would be picked up by the estimated coefficients. For example, governments consolidating during downturns may design consolidation packages so as to direct part of the efforts towards foreign activity, while governments consolidating during overheating periods would primarily target the domestic economy. However, the results are in line with previous empirical evidence suggesting a larger impact from fiscal policy during downturns using regional variations and neutralizing the effects of national monetary and exchange rate policies. Nakamura and Steinsson (2012) report a government spending multiplier of approximately 1.5, reaching 3.5 to 4.5 during period of economic slack. Shoag (2012) estimates that an additional 1 dollar of spending in the face of economic slack generates 3 to 3.5 dollars of income, while the comparable effect is only 1.6 to 1.4 per dollar of spending in more favourable economic conditions.

7 Robustness checks

The effects of fiscal spillovers on domestic growth are robust to a wide range of specification checks. This section examines the effects of fiscal spillovers across different sample of countries and time periods, as well as the use of alternative panel data estimators. It further investigates the spillover effects of fiscal shocks on labour markets, private consumption and investment.

Table 7

Foreign Downturns and Action-based Fiscal Consolidation Spillovers

(effect of an average one percentage point of GDP consolidation in export markets on domestic growth)

Measure of Slack:	**Dependent Variable: Real GDP Growth**					
	A. Unemployment Rate			**B. Output Gap**		
Fiscal Shocks:	**Overall**	**Spending**	**Revenue**	**Overall**	**Spending**	**Revenue**
	(1)	(2)	(3)	(4)	(5)	(6)
Contemporaneous effect						
Fiscal spillovers	–1.425*	–2.972**	–0.572	–0.348	–1.505*	0.596
in normal times	(0.838)	(1.176)	(1.686)	(0.681)	(0.834)	(1.322)
Fiscal spillovers	–1.510*	–2.900***	0.149	–3.241***	–4.068***	–1.756
in a period of slack	(0.887)	(0.602)	(1.192)	(1.008)	(0.684)	(1.636)
3-year average effect						
Fiscal spillovers	–2.022	–3.140*	–2.631	–0.145	–0.876	0.228
in normal times	(1.304)	(1.837)	(2.563)	(0.962)	(1.496)	(2.021)
Fiscal spillovers	–1.567	–1.808	–1.546	–4.437***	–3.545***	–6.802***
in a period of slack	(0.957)	(1.215)	(1.684)	(1.269)	(1.107)	(2.082)
R^2	0.559	0.564	0.558	0.565	0.567	0.561
Observations	885	885	885	885	885	885
Countries	34	34	34	34	34	34

Note: All specifications control for country and year fixed effects, as well as lagged (real) GDP growth in t–1 and t–2. Baseline controls also include lagged unemployment rate, occurrence of systemic banking crises and real GDP growth in export markets. Standard errors in parentheses are robust to heteroskedasticity and within country autocorrelation. * denotes a significant estimate at the 10 per cent level, ** at 5 per cent, *** at 1 per cent.
Source: OECD calculations.

7.1 Robustness to the sample of countries and time-period

The effects of fiscal spillovers on domestic growth are robust to different samples of countries and to different sample of export-market countries. Figure 7, panel A estimates the baseline specification (Table 1, column 1) excluding the OECD countries one-by-one. This process identifies countries that are relatively more sensitive to fiscal spillovers from countries that are relatively insulated. As the action-based dataset covers a different share of exports for each country, the possibility of heterogeneity in spillover effects could be one concern. Canada and Mexico appear relatively insulated from foreign fiscal shocks, while small open economies such as Portugal, Estonia and Luxembourg would seem more sensitive to their trading partner fiscal policies. However, there is no significant outlier. All the estimates are within one standard error of the baseline. Panel B reports the results of excluding one-by-one the fiscal policies of the seventeen export markets documented in Devries *et al.* (2011). The estimated effects for the different samples are in the same range as in panel A. They also confirm the model-based results of Ivanova and Weber (2011). Fiscal policy in Germany has relatively weak spillover effects through trade. By contrast, Spain, Belgium and Japan have relatively strong fiscal spillovers on their trading partners.

Figure 7, panel C reports the results of excluding one-by-one the years from 1978 to 2009. The estimated effects are again stable. Spillovers of fiscal consolidations have been relatively high during the global recessions of the early 1980s and 1990s, as well as in 1998 during the Asian crisis. The larger spillover effects observed in the early 1980s and 1990s also coincide with periods of concomitant consolidations across countries (Figures 1 and 2). By contrast, fiscal consolidation spillovers have been relatively low during periods of economic booms in the early 2000s and mid-1990s.

Figure 7

Robustness of the Effect on Domestic Growth to the Country and Period Sample
A. Jack-knifed Country Sample:
Impact of a Fiscal Contraction of 1 Percentage Point of GDP in Export Markets

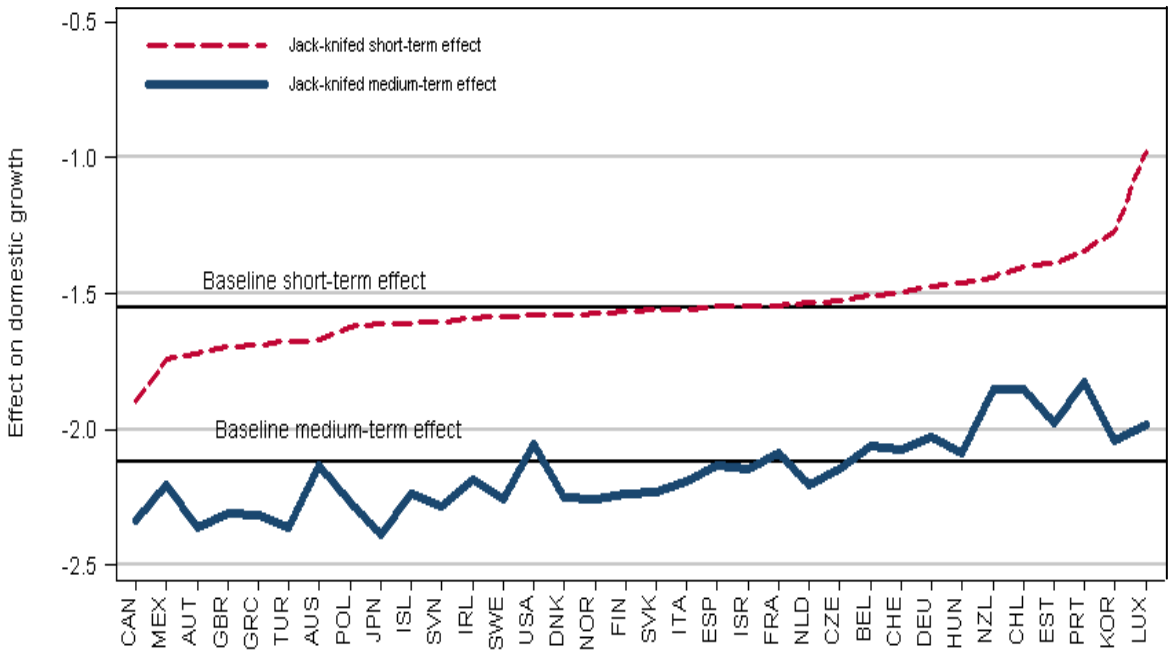
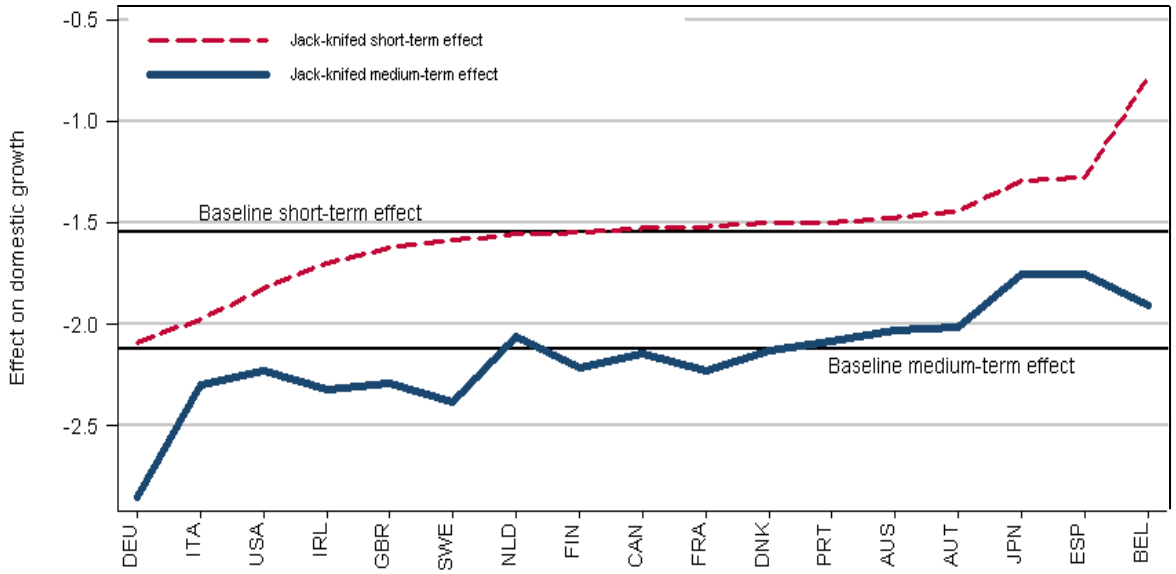
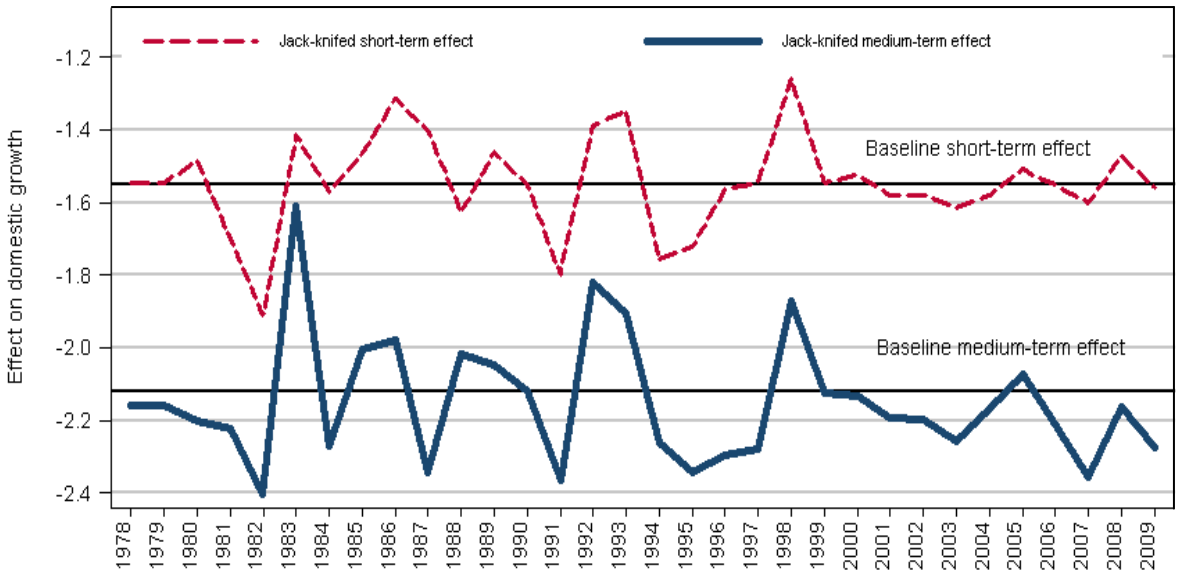


Figure 7 *(continued)*

Robustness of the Effect on Domestic Growth to the Country and Period Sample
B. Jack-knifed Export-Market Sample:
Impact of a Fiscal Contraction of 1 Percentage Point of GDP in Export Markets



C. Jack-knifed Period Sample:
Impact of a Fiscal Contraction of 1 Percentage Point of GDP in Export Markets



Note: The figure reports the effect of an export-weighted consolidation package of 1 percentage point of GDP. All specifications control for country and year fixed effects, as well as lagged GDP growth in t–1 and t–2. Baseline controls also include lagged unemployment rate, occurrence of systemic banking crises and real GDP growth in export markets. The two horizontal solid lines display the baseline point estimates reported in Table 1, column 1.
Panel A, countries are excluded one-by-one and ranked according to the estimated short-term effect in the sample excluding them. Panel B, each of the 17 export-markets are excluded one-by-one and ranked according to the estimated short-term effects for the whole sample of OECD countries. Panel C, one-year periods are excluded one-by-one.
Source: OECD calculations.

7.2 Alternative estimators and export weights

Table 8 examines further the robustness of the effects of fiscal spillovers on output. First, panel A considers different estimators. Static models excluding the lags of the dependent variable and the baseline model with a longer lag structure are estimated. The baseline model is also estimated in first-differences and using the Anderson-Hsiao dynamic panel data estimator. The Anderson-Hsiao procedure addresses the possibility of bias due to the presence of a lagged dependent variable in Specification 3, but the identification becomes dependent on arbitrary lag-length restrictions. Given the large standard errors, all estimators provide statistically similar estimates.

Second, panel B tests the sensitivity of the baseline specification to the initial control variables. The model is estimated including further controls for the domestic public debt-to-GDP ratio and contemporaneous growth in export markets, as well as omitting the baseline controls. The three specifications provide again similar estimates to the ones reported in Table 1, column 1. They also confirm that fiscal consolidations in trading partner countries tend to have an effect above their impact on trading partners' GDP growth. Indeed, fiscal consolidations tend to decrease imports but also to increase the trade-competitiveness of the consolidating countries, raising their exports in currency unions (Section 6).

Third, panel C explores two major sources of heterogeneity, the differences in the size of the economies and their openness to trade. The baseline model is alternatively estimated interacting the fiscal spillover shocks and the short-run dynamics of output with a dummy variable for the 17 largest countries and a dummy variable for the 17 most open economies. The outpout responses to fiscal spillovers appear of similar magnitude across economies of different size. When countries are hit by fiscal spillover shocks, GDP growth decreases significantly on impact in more open economies, while in the case of more closed economies the decrease in GDP becomes significant over the medium term.

Fourth, panel D uses different trade weights for the fiscal spillovers. In the baseline specification, bilateral exports are taken from the UNCTAD COMTRADE dataset. As a robustness check two sets of weights were computed using the IMF Direction of Trade Statistics (DOTS). These weights cover the entire estimation period 1978-2009 or a fixed year (2005). In both specifications of fiscal spillovers, the results are in line with the estimates in Table 1, column 1.

Finally, Panel E addresses the robustness of the main results to third-party countries that may also be affected by fiscal spillovers. As emphasized by Ivanova and Weber (2012), direct relationships between trading partners represent an incomplete picture of international spillovers. The impact of fiscal shocks through trading partners could be further amplified by second round effects. These indirect fiscal shocks are computed as an average of the fiscal shocks in the exports markets of the countries towards whom country *i* exports:

$$\Delta TTF_{it-l} = \sum_{j \neq i} \left(\frac{1}{20} \sum_{s=1990}^{2009} \frac{exp_{ijs}}{exp_{is}} \right) \left\{ \sum_{k \neq i, k \neq j} \left(\frac{1}{20} \sum_{s=1990}^{2009} \frac{exp_{jks}}{exp_{js}} \right) \Delta F_{kt-l} \right\} \quad (7)$$

where the second term in curly brackets reflects that when the export markets (k) of country j enter fiscal consolidation, this may reduce its demand for the goods produced by country i. This gives a clearer picture of the full Keynesian effects of fiscal policy. Two specifications are estimated. First, the third-party spillover shocks are included as controls. Second, assuming that third-party shocks may diffuse to the domestic economy, they are added to the direct spillover shocks to the domestic economy. In the first case, the estimated spillover effects increase slightly as third-party countries partly act as a buffer against external shocks. In the latter case, the estimated spillover effects are in line with those previously estimated, suggesting that fiscal policies shock are partly transmitted from third-party countries.

Table 8

Robustness of the Effect on Domestic Growth to the Econometric Specification
(effect of an average one percentage point GDP consolidation in export markets)

Dependent Variable:	**Real GDP Growth**	
	Short-term Effect	**Medium-term Effect**
Estimation Approach	(1)	(2)
A. Alternative Estimators		
Baseline	–1.547* *(0.776)*	–2.149*** *(0.819)*
Static Model (no lagged dependent variable)	–1.238 *(0.824)*	–1.699** *(0.852)*
Baseline with 4 lags of dependent variable and fiscal spillovers	–1.358* *(0.798)*	–2.005** *(0.779)*
Baseline estimated in first-differences	–1.801** *(0.776)*	–1.631*** *(0.550)*
Anderson-Hsiao dynamic panel data estimator[1]	–3.297*** *(0.914)*	–3.653*** *(0.907)*
B. Additional Control Variables		
Lagged government debt-to-GDP (in t–1 and t–2)	–1.371 *(0.908)*	–2.132** *(0.957)*
Contemporaneous growth in Export markets	–1.252* *(0.720)*	–1.893** *(0.762)*
Baseline without controls (only lagged growth and spillovers)	–1.565* *(0.825)*	–2.099** *(0.831)*
C. Heterogeneity Across Country Size and Openness to Trade		
Baseline (17 largest economies)	–1.614 *(0.977)*	–3.230*** *(1.224)*
Baseline (17 smallest economies)	–1.686* *(0.866)*	–1.878* *(0.983)*
Baseline (17 most open economies)	–1.938** *(0.823)*	–2.438*** *(0.835)*
Baseline (17 least open economies)	–1.069 *(0.962)*	–2.388* *(1.316)*
D. Different Trade Weights		
IMF DOTS average 1978-2009	–1.028 *(0.816)*	–1.935* *(0.997)*
IMF DOTS 2005	–1.054 *(0.799)*	–2.093** *(0.951)*
E. Third-party Countries		
Controlling for third-party effect	–2.035** *(0.887)*	–2.476*** *(0.855)*
Lagged third-party effect included in fiscal spillover shocks	–1.408* *(0.793)*	–2.140*** *(0.800)*

Note: All specifications control for country and year fixed effects, as well as lagged (real) GDP growth in t–1 and t–2. Baseline controls also include lagged unemployment rate, occurrence of systemic banking crises and real GDP growth in export markets. Standard errors in parentheses are robust to heteroskedasticity and within country autocorrelation. * denotes a significant estimate at the 10 per cent level, ** at 5 per cent, *** at 1 per cent.
1. In the first-differenced equation, the two year lag of the dependent variable is the instrument for its lagged first-difference.
Source: OECD calculations.

7.3 Fiscal spillovers, employment, private consumption and investment

The above results suggest that fiscal consolidation spillovers have large contractionary effects on the domestic economy when fiscal consolidations occur in several trading partners. This subsection examines the impact of foreign fiscal consolidations on labour markets and two other indicators of economic activity, real private consumption and real private investment.

Table 9 reports the effect of fiscal spillovers on domestic employment. Though the overall impact of fiscal spillovers is insignificant (column 1), spending-based fiscal consolidations have large and significant spillovers on domestic employment (column 2). Taken at face value, the estimates suggest that domestic employment decreases by around 1.5 per cent in the short term and 2.3 per cent over three years when the main export markets cut government spending by an average of 1 percent of GDP. This would lead to an increase in the unemployment rate by 13 per cent, or 1.5 percentage points in the current euro area situation with an unemployment rate of around 11 per cent (column 5 and OECD, 2013).

As domestic GDP and employment fall, domestic private consumption expenditures and private investment decline during episodes of fiscal consolidation in trading partner countries (Table 10). Domestic private consumption contracts by roughly 2 percentage points when the fiscal balance of the main export markets increases by an average of 1 percent of GDP (column 1). The estimated contraction in real private investment of 4 percentage points is somewhat larger than the estimated contraction in private consumption and aggregate output but statistically insignificant (column 4). As fiscal consolidations increase domestic private savings, they could increase investment abroad. Thus, the results on private investment tend to show that the potential response of capital flows is not systematically correlated with trade flows. This is in line with Feyrer and Shambaugh (2012) who report that tax-based consolidations in the United States have symmetric responses on investment across different countries in the rest of the world. This also provides suggestive evidence that fiscal consolidations in trading partner countries are not anticipated. The reason is that by the time fiscal consolidation occurs, the decline in real private investment should be small when the improvement of the export-weighted fiscal balance is anticipated in advance (Ramey, 2011). Taken together, the results of Tables 9 and 10 confirm that fiscal consolidation spillovers have large real effects on the domestic economy through trade.

8 Conclusion

This paper investigates the international spillovers of fiscal consolidations on output across OECD countries from 1978 to 2009 using bilateral trade linkages. The cross-border effects of fiscal consolidations are economically and statistically significant. Based on narrative records of fiscal consolidation episodes in seventeen advanced economies, the baseline estimates imply that an average of 1 percent of GDP consolidation in export markets is associated with a slowdown of domestic growth by 1.5 percentage points in the short term and around 2 percentage points over three years. The large negative spillovers on output growth estimated using action-based measures of fiscal consolidation contrast with the estimated positive impact of fiscal consolidation spillovers on growth when cyclically-adjusted fiscal outcomes are used to measure fiscal policies. These contrasting estimates mirror the different domestic multipliers identified by the two methodologies (Guajardo *et al.*, 2011).

Cross-country spillovers of fiscal consolidation appear more detrimental to output growth during economic downturns in export markets than in normal times. The spillovers of fiscal shocks also differ across exchange rate arrangements. Under flexible exchange rate regimes, the nominal exchange rate appreciates on impact when a trading partner consolidates, while in currency unions the real exchange rate adjustment occurs through a slower process of price and wage compression.

Table 9

Spillovers of Action-based Fiscal Consolidations and Labour Markets
(effect of an average 1 percentage point GDP consolidation in export markets)

Dependent Variable:	**Growth in Employment**			**Growth in Unemployment Rate**		
Weighting of Fiscal Shocks:	**Equation 1**			**Equation 1**		
Fiscal Shocks:	**Overall**	**Spending**	**Revenue**	**Overall**	**Spending**	**Revenue**
	(1)	(2)	(3)	(4)	(5)	(6)
Contemporaneous Effect						
Fiscal spillovers	–0.686	–1.548**	0.247	7.682*	13.302***	2.942
	(0.487)	*(0.630)*	*(0.943)*	*(3.894)*	*(4.735)*	*(5.870)*
3-year Average Effect						
Fiscal spillovers	–0.817	–2.282*	0.911	11.180*	13.250	10.690
	(0.869)	*(1.285)*	*(1.008)*	*(5.962)*	*(8.989)*	*(8.886)*
R^2	0.432	0.435	0.431	0.484	0.482	0.481
Observations	859	859	859	885	885	885
Countries	33	33	33	34	34	34

Note: All specifications control for country and year fixed effects, as well as lagged (real) GDP growth and employment (unemployment rate) growth in t–1 and t–2. Baseline controls also include lagged occurrence of systemic banking crises and real GDP growth in export markets. Standard errors in parentheses are robust to heteroskedasticity and within country autocorrelation. * denotes a significant estimate at the 10 per cent level, ** at 5 per cent, *** at 1 per cent.
Source: OECD calculations.

Table 10

Spillovers of Action-based Fiscal Consolidations, Private Consumption and Investment
(effect of an average 1 percentage point GDP consolidation in export markets)

Dependent Variable: Growth in…	**Real Private Consumption**			**Real Private Investment**		
Weighting of Fiscal Shocks:	**Equation 1**			**Equation 1**		
Fiscal Shocks:	**Overall**	**Spending**	**Revenue**	**Overall**	**Spending**	**Revenue**
	(1)	(2)	(3)	(4)	(5)	(6)
Contemporaneous Effect						
Fiscal spillovers	–2.099*	–2.371	–2.549	–3.797	–6.704**	–2.052
	(1.052)	*(1.438)*	*(2.367)*	*(2.605)*	*(2.783)*	*(5.489)*
3-year Average Effect						
Fiscal spillovers	–1.634	–2.143	–1.260	–4.901	–7.005*	–4.414
	(1.047)	*(1.397)*	*(2.457)*	*(3.468)*	*(4.156)*	*(6.487)*
R^2	0.401	0.401	0.400	0.327	0.328	0.326
Observations	878	878	878	819	819	819
Countries	34	34	34	28	28	28

Note: All specifications control for country and year fixed effects, as well as lagged (real) GDP growth and real domestic private comsumption or investment in t–1 and t–2. Baseline controls also include lagged occurrence of systemic banking crises and real GDP growth in export markets. Standard errors in parentheses are robust to heteroskedasticity and within country autocorrelation. * denotes a significant estimate at the 10 per cent level, ** at 5 per cent, *** at 1 per cent.
Source: OECD calculations.

However, fiscal consolidations are found to be associated with larger contemporaneous spillovers on output between members of a currency union than between countries with more flexible exchange rate regimes. Further investigations showed that this result is not due to a larger real exchange adjustment in currency unions but rather to a higher sensitivity of trade flows to relative price changes in such unions. This may reflect the strong degree of economic integration among countries sharing currencies or having pegged exchange rates. Indeed, bilateral exports decrease more sharply in currency unions following a fiscal consolidation in another member country than among countries with more flexible exchange rate arrangements. Furthermore, bilateral imports only increase between currency-union members in the short run. The time pattern of fiscal consolidation spillovers across exchange rate arrangements is consistent with the increased response of the current account to domestic fiscal consolidation in euro area countries after the euro adoption estimated by Bluedorn and Leigh (2011).

APPENDIX

Table 11

Definition of the Main Explanatory Variables

Variable	Definition
Fiscal Stance	
Action-based fiscal policies	Devries *et al.* (2011).
Cyclically-adjusted primary balance, primary spending and revenues	OECD Economic Outlook 92 and different vintages (88, 84, 81, 72 and 61): - Cyclically-adjusted government primary balance, NLGXQU or NLGXQA. - Cyclically-adjusted primary spending, YPGTXQU or YPGXQA. - Cyclically adjusted current receipts, general government, YRGTQU or YRGQA.
Country-level Variables	
Real GDP growth	OECD Economic Outlook 92 and different vintages (88, 84, 81, 72 and 61).
Unemployment rate	OECD Economic Outlook 92 and different vintages (88, 84, 81, 72 and 61).
Employment	OECD Economic Outlook 92 and different vintages (88, 84, 81, 72 and 61).
Private Consumption and investment	OECD Economic Outlook 92 or other vintages (88, 84, 81, 72 and 61): private final consumption expenditure, volume (CPV) and real private investment (IPV).
Output gap	OECD Economic Outlook 92 and different vintages (88, 84, 81, 72 and 61).
Systemic Banking crises	Ongoing crises as reported by Laeven and Valencia (2012).
Debt-to-GDP ratio	OECD Economic Outlook 92 and different vintages (88, 84, 81, 72 and 61). The remaining missing values are filled with the data of Mauro *et al.* (2013).
Exchange Rate Arrangements	
Euro area dummy	The Euro area dummy takes value 1 from 1999 and 0 otherwise for Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain. The Euro area dummy takes value 1 from 2001 for Greece, from 2007 for Slovenia, and from 2009 for Slovakia, and 0 otherwise.
Bilateral currency union	Currency union are taken from de Sousa (2012)'s update of Glick and Rose (2002).
Peg dummy	From Ilzeztki *et al*. (2011) based on Reinhart and Rogoff (2004).
Floating dummy	From Ilzeztki *et al*. (2011) based on Reinhart and Rogoff (2004). It is defined as the complement of the peg dummy.
Bilateral Variables	
Bilateral export growth	$\Delta e_{ijt}=[(\log(EXP_{ijt})-\log(EXP_{ijt-1})]$ x 100, where EXP_{ijt} is the exports from country i to country j in USD from the IMF DOTS statistics. Exports are reported free on board (FOB) while imports are reported costs including insurance and freight (CIF), with a 10 per cent difference in average. As in Head *et al*. (2010), mirrors flows are used to obtain a better approximation of exports using the formula: $EXP_{ijt}=\max(TXG_{ijt}, TMG_{ijt}/1.10)$ where TXG is the value of exports and TMG is the value of imports from IMF DOTS (variables TXG and TMG).
Bilateral import growth	$\Delta e_{ijt}=[(\log(IMP_{ijt})-\log(IMP_{ijt-1})]$ x 100, where IMP_{ijt} is the exports from country j to country i in USD from the IMF DOTS statistics computed as above.
Bilateral nominal exchange rate	$EXCH_{it}/EXCH_{jt}$ OECD Economic Outlook 92 and different vintages (88, 84, 81, 72 and 61)..
Bilateral real exchange rate	$EXCH_{it}/EXCH_{jt}$ OECD Economic Outlook 92 and different vintages (88, 84, 81, 72 and 61) deflated by relative GDP deflator (PGDP).
Bilateral CPI and ULC	X_{it}/X_{jt} where X is the consumer price index (CPI) or unit labour costs (ULC) from the OECD Economic Outlook 92 and different vintages (88, 84, 81, 72 and 61).
Competitive positions: relative consumer prices and relative unit labour costs	Competitiveness-weighted relative consumer prices and unit labour costs for the overall economy in dollar terms. Competitiveness weights take into account the structure of competition in both export and import markets of the goods sector of 49 countries. An increase in the index indicates a real effective appreciation and a corresponding deterioration of the competitive position. OECD Main Economic Indicators (MEI).
Regional trade agreements	Bilateral regional trade agreements are taken from de Sousa (2012).
Bilateral distance	Distance between capital cities, as reported in Mayer and Zignago (2011).
Neighbour countries	Mayer and Zignago (2011).

Table 12

Descriptive Statistics

	Mean (1)	Standard Deviation (2)	Median (3)	Min (4)	Max (5)	Number of Observations (6)
A. Domestic Variables						
GDP growth	2.75	3.18	3.00	–15.33	11.60	1031
Unemployment rate	6.83	3.68	6.53	0.18	19.93	962
Unemployment rate growth	2.34	17.93	–0.25	–51.58	119.97	953
Employment growth	0.99	2.07	1.06	–10.06	23.91	900
Private consumption growth	2.63	3.38	2.63	–33.51	19.74	940
Private investment growth	2.82	9.97	3.62	–80.28	82.19	880
Ongoing banking crises	0.10	0.30	0.00	0.00	1.00	1088
Output gap	0.03	2.91	0.12	–11.02	13.33	932
Change in cyclically-adjusted primary budget balance / potential output	–0.07	1.42	0.00	–8.00	11.20	898
Change in cyclically-adjusted primary expenditures / potential output	–0.16	1.29	–0.15	–5.30	15.29	832
Change in cyclically-adjusted revenues / potential output	0.03	1.19	0.10	–5.54	6.13	833
Debt-to-GDP ratio	53.01	36.29	50.56	0.00	283.96	1008
Year	1993.5	9	1993.5	1978	2009	1088
B. Action-based Fiscal Spillovers (Equation 1)						
Aggregate shocks	0.22	0.23	0.13	–0.04	1.34	1088
Spending shocks	0.13	0.16	0.07	–0.01	1.33	1088
Tax shocks	0.09	0.12	0.04	–0.21	0.64	1088
C. Action-based Fiscal Spillovers (Equation 2)						
Aggregate shocks	0.10	0.13	0.05	–0.01	0.91	1023
Spending shocks	0.06	0.09	0.03	–0.01	0.53	1023
Tax shocks	0.04	0.07	0.02	–0.13	0.75	1023
D. Cyclically-adjusted Fiscal Spillovers (Equation 1)						
Aggregate shocks	–0.07	0.55	0.01	–2.99	1.52	1088
Aggregate shocks (consolidation)	0.29	0.24	0.24	0.00	1.90	1088
Spending shocks	–0.10	0.36	–0.06	–1.56	1.03	1088
Tax shocks	0.02	0.39	0.06	–2.02	1.22	1088
Residual spending shocks (Perotti, 1999)	0.00	0.25	0.00	–0.91	1.06	1088
E. Other Foreign Shocks (Equation 1)						
GDP growth	1.60	1.26	1.79	–4.40	6.05	1088

Note: The sample includes 34 OECD countries over the 1978-2009 period.
Source: OECD calculations.

Table 13

Detailed Exchange Rate Arrangements and Spillovers of Fiscal Consolidations on GDP Growth
(effect of an average one percentage point of GDP consolidation in export markets on domestic growth)

Exchange Rate Arrangement:	Dependent Variable: Real GDP Growth					
	A. Reinhart and Rogoff (2004) Binary Measure			B. Reinhart and Rogoff (2004) Discrete Measure		
Fiscal Shocks:	**Overall**	**Spending**	**Revenue**	**Overall**	**Spending**	**Revenue**
	(1)	(2)	(3)	(4)	(5)	(6)
Contemporaneous Effect						
Fiscal spillovers	–0.718	–2.760**	1.337*	0.286	–2.026	1.336
in a non-fixed regime	*(0.941)*	*(1.130)*	*(0.758)*	*(1.297)*	*(1.848)*	*(1.852)*
Fiscal spillovers	–2.214***	–2.900***	–2.466	–2.761***	–3.348***	–1.981
in a fixed regime	*(0.518)*	*(0.447)*	*(1.681)*	*(0.593)*	*(0.546)*	*(1.569)*
3-year Average Effect						
Fiscal spillovers	–2.196*	–3.484**	–0.822	–1.534	–3.071	–2.675
in a non-fixed regime	*(1.276)*	*(1.695)*	*(1.145)*	*(1.718)*	*(2.523)*	*(2.645)*
Fiscal spillovers	–1.368	–1.493*	–0.190	–2.347***	–2.233***	–2.212
in a fixed regime	*(0.862)*	*(0.839)*	*(2.629)*	*(0.794)*	*(0.787)*	*(1.989)*
R^2	0.563	0.564	0.565	0.564	0.564	0.561
Observations	885	885	885	885	885	885
Countries	34	34	34	34	34	34

Note: All specifications control for country and year fixed effects, as well as lagged (real) GDP growth in t–1 and t–2. Baseline controls also include lagged occurrence of systemic banking crises and real GDP growth in export markets. Standard errors in parentheses are robust to heteroskedasticity and within country autocorrelation. * denotes a significant estimate at the 10 per cent level, ** at 5 per cent, *** at 1 per cent.
Source: OECD calculations.

Table 13 investigates the spillovers of fiscal consolidations on output across exchange rate arrangements using a discrete measure of the bilateral constraints on exchange rate movements. This measure is based on Reinhart and Rogoff's coarse classification (Reinhart and Rogoff, 2004). It goes from 1 (both countries are pegged), to 0 if one of the two countries is freely floating. It is the product of two country-specific variables taking values from 0 to 1:

- 1 for pegged exchange rate,
- 2/3 for narrow exchange rate bands,
- 1/3 for wide exchange rate bands,
- 0 for freely floating exchange rate.

This discrete measure provides better comparison groups for pairs of pegged countries and exploits a larger share of the variance between exchange rate arrangements than pairs of pegged countries. According to the constructed bilateral indicator, 66 per cent of the country-pair observations have some constraints on their nominal exchange rate movements over the 1978-2009 period. This avoids relying only on a small number of policy changes such as the euro area implementation to estimate the effect of nominal exchange rate rigidity on fiscal spillovers. Panel A presents the baseline estimates (Table 2 of the main text), while Panel B presents the estimates based on the new bilateral indicator. Panel B confirms the baseline results. In the short run, exchange rate arrangements have a significant effect on the strength of fiscal spillovers: when nominal exchange rate movements are limited, fiscal spillovers are larger. By contrast, exchange rate arrangements do not play a clear role in the medium term.

Table 14 adresses endogeneity concerns about the determination of exchange rate arrangements. Exchange rate arrangements are not randomly chosen and this self-selection may partly bias the estimated impact of fiscal shocks. Panels A and B use one- and two-year lags of the discrete measure of bilateral exchange rate arrangements. The qualitative pattern of the estimates remains the same.

Table 14

Lagged Exchange Rate Arrangements and Spillovers of Fiscal Consolidations on GDP Growth
(effect of an average 1 percentage point of GDP consolidation in export markets on domestic growth)

Exchange Rate Arrangement:	Dependent Variable: Real GDP Growth					
	A. Reinhart and Rogoff (2004) Discrete Measure (t–1)			B. Reinhart and Rogoff (2004) Discrete Measure (t–2)		
Fiscal Shocks:	**Overall**	**Spending**	**Revenue**	**Overall**	**Spending**	**Revenue**
	(1)	(2)	(3)	(4)	(5)	(6)
Contemporaneous effect						
Fiscal spillovers	0.412	0.640	–1.211	0.798	0.961	–1.176
in a non-fixed regime	*(0.775)*	*(0.736)*	*(2.036)*	*(0.888)*	*(0.834)*	*(2.003)*
Fiscal spillovers	–2.882***	–3.417***	–2.155	–2.896***	–3.522***	–2.223
in a fixed regime	*(0.613)*	*(0.656)*	*(1.605)*	*(0.494)*	*(0.576)*	*(1.478)*
3-year average effect						
Fiscal spillovers	–1.471	–2.818	–2.396	–1.124	–2.230	–2.166
in a non-fixed regime	*(1.710)*	*(2.418)*	*(2.732)*	*(1.561)*	*(2.058)*	*(2.685)*
Fiscal spillovers	–2.518***	–2.364***	–2.576	–2.842***	–2.900***	–2.471
in a fixed regime	*(0.817)*	*(0.825)*	*(2.067)*	*(0.698)*	*(0.870)*	*(2.044)*
R^2	0.564	0.563	0.561	0.563	0.564	0.561
Observations	885	885	885	885	885	885
Countries	34	34	34	34	34	34

Note: All specifications control for country and year fixed effects, as well as lagged (real) GDP growth in t–1 and t–2. Baseline controls also include lagged occurrence of systemic banking crises and real GDP growth in export markets. Standard errors in parentheses are robust to heteroskedasticity and within country autocorrelation. * denotes a significant estimate at the 10 per cent level, ** at 5 per cent, *** at 1 per cent.
Source: OECD calculations.

Table 15

Bilateral Trade Flows and Action-based Fiscal Consolidations in the Medium Term

(effect of a 1 percentage point of GDP consolidation in country j)

Dependent Variable:	**Growth in Exports from i to j**			**Growth in Imports of i from j**		
Fiscal Shocks:	**Overall**	**Spending**	**Revenue**	**Overall**	**Spending**	**Revenue**
	(1)	(2)	(3)	(4)	(5)	(6)
Contemporaneous effect						
Fiscal consolidation	–1.460***	–3.177***	–1.613**	–0.517	0.054	–1.073
In a non-fixed regime	*(0.465)*	*(0.667)*	*(0.806)*	*(0.461)*	*(0.600)*	*(0.834)*
Fiscal consolidation	–3.655***	–6.083***	–5.295***	2.563***	4.469***	3.760**
in a fixed regime[1]	*(0.970)*	*(1.687)*	*(1.686)*	*(0.889)*	*(1.559)*	*(1.473)*
3-year Average Effect						
Fiscal consolidation	–2.429****	–3.192***	–4.114***	–0.187	0.020	–0.153
In a non-fixed regime	*(0.514)*	*(0.733)*	*(0.897)*	*(0.424)*	*(0.661)*	*(0.735)*
Fiscal consolidation	–3.849***	–6.064***	–5.512***	1.265	2.627*	1.914
in a fixed regime[1]	*(0.940)*	*(1.672)*	*(1.661)*	*(0.867)*	*(1.466)*	*(1.450)*
R^2	0.351	0.351	0.351	0.437	0.437	0.437
Observations	14,521	14,521	14,521	14,521	14,521	14,521
Countries	561	561	561	561	561	561

Note: All specifications control for bilateral fixed effects, destination-year fixed effects, two lags of the dependent variable and two-lags of the explanatory variables and the currency union dummy as in Equation 5. Clustered standard errors in parentheses are robust to heteroskedasticity and within country-pair auto-correlation. * denotes a significant estimate at the 10 per cent level, ** at 5 per cent, *** at 1 per cent. 1

1. Estimated effect of a 1 point GDP in the export market for an exporting country in the same currency union (the sum of the four estimated coefficients in the main panel of Table 4).

Source: OECD calculations.

Table 16

Bilateral Exchange Rates and Action-based Fiscal Consolidations in the Medium Term

(effect of a 1 percentage point of GDP consolidation in country j)

	Dependent Variable: Bilateral Growth in…						
	Nominal Exch. Rate	Relative GDP Deflator	Real Exch. Rate	Relative CPI	Relative ULC	Relative Effective:	
						CPI	ULC
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Contemporaneous Effect							
Fiscal consolidation	2.047***	–0.077	2.473***	–0.017	0.193*	1.836***	2.336***
in a non-fixed regime	*(0.116)*	*(0.173)*	*(0.259)*	*(0.053)*	*(0.116)*	*(0.122)*	*(0.149)*
Fiscal consolidation	0.213***	0.687***	0.908***	0.531***	1.321***	1.136***	1.733***
in a fixed regime[1]	*(0.070)*	*(0.091)*	*(0.120)*	*(0.056)*	*(0.125)*	*(0.103)*	*(0.138)*
3-year Average Effect							
Fiscal consolidation	2.210***	0.132	2.887***	0.043	0.483***	2.231***	2.936***
in a non-fixed regime	*(0.178)*	*(0.140)*	*(0.225)*	*(0.109)*	*(0.128)*	*(0.156)*	*(0.176)*
Fiscal consolidation	0.282	1.142***	1.575***	1.127***	2.374***	1.916***	3.127***
in a fixed regime[1]	*(0.204)*	*(0.160)*	*(0.186)*	*(0.107)*	*(0.166)*	*(0.185)*	*(0.265)*
R^2	0.899	0.851	0.488	0.755	0.878	0.720	0.758
Observations	15,232	15,159	15,094	15,279	14,393	14,382	13,719
Country pairs	561	561	561	561	557	561	544

Note: All specifications control for bilateral fixed effects, destination-year fixed effects, two lags of the dependent variable and two-lags of the explanatory variables and the currency union dummy as in Equation 5. Clustered standard errors in parentheses are robust to heteroskedasticity and within country-pair auto-correlation. * denotes a significant estimate at the 10 per cent level, ** at 5 per cent, *** at 1 per cent.

1. Estimated effect of a 1 point GDP in the export market for an exporting country in the same currency union (the sum of the four estimated coefficients in the main panel of Table 5).

Source: OECD calculations.

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COMMENT TO "CROSS-COUNTRY SPILLOVERS FROM FISCAL CONSOLIDATIONS" BY ANTOINE GOUJARD

Diego Martínez López[*]

1 Introduction

The monetary policy seems to have achieved historical limits in its wide-ranging use of tools around the world. Although there have been significant differences in timing since the very beginning of the Great Recession, the central bank balance sheets of advanced economies have experienced an unprecedented expansion. The fiscal policy, however, has not been subject to the same consensus, following dissimilar paths depending upon which side of the Atlantic or the English Channel is considered.

One of the most controversial issues is that regarding the extent of the fiscal multipliers. As is well-known, the academic and policy-makers interest was fuelled by a box published in the October 2012 World Economic Outlook of the IMF; the alarm was the systematic downward bias in the fiscal multipliers assumed by the GDP growth forecast modellers compared to the actual (and higher) ones during 2010-2011. At the same time, some frustrating results coming from the intense fiscal consolidation processes carried out in the Eurozone added a real world ingredient to the discussion.

The paper "Cross-country Spillovers from Fiscal Consolidations", by Antoine Goujard, perfectly fits the current, intense debate on the effectiveness of the fiscal policies. The aim of the author has been to provide empirical estimates of the spillover effects coming from fiscal consolidations on the domestic economic activity and transmitted through the trade exchanges. The author has used panel data econometrics and offered additional robustness checks.

This comment is structured as follows. First, I summarise the main assets and contributions of the paper. Second, I shortly discuss the main issues arising from the reading of the paper, with some of them seen as further research. Finally, some minor and technical comments are offered.

2 Main assets and contributions of the paper

The paper by A. Goujard (2014), titled "Cross-country spillovers from fiscal consolidations", is clearly placed at the centre of the current discussion on fiscal multipliers. Some reasons support its bearing in this context, namely, the scope of the sample (in terms of both the time and geographical dimension of data), the use of standard methodologies (making easier its connection with the previous literature), and the widely battery of results offered.

Particularly, the main contributions of the paper are the next ones:

- A comprehensive discussion of the effects of fiscal consolidations across borders is presented. The econometric estimates not only focus on the impact on the real domestic output of trading partners but also pay attention to the growth of variables related to bilateral trade, employment and other components of the aggregate demand such as private consumption and investment.
- As said before, the methodological strategy has followed the standard patterns. This can be interpreted as a signal of technical competence for obtaining sound enough empirical results. At

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the same time, his econometric findings can be then appropriately contextualised in the previous literature.

- The author has also built new measures of trade-weighted fiscal spillovers and provided a number of robustness checks regarding different trade weights, econometric estimators and alternative sets of control variables.
- The rationale for explaining the empirical results within determined frameworks (flexible exchange rates, currency union, etc.) has been carefully elaborated.

3 A constructive discussion of the results

Next, I shall summarise the main concerns arising from a further interpretation of the empirical results and some questions with reference to the general approach of the paper as well. In a sense, part of my comments can be seen as potential extensions to be considered if useful. In other cases, I have elaborated some ideas using Goujard (2014) as motivation.

3.1 The estimates of cross-country fiscal multipliers are relatively huge

The central estimates for the impact of foreign fiscal shocks on domestic GDP growth are much higher than one would expect. For example, the author finds that "a fiscal consolidation in export market of 1 percent of GDP on average is associated with a decrease in domestic growth of 1.5 percentage points". In fact, this particular value can be classified as the minimum threshold in the battery of estimates because other fiscal spillover effects reported may well exceed 3 per cent of GDP (for instance, those regarding spending cuts in non-fixed exchange regime).

These figures are extraordinarily striking, especially when they are compared to the conventional fiscal multipliers estimated for domestic fiscal shocks. The World Economic Outlook of the International Monetary Fund (2010) reports an average value of around 0.5 in a sample of 15 advanced economies over the period 1979-2009. Even with the reconsideration of the debate, launched by Blanchard and Leigh (2013) in the aftermath of the Great Recession, the estimates for domestic fiscal multipliers are in a range of 0.9-1.7.

A convincing explanation of such as high impacts of foreign fiscal consolidations on trade partners is necessary in Goujard's paper. I would then suggest a more extensive use of the existing literature (for example, Auerbach and Gorodnichenko, 2013) and of the works in progress on the topic (for instance, some of the papers presented at the ECB Conference "Heterogeneity in currency areas and macroeconomic policies") in order to support your view. I guess the previous references could provide not only an implicit backing to his estimates in terms of similar values but also, and more importantly, a rationale about why fiscal spillover effects are relatively higher than one would expect at first sight.

3.2 The non-Keynesian effects of fiscal consolidations have been ignored

Despite the fact that the author recognises that fiscal consolidations may have positive effects on economic activity through lower interest rates (the so-called non-Keynesian effects), I have missed a more explicit treatment of them. Even within the cross-country environment featuring this paper, the non-Keynesian effects may well still matter. In this sense, note the extraordinarily high sensitivity of spreads in sovereign debt of some countries in the Eurozone when doubts about the fiscal sustainability of other countries emerge (Caporale and Girardi, 2013). In other words, successful episodes of fiscal consolidations positively impact not only on the

domestic interest rates but also on those of other countries that, because of a number of (mainly institutional) reasons, are associated with.

In principle, the central specification determined in the paper (expression 3) contains time dummies being intended to control for the interest rate channel. But the intuition behind such interpretation is far from being straightforward. By contrast, the option chosen by Beetsma *et al.* (2006) and pointed out by the very author in the footnote 8, deserves a further reconsideration.

3.3 The interactions with the monetary policy should have been taken account

Recent papers have theoretically emphasised the links between the fiscal shocks across borders and the monetary policy rules and financial markets as well. See, for instance, the contributions by Bénassy-Quéré (2006) and Cooper *et al.* (2014). The conduit through which monetary and financial shocks and developments may affect GDP growth usually takes the equilibrium wages and interest rates (see my previous comment) as key variables.

However, the paper by Goujard has dismissed this possibility. Obviously, the translation of theoretical results to empirical articles is always a challenging task and this may be the case. But a range of alternative approaches (dummies, subsamples, structural breaks when monetary policies rules are modified) are available and the interested reader might very possibly miss a more explicit analysis of money in the estimates of fiscal spillovers.

This circumstance is highlighted by the fact that there are two big and clearly differentiated areas in terms of monetary policy rules (the Eurozone vs the US), and it is widely accepted that the effectiveness of fiscal policy is strongly conditioned by the mandate of the central bank.

3.4 Symmetry in the reasoning: what about expansionary fiscal shocks?

This point is more a reflexion than a criticism. Clearly, the paper by Goujard (2014) adopts the view of analysing to what extent contractionary fiscal shocks affect economic activity in trading partners. However, it could be very interesting to assess how symmetric are the results if instead of fiscal consolidations the governments are embarked in fiscal stimuli. Not in vain, a significant part of the current discussion in the policy arena pivots on the idea of turning fiscal austerity into a more expansive stance of the fiscal policy.

The question then would be: what is the fiscal multiplier of expansionary fiscal policies in the trading partner economies in terms of domestic activity? The high values achieved when fiscal consolidations are at place (and commented above) are still valid (obviously with the opposite sign) after changing the fiscal policy orientation? I obviously recognise that we would be talking about a completely different paper but the issue is extremely relevant nowadays from a policy view.

An additional challenging extension along this line would consist of investigating the impact of real spending and tax policies on the economic activity of trading partners, without constraining the scope of analysis to expansionary vs contractionary fiscal policies. At a given moment in time, each economy is affected by the fiscal consolidations carried out by some of its trading partners but, simultaneously, by the expansionary policies adopting in other countries. The extent of the net effect on the domestic economic activity becomes therefore a very realistic description of what is actually happening in the real world.

3.5 Opposite fiscal policies simultaneously in the Eurozone?

Extending the previous comment, a reasonable policy option to outweigh the depressing effects of fiscal consolidations of highly indebted countries in currency unions would entail a looser fiscal stance in economies without problems of fiscal sustainability. In the European context, this would imply that meanwhile the Southern countries are involved in cutting their public deficits, other Member States such as Germany, Austria or Finland should adopt a more expansionary fiscal stance.

The key underlying idea behind this argument is that there is a link between the deficits and the surpluses in the Eurozone, basically in terms of current account balances. But this relatively accepted statement is far from being formally proved. As Wylopsz (2010) has discussed, the issue is that all the Eurozone countries compete among them and with the rest of the world; and the fact that the lack of exchange rate adjustments in the Eurozone has led to current account imbalances with opposite signs cannot be used as proof that countries like Germany or Austria has built their external financial position on the basis of Southern countries deficits. Rather, a significant part of the surpluses is rooted in productivity gains and wage moderation, with substantial, similar implications on their commercial relationships with the rest of the world. Consequently, it does not make sense to call for reductions in German competitiveness to ease Southern European countries.

Beyond this "external" argument, an additional and even more relevant issue arises in order to deactivate this symmetric approach based on the combination of fiscal policies with different signs. I am referring to the fact that, under this corrective scenario, some governments (precisely those with stronger fundamentals to support economic sustainability) should be forced to modify their inter-temporal decisions in favour of more consumption and less savings. Though the excess of savings can be seen as inefficient in the short-term, some considerations regarding aging population may back the generation of optimal surpluses in the long run.

4 Minor comments

- With lags of the dependent variable among the regressors, the Anderson-Hsiao dynamic panel data estimator should offer the central estimates of the paper, instead of pushing them into the background as robustness checks.
- Given the availability of long enough time series (1978-2011), it would have been appropriate to check whether the variables are I(0) or I(1) and, if this is the case, whether co-integration analyses may improve the quality of estimates.
- SURE estimates could be also reasonable. In fact, it is likely to find out contemporaneous correlations across countries, which conveniently exploited might increase the efficiency of the results (using Zellner-type estimator).
- When comparing the action-based and the cyclically-adjusted fiscal spillovers, the paper arrives at completely different results. The author guesses that this may be caused by endogeneity problems and uses the action-based measure to instrument the cyclically-adjusted measure. Then, the estimates appear aligned and compatible. Maybe I am wrong, but it seems to me an absolutely trivial and not very informative approach.

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DOES FISCAL AUSTERITY AFFECT PUBLIC OPINION?

Anna Kalbhenn[*] *and Livio Stracca*[*]

In this paper we explore the impact of fiscal austerity on three different dimensions of public opinion (overall life satisfaction and confidence, attitude towards national authorities, and European institutions). Based on a panel of 26 EU countries, we find that, overall, fiscal consolidation episodes tend to have little and inconsistent impact on our measures of public opinion once we include macro controls (real GDP growth, inflation, unemployment, and whether a country is in a EU/IMF program).

Some of the circumstances under which consolidation is undertaken are significant in explaining the effect on public opinion, but also these effects are neither strong nor consistent throughout. We conclude that the effect of fiscal consolidation measures on public opinion mainly operates through their effect on the macroeconomy.

1 Introduction

Recent years have seen substantial fiscal consolidation in several euro area member states to address unsustainably high public debt levels. At the same time, protest campaigns and demonstrations in several countries suggest public discontent with painful reforms and fiscal austerity.

Public opinion matters, for at least two reasons. First, negative public opinion may jeopardise reforms and push governments to backtrack, leading to risks for fiscal sustainability down the road. This may happen through elections (unpopular governments are voted out of office) but also through public pressure or the simple threat of losing elections down the road. Second, public opinion may matter on its own right. After all, one key objective of economic policy should be to make citizens confident, satisfied with their life and trustful, which in turn helps the smooth functioning of public authorities. Public opinion, therefore, is important beyond the role that it plays in influencing electoral outcomes.

So far, little is known on the economic determinants of public opinion and in particular on the role that fiscal austerity plays in influencing it. Several possible channels are conceivable at the theoretical level. Fiscal austerity may be regarded a negative shock to current spending, at least if consumers are not Ricardian, which may have a negative effect on confidence and life satisfaction. Such a loss in confidence and life satisfaction might also be reflected in less trust in governmental and European institutions. Alternatively, the public might perceive austerity as a necessary action to restore fiscal sustainability. Following this logic, trust in public institutions might increase, and uncertainty about future economic developments might decrease. Such a development could possibly also boost consumer confidence.

To fully understand the impact of austerity on public opinion, we need to go beyond these globally applicable hypotheses. The situation of EU countries is peculiar, as fiscal policy is decided

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and implemented at the national level, but influenced and constrained by rules prevailing at the European level, especially in the euro area.[1]

To do justice to these circumstances, we consider three dimensions of public opinion: people's overall life satisfaction, their attitude towards national authorities, and towards European institutions. Such a distinction would not be possible, if we considered election results. Focusing on public opinion thus has an additional advantage: it allows us to draw more differentiated conclusions regarding the effect of austerity.

Our main result is that fiscal stance and fiscal consolidation measures are mostly insignificant for the public opinion variables that we consider, once macroeconomic controls are included. There are, however, a few interesting exceptions. In particular, we find that fiscal consolidation episodes have a negative, albeit small, effect on trust in the national parliament and in the European Commission, and a slight worsening of attitude towards Europe.

Given that we include macro controls, these results reflect the marginal effect of fiscal stance and fiscal consolidation episodes on public opinion, i.e. the impact they have on top of the effect that they (may) have on economic growth and the unemployment rate. To the extent that fiscal austerity impinges on GDP growth and the unemployment rate (an issue on which we do not take a stance in this paper), it also thereby affects measures of life satisfaction, confidence and trust, as shown by our results.

To our knowledge, our work is among the first to focus on the effect of fiscal austerity on public opinion. The only studies that we are aware of that are partly related to this question include pioneering work by Stix (2013) based on face-to-face interviews with Austrian voters, a study by Hayo and Neumeier (2013) examining how personal attributes impact attitudes toward fiscal consolidation and preferences for alternative consolidation measures in Germany, and the work by Beetsma et al. (2014) quantifying the effect of fiscal measures on consumer confidence. Beyond these, our paper is related to recent literature on the impact of fiscal tightening on voter support. For instance, analysing a sample of 19 OECD countries from 1975 to 2008, Alesina, Carloni and Lecce (2012) find no evidence that governments that quickly reduce budget deficits are systematically voted out of office. Similarly, Buti et al. (2010) analyse re-election chances for incumbent governments in 21OECD countries from 1985 to 2003. They do not find these chances to be significantly affected by pro-market reforms per se. Rather, re-election chances depend on the type of reform and the policy environment.

Other related and more recent literature considers the effect of fiscal consolidations on inequality, which may be a driver of public opinion. Ball *et al.* (2013) and Woo *et al.* (2013) find that fiscal consolidations are normally followed by an increase in inequality. The nexus between rising inequality and public opinion is an interesting topic for future research, but we can say little on this in this paper since our focus is on country-level, aggregate data.

In addition to these closely related strands of literature, large fiscal consolidations have been the subject of a wide array of academic research with a focus mainly on their impact on economic growth (cf. Sims and Wolff, 2013), but also on their distributional consequences (as the papers just cited and Jensen and Rutherford, 2002) and their potential social implications (Vegh and Vuletin, 2014).

More recent research has focused on whether the growth impact of fiscal consolidation depends on how such consolidations are designed. Alesina, Favero and Giavazzi (2012) simulate multi-year fiscal plans and find that spending-based fiscal adjustments lead to less output losses

[1] The situation of countries under EU/IMF programs is even more peculiar, as their fiscal policy is essentially determined in the program negotiated between the country and the "troika" authorities (the European Commission, the International Monetary Fund (IMF) and the European Central Bank (ECB).

than tax-based ones. Similarly, Alesina and Ardagna (2012) show that spending-based fiscal adjustments have caused smaller recessions than tax based ones. In fact, expansionary fiscal adjustments are possible if the adjustment is spending-based. At the same time, fiscal adjustments that are mostly based on the spending side are more likely to be reversed.

While there is quite some evidence that spending-based adjustments are more growth-friendly than tax-based ones, we are not aware of any study that considers the impact of the design of fiscal adjustments on public opinion. Further to addressing the overall effect of fiscal consolidation on public opinion, we thus also investigate in how far it matters for public opinion whether consolidation is more spending or more tax based.

Intuitively, we might expect spending-based consolidations to have a less negative impact on public opinion than tax-based ones. For one, citizens might expect to be more or less uniformly hit by tax hikes, while spending cuts might only affect certain groups. This is consistent with the findings by Agnello and Sousa (2012) and Ball *et al.* (2013) that spending-based adjustments tend to have larger distributional effects than tax-based ones. Ultimately, potential differences in the impact of revenue- versus spending-based measures might, however, depend on their specific design, such as their progressivity (cf. IMF, 2014). Furthermore, the impact of fiscal consolidation episodes might depend on the circumstances under which they happen and the political and economic factors driving them. In our paper, we therefore check whether consolidation follows high debt levels in the previous period (a proxy for consolidations that are made necessary by the need to maintain or restore fiscal sustainability) and whether citizens in the euro area react differently to austerity than those in non euro area countries (a proxy for the fact that fiscal policy decisions are influenced by external factors).

The paper is organised as follows. In Section 2 we describe the data. Section 3 presents the empirical model, and Section 4 the results. Section 5 concludes.

2 Data and descriptive statistics

We use yearly country level data for all EU Member States (excluding Malta). For data that is available at higher than yearly frequency we use the yearly mean.

The analysis in this paper is thus limited to country-level, aggregate data. We are aware that there is a host of relevant questions that focus on the distributional consequences of fiscal policy and fiscal consolidation, including on the public opinion variables that we look at. For example, it may be useful to understand whether fiscal policy actions disproportionately affect different income groups, and this may be particularly relevant in comparing, say, revenue based and spending based consolidations. In order to carry out this type of analysis one would need matched data on income and public opinion that is not available in the Eurobarometer survey, though proxies can be found. While these are certainly worthwhile questions, we believe that the first order question should be to understand the aggregate impact of fiscal policy and fiscal consolidations, and for that analysis the aggregate country data are a natural starting point. Using country data also allows us to compare the Eurobarometer data with the consumer survey data, which is important for a cross validation.

Data availability restricts the time period of our analysis to range from 1973 to 2013. Table 1 provides an overview on how the variables are constructed and defined and the data sources.

Public opinion variables. We consider three dimensions of public opinion: life satisfaction and confidence, views towards the national elected representatives and the degree of Euroscepticism. We measure the first as the degree of consumer confidence as measured by the

Table 1

Sources and Definition of the Data

Variable	Source and Definition
Consumer confidence	European Commission consumer survey
Life satisfaction	European Commission Eurobarometer survey; logistic transformation of the share of answers *"Very"* and *"fairly"* and *"No"* and *"Not at all"* to the question *"On the whole, are you very satisfied, fairly satisfied, not very satisfied, or not at all satisfied with the life you lead?"*
Net trust in the national government and in the national parliament	European Commission Eurobarometer survey; difference between the share of responses of *"tend to trust"* and *"tend not to trust"* respectively the national government and the national parliament (the question is: *"For each of the following institutions, please tell me if you tend to trust it or tend not to trust it"*)
Net trust in the ECB and in the European Commission	European Commission Eurobarometer survey; difference between the share of responses of *"tend to trust"* and *"tend not to trust"* respectively the ECB and the European Commission (the question is: *"For each of the following institutions, please tell me if you tend to trust it or tend not to trust it"*)
EU membership is a good thing (general attitude towards Europe)	European Commission Eurobarometer survey; difference between the share of responses of *"A good thing"* and *"Not a good thing"* to the question *"Generally speaking, do you think that (your country"s) membership of the European Community (Common Market) is ...?"*
Fiscal stance measures: Primary balance to GDP, cyclically adjusted primary balance (CAB), public debt to GDP (Maastricht definition)	European Commission, AMECO database
Euro dummy	Takes value 1 if and when the country's currency is the euro and 0 otherwise

Program country dummy	Takes value 1 if in a given year the country is under a EU/IMF program and 0 otherwise
Fiscal consolidation dummy	Takes value 1 in a 2-year period in which the CAB improves in each year and the cumulative improvement is at least 2 per cent of GDP for the primary balance, or in a 3-year period in which the CAB improves in each year and the cumulative improvement is at least 3 per cent of GDP (Alesina and Ardagna, 2012)
Spending versus revenue based	Spending based consolidation if the change in public expenditure is less than its median across all years in which a consolidation occurs; revenue based if the change in public revenues is more than its median across all years in which consolidation occurs; see Alesina, Carloni and Lecce (2012)
Real GDP, unemployment rate, consumer price index (CPI)	IMF World Economic Outlook (WEO) database Inflation is computed as the annual growth of the CPI
Banking and debt crisis dummies	Mars database (European Central Bank) The original database is available for a quarterly frequency from 1970 to 2010, with three binary variables capturing the episodes of banking, debt and currency crises. The variables take value 1 when a crisis occurred and 0 otherwise. The database has been assembled for an ECB working paper on banking, debt and currency crises (Babecky *et al.*, 2012) The original quarterly database is converted into an annual database where a dummy previously coded as 1 takes the value of 0.25. Accordingly, the annual variable for a crisis period is only equal to 1 if a crisis has been identified for all four quarters. If for example a banking crisis has been identified only in two quarters for a respective year, the corresponding banking crisis variable takes the value of 0.5. The variable takes on the value of 0 if no banking crisis has occurred during any of the quarters within a year

Note: Data have an annual frequency; for variables available at a higher frequency (including Eurobarometer survey data), data are annual averages. The sample period is 1973 to 2013.

European Commission consumer survey and reported life satisfaction according to the Eurobarometer survey (see Table 1). The national dimension is covered by the net share of Eurobarometer respondents that indicate they tend to trust their national government/national parliament (net trust). Finally, we proxy Euroscepticism by reported net trust in the European Commission, the European Central Bank and general attitude towards Europe (share of respondents saying that "EU membership is a good thing"), all according to the Eurobarometer survey.[2]

Fiscal stance measures. We assess a government's fiscal stance by the respective country's primary balance and it's cyclically adjusted primary balance (CAB). The data stems from the European Commission's AMECO database.

Fiscal consolidation episodes. To identify periods of fiscal consolidation we introduce dummies following the approach suggested by Alesina and Ardagna (2012). In particular, the consolidation dummy assumes the value 1 for time periods in which either the CAB improves for 2 years in a row and the cumulative improvement is at least 2 per cent of GDP or the CAB improves for 3 years in a row and the cumulative improvement is at least 3 per cent of GDP. We also distinguish between tax versus spending-based consolidation episodes as suggested by Alesina, Carloni and Lecce (2012): A consolidation is considered to be spending based if the change in public expenditure is less than its median across all years in which a large adjustment occurs. Likewise, it is considered to be tax-based if the change in public revenues is more than its median across all years in which a large adjustment occurs.

An important clarification to be noted in this context is that we look at headline measures of fiscal stance and consolidation, and we are not interested in measuring fiscal "shocks". We believe that consumers are unlikely to react in a different way to expected and unexpected changes in fiscal policy, and are not really in a position to appreciate what is new and what is not.

Macro controls. Following Stracca (2014) we include a set of standard macro controls: real GDP growth, CPI inflation, and the unemployment rate. This implies that in this paper we are looking at the effects of fiscal austerity that come on top of their influence on typical macroeconomic variables.

As both fiscal consolidation and public opinion might react to crises episodes, we also include dummies for banking and debt crises in EU countries as in Babecký *et al.* (2012).

In Figures 1-3 we take a preliminary look at the data for three representative countries, *i.e.*, Greece (program country), Latvia (non-euro area experiencing a large fiscal adjustment) and Germany (as a reference point). In Table 2a we report summary statistics for the variables used in the empirical analysis, and in Table 2b we look at the within and between variation in some of the dependent variables.

These descriptive statistics illustrate that the fiscal consolidation dummy is plausible (Figure 1), see, e.g., Greece (2009-2012) and Latvia (2009-12). In terms of the dependent variables, we observe that life satisfaction and consumer confidence are very correlated (Figure 2; see also Stracca, 2014). Furthermore, it is interesting to note that net trust in national institutions is generally lower than trust in European institutions and in Europe (Figure 3 and Table 2). Confirming anecdotal evidence, trust especially in Europe and European institutions went down in the crisis period (Figure 3, see in particular Greece).

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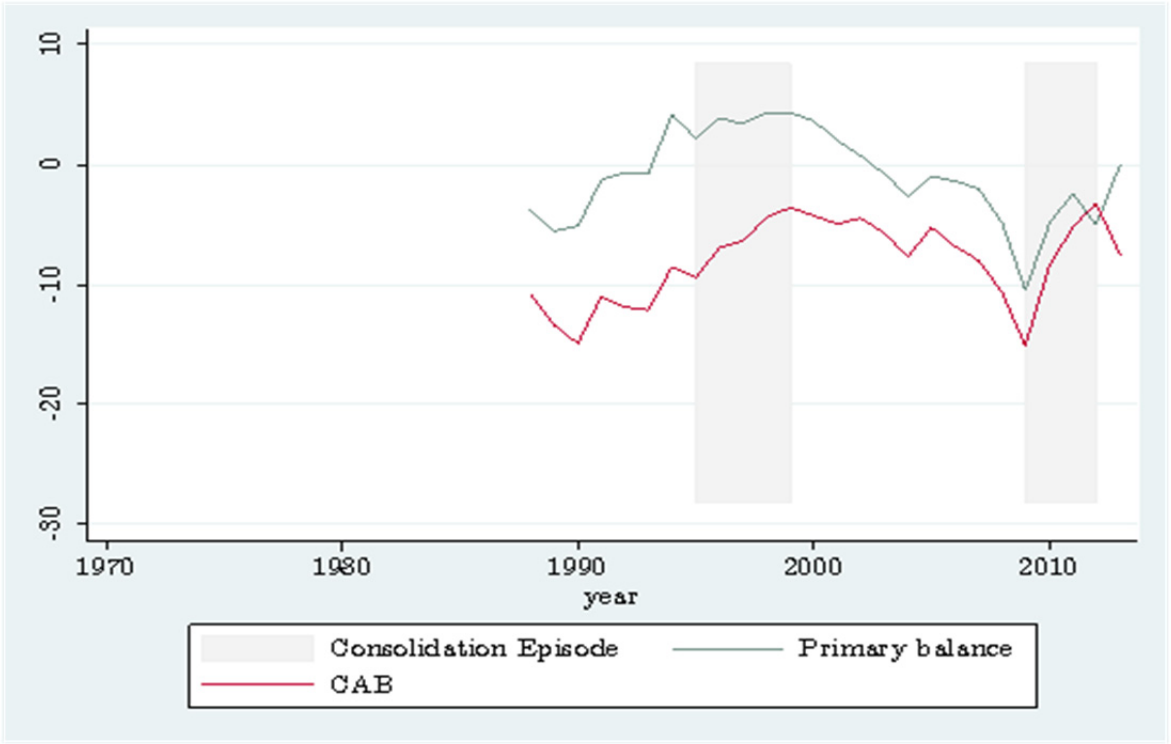
[2] The Eurobarometer survey is conducted twice a year. Given that all other data is available only at annual frequency, we use the mean of the the two biannual waves for all variables that are based on Eurobarometer data.

Figure 1

Fiscal Stance Measures
1a. Greece



1b. Latvia

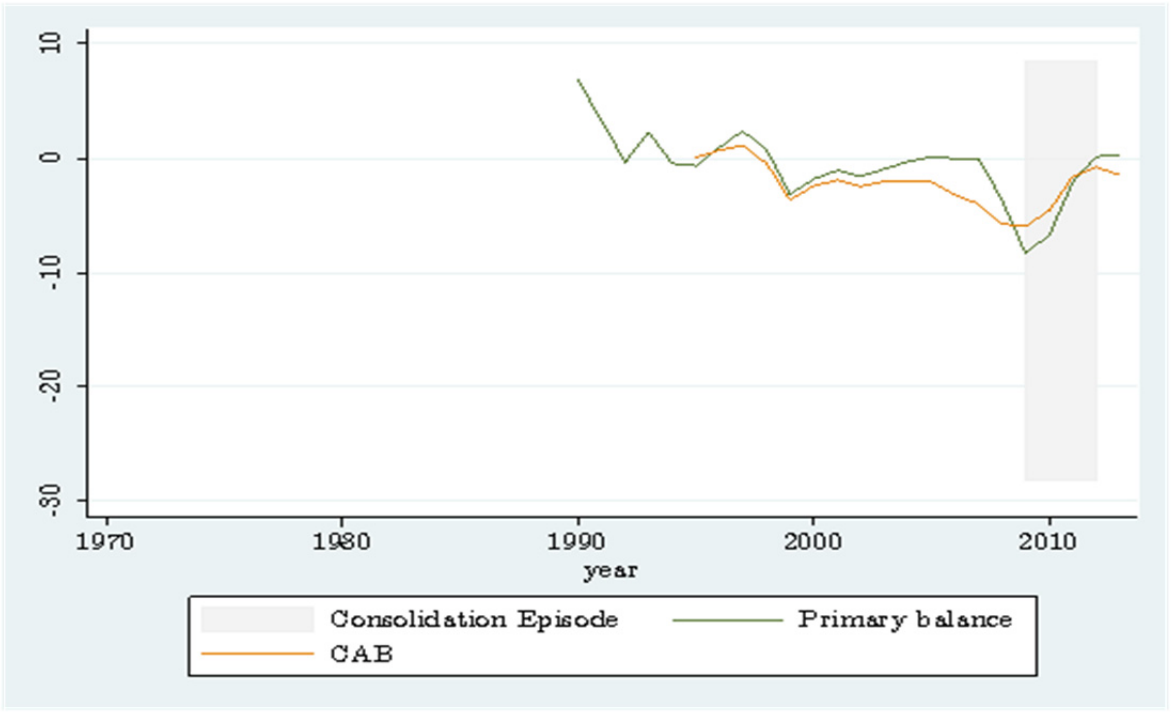
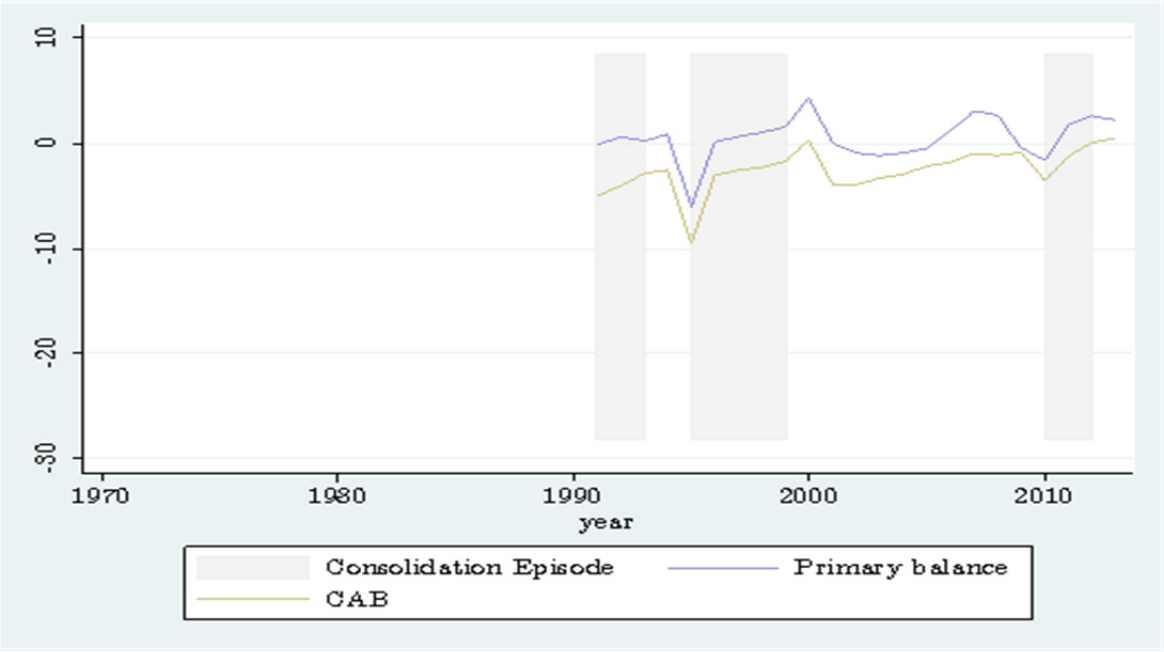


Figure 1 (continued)

Fiscal Stance Measures
1c. Germany



Notes: See Table 1 for the definition of the variables and the sources. CAB stands for Cyclically Adjusted Balance.

Figure 2

Life Satisfaction and Consumer Confidence
2a. Greece

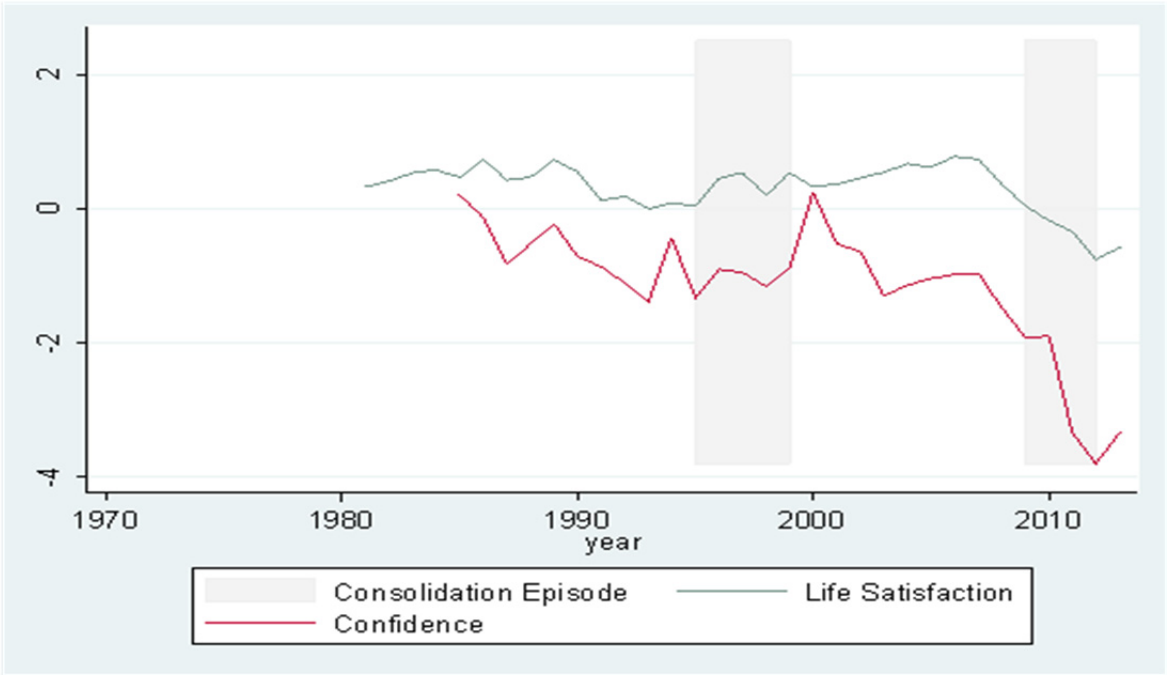
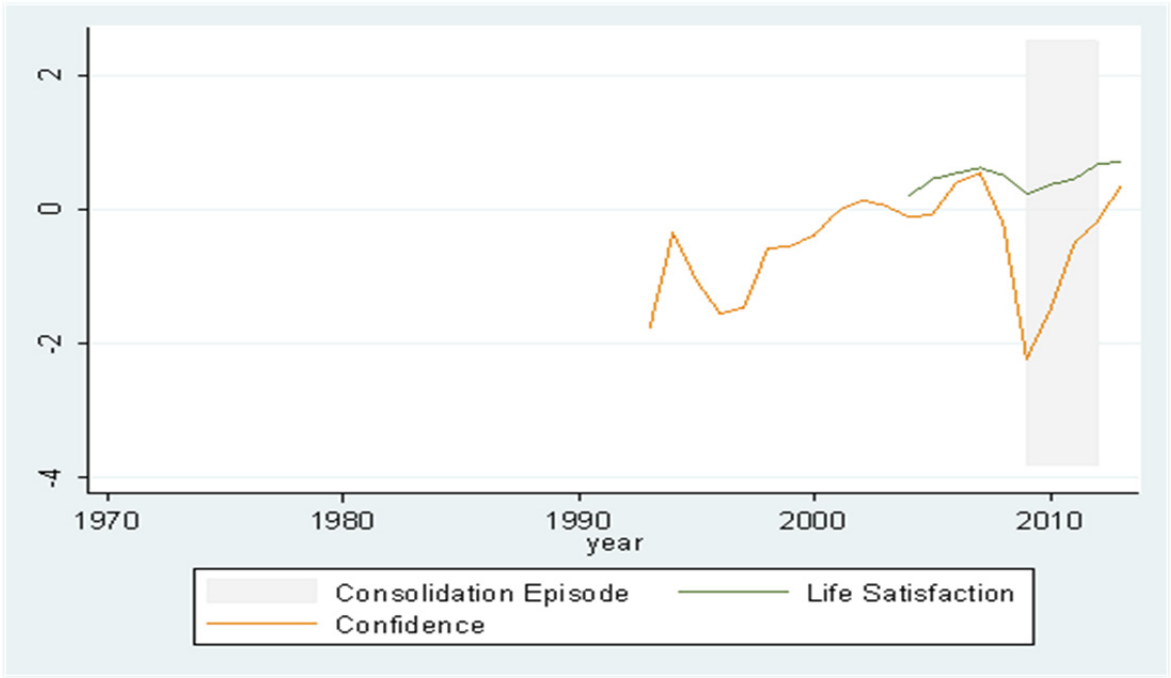
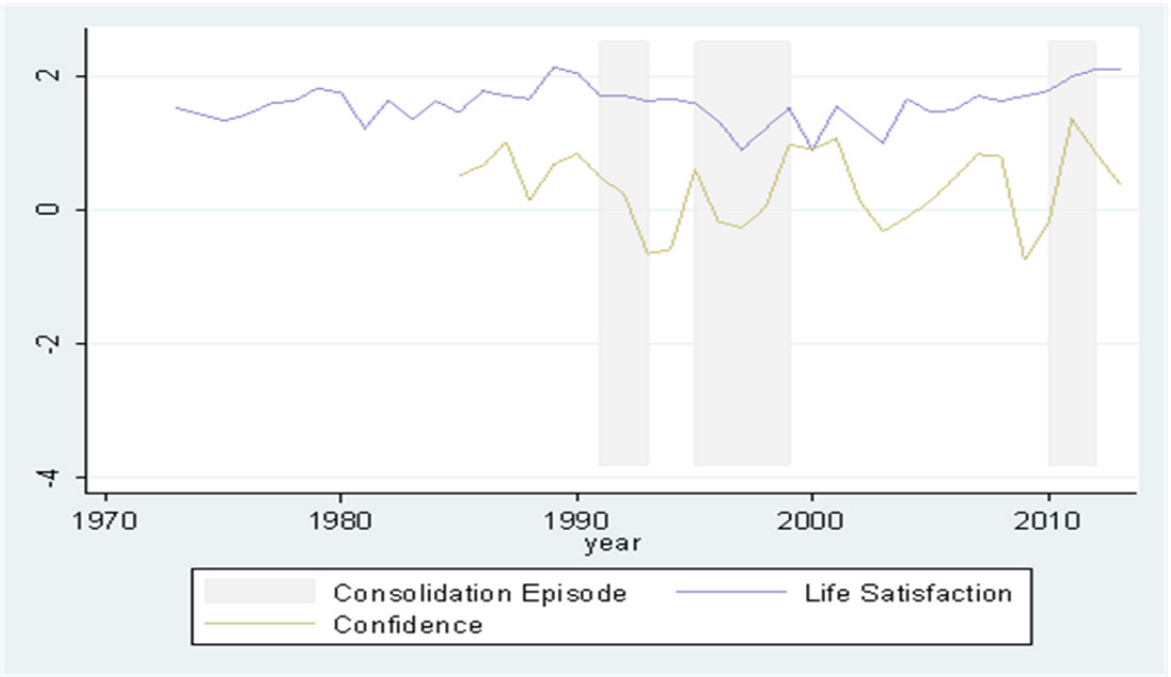


Figure 2 (continued)

Life Satisfaction and Consumer Confidence
2b. Latvia



2c. Germany

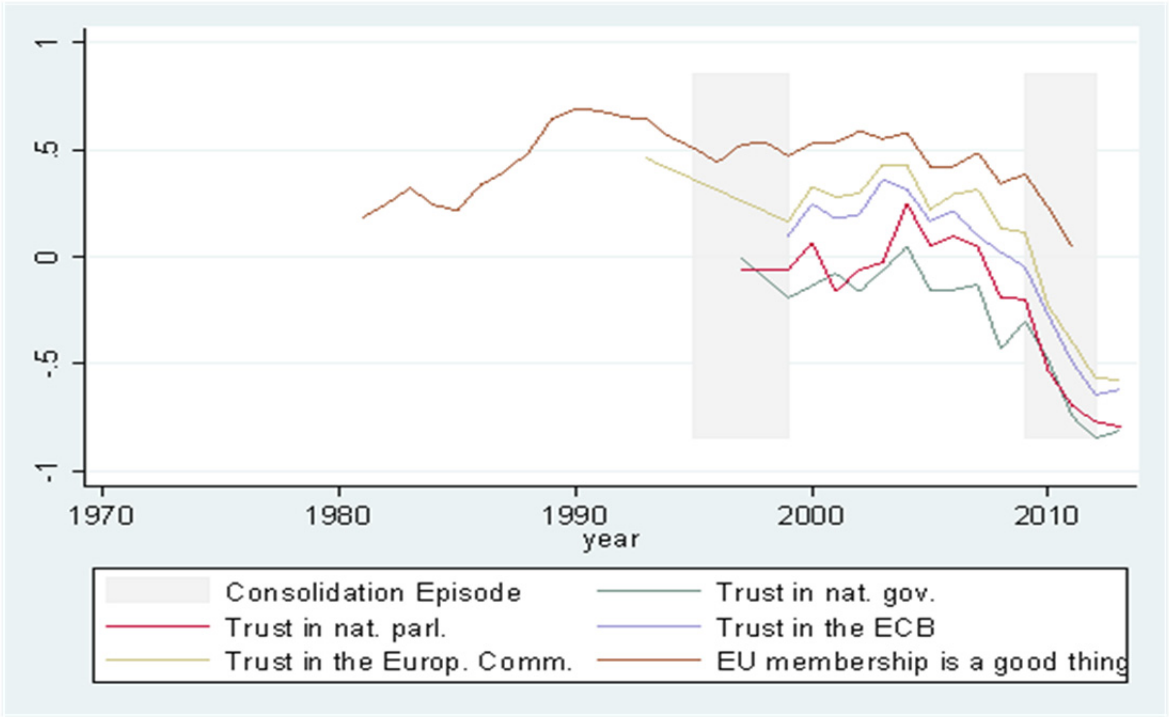


Notes: See Table 1 for the definition of the variables and the sources.

Figure 3

Net Trust in National and European Institutions

3a. Greece



3b. Latvia

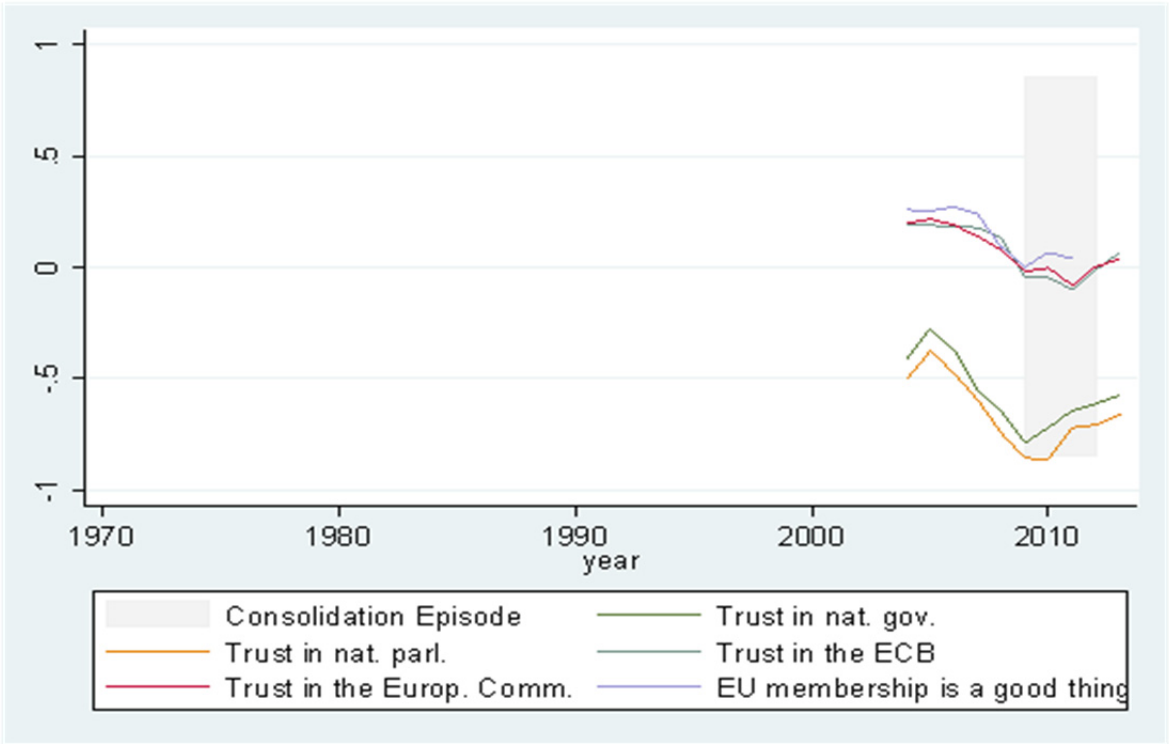
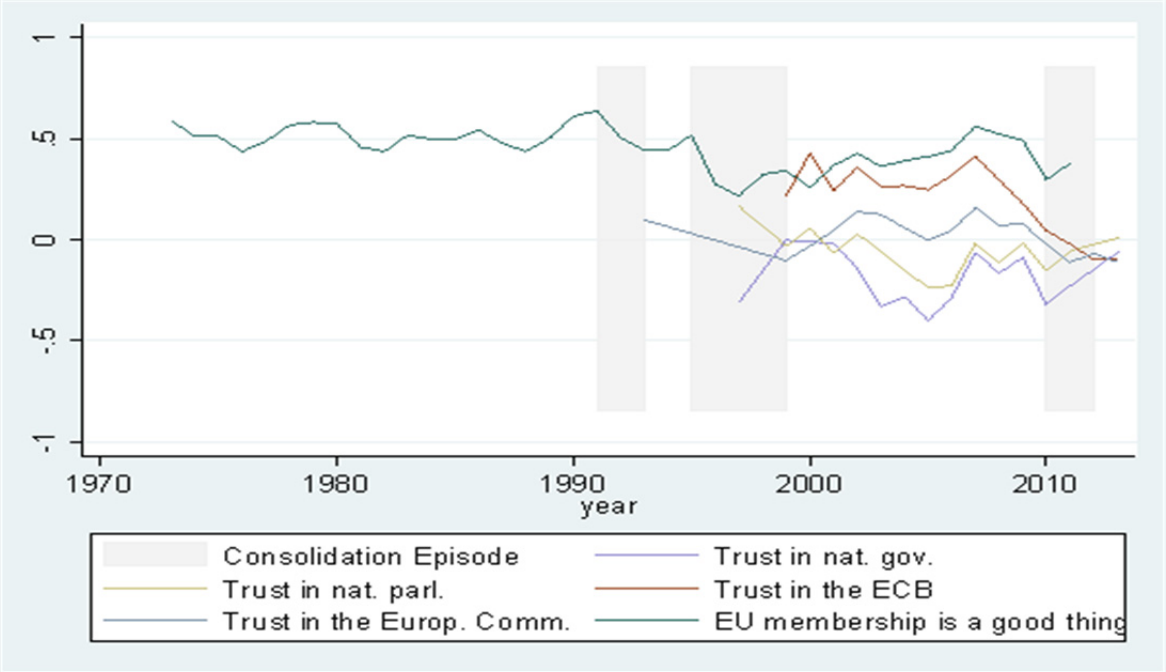


Figure 3 (continued)

Net Trust in National and European Institutions
3c. Germany



Notes: See Table 1 for the definition of the variables and the sources. The trust measures shown are net trust (difference from share of responses "tend to trust" and "do not tend to trust").

Table 3 reports correlations between the dependent variables and the fiscal stance and consolidation measures. We find that net trust variables are correlated between themselves and with life satisfaction and confidence; trust in the European Commission appears to be an exception; and program countries are characterised by lower confidence and lower trust, in particular in the European institutions, less so in national institutions and overall attitude towards Europe. For the fiscal austerity measures, we find that the fiscal consolidation dummy is only loosely correlated with the primary balance and the CAB. This underlines the importance to look both at fiscal stance measures and fiscal consolidation episodes separately, as we do in this paper. Moreover, we find that fiscal consolidation episodes are more common with higher public debt, in EU/IMF program countries, and are associated with larger reductions in spending than tax increases, as a share of GDP.

3 Empirical Model

Our baseline estimation is specified as follows:

$$y_{it} = \alpha_i + \beta_1 AUSTERITY_{it} + \beta_2 z_{it} + \beta_3 y_{i,t-1} + \lambda_t + \varepsilon_{it} \quad (1)$$

where y is one of the measures of public opinion (as described in Section 2), *AUSTERITY* is either a measure of fiscal stance or a fiscal consolidation episode, z are the macro controls, α_i is the country specific constant and λ_t are time dummies.

Table 2a

Summary Statistics

	Obs	Mean	St.dev	Min	Max
Life satisfaction	585	1.56	0.98	–0.90	3.89
Consumer confidence	566	–0.00	1.00	–3.80	2.50
Net trust in nat. gov.	335	–0.08	0.71	–0.85	5.03
Net trust in nat. parl.	350	–0.20	0.46	–2.96	2.36
Net trust in the ECB	360	0.20	0.22	–0.69	0.68
Net trust in EU Comm.	373	0.19	0.21	–0.57	0.54
EU membership is good	632	0.43	0.22	–0.25	0.86
Real GDP growth	852	2.15	3.72	–18.50	13.57
Unemployment rate	863	7.68	4.42	0.00	27.00
CPI inflation	921	8.86	20.33	–4.59	246.47
Primary balance	726	0.33	3.74	–28.21	11.62
Public debt to GDP	830	50.75	30.65	3.69	175.18
Public spending to GDP	921	42.87	6.58	24.21	75.36
Revenues to GDP	719	43.16	6.92	23.88	60.55
Govt. consumption to GDP	445	20.12	3.22	12.64	29.79
Fiscal consolidation	678	0.34	0.47	0.00	1.00
Expenditure-based consolidation	1195	0.11	0.32	0.00	1.00
Revenue-based consolidation	1195	0.13	0.33	0.00	1.00
Euro area country	1195	0.17	0.37	0.00	1.00
Program country	1195	0.01	0.10	0.00	1.00
Banking crisis dummy	1025	0.08	0.27	0.00	1.00
Debt crisis dummy	1025	0.01	0.06	0.00	1.00

Table 2b

Summary Statistics for the Dependent Variables: Between and Within Variation

		Mean	St. Dev.	Min.	Max.	Obs.
Consumer confidence	overall	–1.2E–09	1.00	–3.80	2.50	N = 566
	between		0.79	–1.21	1.60	n = 26
	within		0.67	–2.65	1.88	T–bar = 21.77
Net trust in nat. gov.	overall	–0.07636	0.71	–0.85	5.03	N = 335
	between		0.60	–0.56	2.59	n = 26
	within		0.34	–2.18	2.37	T–bar = 12.88
Net trust in nat. parl.	overall	–0.19659	0.46	–2.96	2.36	N = 350
	between		0.27	–0.69	0.19	n = 26
	within		0.38	–2.78	2.53	T–bar = 13.46
Net trust in the ECB	overall	0.206353	0.22	–0.69	0.68	N = 335
	between		0.14	–0.16	0.46	n = 26
	within		0.17	–0.62	0.58	T–bar = 12.88
Net trust in the Comm.	overall	0.199933	0.21	–0.57	0.54	N = 347
	between		0.13	–0.19	0.37	n = 26
	within		0.16	–0.55	0.55	T–bar = 13.35
EU membership is good	overall	0.435389	0.22	–0.26	0.86	N = 586
	between		0.18	0.08	0.71	n = 26
	within		0.12	0.03	0.79	T = 22.54

Table 3

Correlation Tables
3a. Dependent Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Life satisfaction	1.00						
Consumer confidence	0.71***	1.00					
Trust in the national government	0.60***	0.54***	1.00				
Trust in the national parliament	0.68***	0.52***	0.82***	1.00			
Trust in the ECB	0.28***	0.38***	0.55***	0.43***	1.00		
Trust in the European Commission	–0.17*	–0.01	0.27***	0.16*	0.75***	1.00	
EU membership is a good thing	0.09	0.16*	0.30***	0.22***	0.64***	0.68***	1.00

3b. Fiscal Stance and Consolidation Measures

	(1)	(2)	(3)	(4)	(5)	(6)
Primary balance	1.00					
CAB	0.72***	1.00				
Public debt to GDP, t–1	0.10**	–0.37***	1.00			
Fiscal consolidation dummy	–0.01	–0.08*	0.27***	1.00		
Change in public spending to GDP	–0.24***	–0.15***	–0.10**	–0.19***	1.00	
Change in public revenue to GDP	0.11**	0.05	0.06	0.07	0.26***	1.00

As we use time dummies and country fixed effects, our approach effectively becomes a diff-in-diff approach. To account for potential heteroscedasticity, autocorrelation, and cross-sectional dependence, we use Driscoll-Kraay standard errors. The parameter of interest in this part of the analysis is β_1.

3.1 Dealing with the possibility of reverse causality

While we are interested in whether fiscal consolidation affects public opinion, we cannot exclude that causality runs the other way around. That is, governments' decisions to undertake consolidation might actually depend on public opinion. In other words, public opinion might drive government decisions on matters of fiscal policy, especially close to elections, but also more generally. For example, higher consumer confidence may foster voters' support for the government and in turn embolden the government into action, including on fiscal consolidation.

Ignoring this potential endogeneity problem would lead to biased and inconsistent estimates. While there is no way to entirely avoid this risk, we re-estimate equation 1 using instrumental variables (IV), in order to at least mitigate the risk of reverse causality.

We use the lagged austerity measures as instruments. As we include lags of the endogenous variables among the regressors, we can quite safely assume that current-year public opinion does not drive fiscal austerity in the previous year.[3] We find that the instrument is strong in all the specifications. With one excluded instrument and one potentially endogenous variable, the equation is exactly identified. We therefore cannot test the validity of the chosen instrument.

3.2 Interaction terms

As a second step in the analysis, we aim to assess whether public opinion reacts differently to fiscal consolidation episodes under varying circumstances. We therefore run a second type of regression introducing interaction terms:

$$y_{it} = \alpha_i + \beta_1 \text{AUSTERITY}_{it} + \beta_2 z_{it} + \beta_3 y_{i,t-1} + \beta_4 \text{AUSTERITY}_{it} * x_{it} + \lambda_t + \varepsilon_{it} \quad (2)$$

where x_{it} is a vector of variables that are interacted with the fiscal austerity measure (say, whether the country has a high public debt). In this case, the parameter of interest is β_4.

4 Results

We now turn to describe the results. We present the results for equation 1, the baseline, in Section 4.1; and the results for equation 2, containing the interaction terms, in Section 4.2.

Overall, we find that fiscal stance and fiscal consolidation measures are mostly insignificant for the public opinion variables that we consider, once we introduce our macroeconomic controls. Including these controls implies that we are only looking at the marginal effect of fiscal stance and fiscal consolidation episodes, *i.e.*, the effect they may have on top of the effect that they (may) have on economic growth and the unemployment rate, on which we do not take a stance in this paper.

There are, however,a few exceptions. In particular, we find that fiscal consolidation episodes have a negative (but small) effect on trust in the national parliament and in the European Commission, and a slight worsening of attitude towards Europe. The Cyclically Adjusted Balance,

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[3] Note that with a sample period spanning 40 years the Hurwicz (Nickell) bias should be negligible.

a measure of the fiscal stance, tends to have an insignificant effect, but in the very few cases in which the effect is statistically significant it is positive, e.g., for trust in the national parliament.

Turning to the control variables themselves, the coefficients of the macro control variables overall point into the expected direction. That is, trust and confidence are higher if the economy is doing well, the unemployment rate and inflation are low. In particular, we find that real GDP growth consistently positively and statistically significantly affects all our public opinion variables in most specifications. The unemployment rate is also statistically significant and negative for life satisfaction, confidence and trust in the national institutions (but not in European institutions). Inflation is mostly negative and significant for confidence, but not for the other variables.

It is also interesting that being in a programme independently reduces confidence, life satisfaction (though often not statistically significantly so) and trust in European institutions as well as a pro-European attitude, but it is actually *positive* for trust in national institutions. We find being a euro area country to be *negative* for most public opinion variables, in particular trust in national institutions. Finally, a high public debt to GDP reduces trust in European institutions and attitude towards Europe. Note that because we include country fixed effects in the estimation, our results do not capture a possible effect of the overall quality of a country's institutions, that may be correlated with both the propensity to accumulate high debt and with trust.

4.1 Baseline estimates

Beginning with the OLS estimates of equation 1 and the cyclically adjusted primary balance (CAB)[4] as a measure of the fiscal stance (Table 4a), we find that the fiscal stance has little impact on any of our measures of public opinion, with the exception of a slight increase in trust in the ECB.

With respect to our control variables, we find that real GDP growth has a consistent positive and statistically significant effect on all public opinion variables, while the unemployment rate has a negative and significant impact on life satisfaction, confidence and trust in national, but not European, institutions. Inflation has quite a large negative effect on confidence, but is statistically insignificant for other variables.

Furthermore, we find that being a programme country has a negative effect on confidence and trust in European institutions and attitude towards Europe, but is actually positive for national institutions (though insignificant for trust in the national parlia ment). Somewhat surprisingly, we find that being a euro area country negatively impacts all our dependent variables (although the effect is insignificant for confidence and trust in the ECB). Finally, the lagged public debt to GDP ratio has a consistently negative effect on public opinion variables, though the coefficient is only significant for attitude towards Europe, trust in the ECB and the European Commission and in the national parliament. One could surmise that this result is driven by a third factor, such as the quality of the institutions in a given country, but we need to keep in mind that our model includes country fixed effects, so this explanation is not likely to be driving the results. The fact that the effect seems stronger for trust in European institutions and Europe suggests that "Europe" may be seen as more intruding and constraining in countries with a higher public debt that therefore need more fiscal adjustment, although this is clearly only a conjecture.

How do results differ once we consider fiscal consolidation episodes in place of the fiscal stance (Table 4b)? The difference is limited and the main messages of the baseline exercise remain unchanged, but there is some more evidence of a negative effect, which is statistically significant

[4] Results using the primary balance are very similar and not reported for brevity.

Table 4a

Estimates with OLS, Effect of the Cyclically-adjusted Balance on Public Opinion

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Life Satisfaction	**Confidence**	**Trust Nat. Government**	**Trust Nat. Parliament**	**EU Good**	**Trust ECB**	**Trust Comm.**
Lagged dependent variable	0.542***	0.493***	0.305	0.484**	0.743***	0.544***	0.606***
	(0.056)	*(0.053)*	*(0.184)*	*(0.193)*	*(0.031)*	*(0.074)*	*(0.052)*
Cyclically Adjusted Balance (CAB)	–0.001	–0.008	0.002	0.005	0.000	0.003**	0.002
	(0.004)	*(0.006)*	*(0.009)*	*(0.009)*	*(0.001)*	*(0.002)*	*(0.002)*
Real GDP growth	0.013***	0.076***	0.012***	0.018***	0.005***	0.003**	0.003*
	(0.005)	*(0.013)*	*(0.004)*	*(0.006)*	*(0.001)*	*(0.001)*	*(0.002)*
Unemployment rate	–0.017***	–0.027***	–0.021***	–0.009	0.001	–0.000	–0.001
	(0.004)	*(0.006)*	*(0.005)*	*(0.006)*	*(0.002)*	*(0.002)*	*(0.002)*
CPI inflation	0.001	–0.020**	–0.001	–0.006	–0.001	–0.003	–0.001
	(0.008)	*(0.008)*	*(0.012)*	*(0.008)*	*(0.001)*	*(0.003)*	*(0.003)*
Program country	–0.145	–0.565***	0.083*	0.035	–0.064***	–0.129***	–0.156***
	(0.092)	*(0.141)*	*(0.042)*	*(0.068)*	*(0.014)*	*(0.032)*	*(0.046)*
Euro area country	–0.063*	–0.093	–0.167***	–0.138***	–0.032**	–0.020	–0.060***
	(0.035)	*(0.063)*	*(0.046)*	*(0.030)*	*(0.014)*	*(0.020)*	*(0.016)*
Public debt to GDP (std.), t–1	–0.022	–0.047	–0.061	–0.119*	–0.033***	–0.082***	–0.048**
	(0.020)	*(0.048)*	*(0.045)*	*(0.057)*	*(0.009)*	*(0.020)*	*(0.017)*
Observations	441	488	251	281	470	281	281
Number of countries	25	26	26	26	26	26	26

Note: Pooled OLS with Driscoll-Kraay standard errors, sample 1970 to 2013 (or longest available). Dependent variables are indicated in the columns. Country fixed effects and time dummies are always included (and not shown for brevity). See Table 1 for the definition of the variables.

Table 4b

Estimates with OLS, Effect of Fiscal Consolidation Episodes on Public Opinion

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Life Satisfaction	**Confidence**	**Trust Nat. Government**	**Trust Nat. Parliament**	**EU Good**	**Trust ECB**	**Trust Comm.**
Lagged dependent variable	0.543***	0.496***	0.303	0.471**	0.734***	0.541***	0.603***
	(0.055)	*(0.052)*	*(0.185)*	*(0.187)*	*(0.030)*	*(0.074)*	*(0.052)*
Fiscal consolidation	0.007	–0.062	–0.042	–0.101**	–0.019***	–0.006	–0.029***
	(0.024)	*(0.059)*	*(0.033)*	*(0.046)*	*(0.005)*	*(0.009)*	*(0.005)*
Real GDP growth	0.013***	0.073***	0.011**	0.014**	0.005***	0.003**	0.002
	(0.005)	*(0.013)*	*(0.005)*	*(0.005)*	*(0.001)*	*(0.001)*	*(0.002)*
Unemployment rate	–0.017***	–0.027***	–0.024***	–0.014**	0.001	–0.001	–0.002
	(0.004)	*(0.007)*	*(0.006)*	*(0.006)*	*(0.002)*	*(0.002)*	*(0.002)*
CPI inflation	0.001	–0.021**	–0.003	–0.009	–0.001	–0.004	–0.002
	(0.008)	*(0.008)*	*(0.012)*	*(0.009)*	*(0.001)*	*(0.003)*	*(0.003)*
Programme country	–0.144	–0.585***	0.072	0.028	–0.065***	–0.120***	–0.157***
	(0.096)	*(0.134)*	*(0.072)*	*(0.076)*	*(0.013)*	*(0.036)*	*(0.041)*
Euro area country	–0.061*	–0.120	–0.179***	–0.165***	–0.037**	–0.027	–0.068***
	(0.035)	*(0.080)*	*(0.036)*	*(0.029)*	*(0.014)*	*(0.021)*	*(0.015)*
Public debt to GDP (std.), t–1	–0.024	–0.032	–0.042	–0.093*	–0.028***	–0.085***	–0.040**
	(0.021)	*(0.042)*	*(0.032)*	*(0.050)*	*(0.008)*	*(0.025)*	*(0.017)*
Observations	441	488	251	281	470	281	281
Number of countries	25	26	26	26	26	26	26

Note: Pooled OLS with Driscoll-Kraay standard errors, sample 1970 to 2013 (or longest available). Dependent variables are indicated in the columns. Country fixed effects and time dummies are always included (and not shown for brevity). See Table 1 for the definition of the variables.

for the national parliament, the attitude towards Europe and trust in the European Commission. Still, the effects are not large in absolute terms. Results for the control variables are largely the same.

As discussed in Section 3 above, we repeat the same estimation using instrumental variables (IV) for the fiscal stance (Table 5a) and the fiscal consolidation dummy (Table 5b), using a lag of the fiscal measure as instrument. The diagnostic statistics, in particular the F of the first stage regressions, confirm that instruments are strong (validity cannot be tested because the equations are exactly identified).

The results of this analysis are qualitatively the same and confirm that there is no significant endogeneity bias in the OLS estimates. There are some changes in the statistical significance that reflect the fact that standard errors are larger when using IV rather than OLS. In particular, the coefficients for trust in the national parliament and attitude towards the EU are now statistically insignificant, although they are also not much different from the OLS estimates in terms of size and sign. There are other minor differences (such as the fact that the effect of lagged public debt on trust in the national parliament is now insignificant) but overall the results are qualitatively the same for control variables as well.

4.2 Estimates with interaction terms

Finally, we include interaction terms between the fiscal variables and other characteristics (Tables 6a-6c). Because results of the previous section seem to suggest that there are more significant results for the fiscal consolidation dummy we focus on this variable as our main fiscal austerity variable.

In particular we include interaction terms of the fiscal consolidation variable with the high debt country dummy (to test whether fiscal consolidation is better accepted when need to correct unsustainable debt), with the euro area country dummy, and real GDP growth (to test for the additional effects of pro-cyclical fiscal consolidation). Moreover, we include a dummy for revenue-based fiscal consolidations (see Table 1 for additional explanation). It should be noted that in this specification the coefficient associated with the fiscal consolidation dummy is the coefficient prevailing in (i) a low debt country, (ii) a non-euro area country, (iii) with zero real GDP growth and (iv) a spending-based consolidation. The interpretation is therefore not straightforward and should not directly be compared to the results in the previous section. The purpose of this part of the analysis is not to understand the baseline effect of fiscal consolidations but rather to find out under which conditions they may have a stronger or more attenuated effect on public opinion variables.

We uncover some interesting results for the interaction terms (Table 6a). In particular, we find that revenue-based fiscal consolidations are associated with quite substantial falls in confidence and trust in the national government, while making citizens marginally more pro-European. We also find that during fiscal consolidation episodes citizens are less pro-European in non-euro area countries, but more pro-European in euro area countries. Possibly, this reflects a fall in relative trust in national institutions. The results for the control variables are largely the same as in the previous estimations.

We once more repeat the same exercise, but this time, we additionally include dummies for periods of banking crises and debt crises, to test whether results are overly influenced by crisis times (Table 6b). Note that data for the crisis dummies are available only until 2010, and this is the reason why they are not included in the baseline specification.

Table 5a

Estimates with Instrumental Variables, Effect of the Cyclically-Adjusted Balance on Public Opinion

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Life Satisfaction	**Confidence**	**Trust Nat. Government**	**Trust Nat. Parliament**	**EU Good**	**Trust ECB**	**Trust Comm.**
Lagged dependent variable	0.534***	0.502***	0.303	0.479***	0.732***	0.545***	0.608***
	(0.045)	*(0.046)*	*(0.209)*	*(0.170)*	*(0.033)*	*(0.055)*	*(0.053)*
Cyclically Adjusted Balance (CAB)	–0.001	–0.006	0.014	0.025*	0.002	0.005**	0.004
	(0.005)	*(0.012)*	*(0.011)*	*(0.013)*	*(0.002)*	*(0.002)*	*(0.003)*
Real GDP growth	0.013***	0.075***	0.012*	0.017**	0.005***	0.003	0.003**
	(0.004)	*(0.011)*	*(0.006)*	*(0.007)*	*(0.001)*	*(0.002)*	*(0.002)*
Unemployment rate	–0.018***	–0.027**	–0.019***	–0.006	0.002	0.000	–0.000
	(0.005)	*(0.011)*	*(0.007)*	*(0.007)*	*(0.002)*	*(0.002)*	*(0.003)*
CPI inflation	0.001	–0.027***	–0.000	–0.005	–0.002	–0.003	–0.001
	(0.006)	*(0.010)*	*(0.011)*	*(0.010)*	*(0.002)*	*(0.003)*	*(0.003)*
Programme country	–0.144	–0.576***	0.044	–0.026	–0.062**	–0.133***	–0.164***
	(0.088)	*(0.203)*	*(0.126)*	*(0.151)*	*(0.031)*	*(0.036)*	*(0.056)*
Euro area country	–0.067	–0.110	–0.145**	–0.108**	–0.033**	–0.018	–0.056**
	(0.045)	*(0.075)*	*(0.063)*	*(0.051)*	*(0.013)*	*(0.026)*	*(0.028)*
Public debt to GDP (std.), t–1	–0.015	–0.042	–0.043	–0.093	–0.035***	–0.080***	–0.044*
	(0.024)	*(0.048)*	*(0.062)*	*(0.070)*	*(0.009)*	*(0.022)*	*(0.022)*
Observations	434	481	251	281	463	281	281
R-squared	0.649	0.697	0.211	0.346	0.789	0.807	0.804
Number of country	25	26	26	26	26	26	26
F-stat first stage	73.4	74.9	33.0	36.5	97.5	39.1	39.4

Note: Pooled OLS with Driscoll-Kraay standard errors, sample 1970 to 2013 (or longest available). Dependent variables are indicated in the columns. Country fixed effects and time dummies are always included (and not shown for brevity). The excluded instrument is one lag of the CAB. See Table 1 for the definition of the variables.

Table 5b

Estimates with Instrumental Variables, Effect of Fiscal Consolidation Episodes on Public Opinion

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Life Satisfaction	**Confidence**	**Trust Nat. Government**	**Trust Nat. Parliament**	**EU Good**	**Trust ECB**	**Trust Comm.**
Lagged dependent variable	0.534***	0.504***	0.300	0.466***	0.723***	0.546***	0.603***
	(0.045)	*(0.046)*	*(0.209)*	*(0.171)*	*(0.034)*	*(0.055)*	*(0.050)*
Fiscal consolidation	–0.054	–0.060	–0.117	–0.133	–0.021	0.010	–0.026
	(0.045)	*(0.092)*	*(0.096)*	*(0.097)*	*(0.014)*	*(0.021)*	*(0.020)*
Real GDP growth	0.012***	0.073***	0.008	0.012	0.005***	0.003	0.002
	(0.004)	*(0.010)*	*(0.007)*	*(0.008)*	*(0.001)*	*(0.002)*	*(0.002)*
Unemployment rate	–0.019***	–0.028**	–0.028***	–0.016**	0.001	–0.000	–0.002
	(0.005)	*(0.011)*	*(0.009)*	*(0.008)*	*(0.002)*	*(0.003)*	*(0.003)*
CPI inflation	0.001	–0.027***	–0.004	–0.010	–0.001	–0.003	–0.002
	(0.006)	*(0.010)*	*(0.011)*	*(0.011)*	*(0.002)*	*(0.004)*	*(0.003)*
Program country	–0.156*	–0.593***	0.042	0.021	–0.064**	–0.116***	–0.157***
	(0.091)	*(0.210)*	*(0.109)*	*(0.117)*	*(0.028)*	*(0.038)*	*(0.050)*
Euro area country	–0.076	–0.132	–0.194***	–0.171***	–0.039***	–0.024	–0.067**
	(0.047)	*(0.081)*	*(0.069)*	*(0.061)*	*(0.013)*	*(0.025)*	*(0.027)*
Public debt to GDP (std.), t–1	0.000	–0.027	–0.004	–0.083	–0.030***	–0.090***	–0.041*
	(0.029)	*(0.051)*	*(0.077)*	*(0.073)*	*(0.009)*	*(0.024)*	*(0.024)*
Observations	434	481	251	281	463	281	281
R-squared	0.643	0.697	0.214	0.367	0.794	0.803	0.812
Number of country	25	26	26	26	26	26	26
F-stat first stage	119	116	36.9	51.4	106	56.0	54.7

Note: Pooled OLS with Driscoll-Kraay standard errors, sample 1970 to 2013 (or longest available). Dependent variables are indicated in the columns. Country fixed effects and time dummies are always included (and not shown for brevity). The excluded instrument is one lag of the fiscal consolidation dummy. See Table 1 for the definition of the variables.

When controlling for crisis episodes we find that banking and debt crises dummies are insignificant for all public opinion variables once including the macro controls (notably real GDP and unemployment) except trust in the ECB for high debt countries. It also eliminates the effect of the programme country dummy. However, this result is not very informative since this estimation ends in 2010 and there are not enough observations for programme countries.

Unlike in the previous estimation (Table 6a), we also find that the negative effect of revenue-based consolidations becomes statistically insignificant, while trust in the national government becomes positive and significant in a euro area country, and less significant (but still positive) for the attitude towards Europe.

Finally, we asses whether the current crisis is the main driver of our results and re-run our regression only for pre-crisis years (Table 6c). The main changes are that we now observe a negative impact of fiscal consolidations that take place in a euro area country on life satisfaction and a positive effect on a pro-European attitude if consolidation takes place in a high debt country.

5 Conclusion

In this paper we have looked at the impact of fiscal austerity (based on measures of fiscal stance and fiscal consolidation episodes) on several dimensions of public opinion, in particular (i) life satisfaction and confidence, (ii) trust in national institutions, (iii) trust in Europe and European institutions. In our view this is an important field of investigation that goes beyond the effect that public opinion has on voter behaviour and hence the probability of incumbent governments to be re-elected into office and the impact of consolidations on that probability. Because we include macro controls in the estimation, we are not measuring the effect that goes through the effect of fiscal austerity measures on the business cycle (a question on which this paper has little to contribute), but rather any remaining effect that goes beyond it.

Our main result is that fiscal austerity measures are mostly insignificant for the public opinion variables that we consider when we include macroeconomic controls. At the same time, there are a few exceptions. In particular, we find that fiscal consolidation episodes have a negative (but small) effect on trust in the national parliament and in the European Commission, and a slight worsening of attitude towards Europe.

Our measure of the fiscal stance, the Cyclically Adjusted Balance (CAB) has mostly an insignificant effect, but whenever it is significant it is almost always positive. In other words, we find no evidence that the level of a government's fiscal stance is associated with lower confidence, less life satisfaction, or lower trust in that government or any of the other institutions considered in our analysis.

As a side result, it is also interesting that being in a programme country independently reduces confidence, life satisfaction (though often not statistically significantly so) and trust in European institutions as well as pro-Europe attitude. The coefficient on the programme country dummy is, however, *positive* for trust in national institutions, suggesting some form of rallying around the flag behaviour. Being a euro area country is found to be negative for most public opinion variables, in particular trust in national institutions. Finally, a high public debt to GDP is found to reduce trust in European institutions and attitude towards Europe.

Our analysis is a first step and it can be extended in several dimensions. Once time series are long enough, it would be interesting to follow-up on the "programme country effect" and test whether there is a different perception of consolidations that take place under an EU-IMF programme. Is trust in European institutions more affected if consolidation might be perceived to be "forced" upon a country? If so, this may have important policy implications. Future research

Table 6a

Estimates with OLS, Effect of Fiscal Consolidation Episodes on Public Opinion; Including Interaction Terms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Life Satisfaction	**Confidence**	**Trust Nat. Gov.**	**Trust Nat. Parl.**	**EU Good**	**Trust ECB**	**Trust Comm.**
Lagged dependent variable	0.530***	0.488***	0.304	0.463**	0.729***	0.509***	0.569***
	(0.061)	*(0.050)*	*(0.187)*	*(0.186)*	*(0.030)*	*(0.069)*	*(0.047)*
Fiscal consolidation	0.046*	0.045	–0.014	0.009	–0.047***	0.019	–0.005
	(0.026)	*(0.089)*	*(0.034)*	*(0.055)*	*(0.010)*	*(0.015)*	*(0.013)*
Fiscal consolidation*High debt country	–0.002	–0.104	–0.031	0.060	0.026	–0.097**	–0.068**
	(0.062)	*(0.090)*	*(0.037)*	*(0.090)*	*(0.019)*	*(0.043)*	*(0.031)*
Fiscal consolidation*Euro area country	–0.085	–0.038	0.020	–0.174	0.025***	–0.003	0.000
	(0.051)	*(0.064)*	*(0.028)*	*(0.135)*	*(0.009)*	*(0.012)*	*(0.013)*
Fiscal consolidation*Real GDP growth	0.003	0.001	0.009**	0.005	0.003	–0.000	–0.001
	(0.006)	*(0.019)*	*(0.004)*	*(0.003)*	*(0.002)*	*(0.002)*	*(0.001)*
Revenue–based fiscal consolidation	–0.024	–0.123**	–0.060**	–0.041	0.014**	–0.013	–0.018
	(0.025)	*(0.046)*	*(0.021)*	*(0.037)*	*(0.006)*	*(0.010)*	*(0.018)*
High debt country	–0.018	–0.117	0.041	0.044	–0.005	0.054**	0.063**
	(0.046)	*(0.086)*	*(0.055)*	*(0.052)*	*(0.019)*	*(0.019)*	*(0.028)*
Real GDP growth	0.011*	0.071***	0.006	0.013**	0.004***	0.003*	0.003
	(0.006)	*(0.009)*	*(0.005)*	*(0.006)*	*(0.001)*	*(0.002)*	*(0.002)*
Unemployment rate	–0.019***	–0.030***	–0.024***	–0.014**	0.001	–0.001	–0.002
	(0.005)	*(0.007)*	*(0.006)*	*(0.006)*	*(0.001)*	*(0.003)*	*(0.003)*
CPI inflation	0.001	–0.021***	–0.001	–0.005	–0.001	–0.003	–0.002
	(0.009)	*(0.007)*	*(0.011)*	*(0.007)*	*(0.001)*	*(0.003)*	*(0.003)*
Program country	–0.115	–0.534***	0.073	0.046	–0.074***	–0.085***	–0.142***
	(0.092)	*(0.150)*	*(0.049)*	*(0.070)*	*(0.011)*	*(0.028)*	*(0.033)*
Euro area country	–0.038	–0.121	–0.203***	–0.109**	–0.043***	–0.028	–0.071***
	(0.044)	*(0.077)*	*(0.044)*	*(0.048)*	*(0.014)*	*(0.019)*	*(0.016)*
Public debt to GDP (std.), t–1	–0.021	0.014	–0.029	–0.108	–0.031***	–0.097***	–0.052***
	(0.023)	*(0.039)*	*(0.031)*	*(0.068)*	*(0.010)*	*(0.022)*	*(0.015)*
Observations	441	488	251	281	470	281	281
Number of countries	25	26	26	26	26	26	26

Note: Pooled OLS with Driscoll-Kraay standard errors, sample 1970 to 2013 (or longest available). Dependent variables are indicated in the columns. Country fixed effects and time dummies are always included (and not shown for brevity). See Table 1 for the definition of the variables.

Table 6b

Estimates with OLS, Effect of Fiscal Consolidation Episodes on Public Opinion; Including Interaction Terms and Controlling for Banking and Debt Crises

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Life Satisfaction	**Confidence**	**Trust Nat. Gov.**	**Trust Nat. Parl.**	**EU Good**	**Trust ECB**	**Trust Comm.**
Lagged Dependent Variable	0.471***	0.485***	0.370	0.509	0.724***	0.434***	0.537***
	(0.083)	*(0.059)*	*(0.329)*	*(0.293)*	*(0.034)*	*(0.102)*	*(0.111)*
Fiscal consolidation	0.028	0.003	–0.096**	–0.012	–0.049***	0.012	–0.027
	(0.021)	*(0.087)*	*(0.030)*	*(0.117)*	*(0.012)*	*(0.025)*	*(0.020)*
Fiscal consolidation*High debt country	–0.066	–0.102	–0.040	0.143	0.015	–0.060	0.005
	(0.062)	*(0.120)*	*(0.129)*	*(0.184)*	*(0.023)*	*(0.056)*	*(0.044)*
Fiscal consolidation*Euro area country	–0.118*	–0.032	0.078**	–0.207	0.023*	0.004	0.011
	(0.062)	*(0.112)*	*(0.032)*	*(0.191)*	*(0.012)*	*(0.018)*	*(0.012)*
Fiscal consolidation*Real GDP growth	0.006	–0.003	0.013	0.010	0.003	–0.002	–0.002
	(0.005)	*(0.020)*	*(0.008)*	*(0.006)*	*(0.002)*	*(0.003)*	*(0.002)*
Revenue–based fiscal consolidation	–0.012	–0.084	–0.042	–0.044	0.017**	–0.006	–0.000
	(0.022)	*(0.050)*	*(0.039)*	*(0.089)*	*(0.008)*	*(0.017)*	*(0.027)*
High debt country	0.014	–0.104	–0.006	0.075	0.002	0.065**	0.016
	(0.087)	*(0.138)*	*(0.071)*	*(0.100)*	*(0.022)*	*(0.027)*	*(0.021)*
Real GDP growth	0.006	0.063***	–0.001	0.006	0.003***	0.003*	0.002
	(0.006)	*(0.010)*	*(0.003)*	*(0.006)*	*(0.001)*	*(0.002)*	*(0.002)*
Unemployment rate	–0.024***	–0.030**	–0.027**	–0.020**	0.002	0.001	–0.002
	(0.007)	*(0.012)*	*(0.009)*	*(0.007)*	*(0.001)*	*(0.002)*	*(0.002)*
CPI inflation	–0.001	–0.015	–0.004	–0.006	–0.002*	–0.003	–0.003
	(0.011)	*(0.011)*	*(0.014)*	*(0.008)*	*(0.001)*	*(0.003)*	*(0.004)*
Program country	–0.025	–1.051	0.071	–0.264	–0.007	0.067	–0.149
	(0.129)	*(0.660)*	*(0.321)*	*(0.463)*	*(0.043)*	*(0.082)*	*(0.113)*
Euro area country	–0.026	–0.133	–0.221**	–0.162**	–0.041**	–0.018	–0.084**
	(0.048)	*(0.088)*	*(0.090)*	*(0.070)*	*(0.016)*	*(0.019)*	*(0.028)*
Public debt to GDP (std.), t–1	–0.015	0.019	0.003	–0.126	–0.034**	–0.142***	–0.068**
	(0.027)	*(0.047)*	*(0.046)*	*(0.111)*	*(0.013)*	*(0.018)*	*(0.022)*
Banking crisis	0.035	–0.096	–0.081	–0.078	–0.003	0.003	–0.008
	(0.055)	*(0.074)*	*(0.053)*	*(0.062)*	*(0.015)*	*(0.011)*	*(0.017)*
Debt crisis	–0.261	1.346	–0.161	0.198	–0.067	–0.229*	–0.232
	(0.164)	*(0.803)*	*(0.414)*	*(0.586)*	*(0.055)*	*(0.109)*	*(0.132)*
Observations	357	399	186	214	407	214	214
Number of groups	23	24	24	24	24	24	24

Note: Pooled OLS with Driscoll-Kraay standard errors, sample 1970 to 2013 (or longest available). Dependent variables are indicated in the columns. Country fixed effects, time dummies and one lag of the endogenous variable are always included (and not shown for brevity). See Table 1 for the definition of the variables.

Table 6c

Estimates with OLS, Effect of Fiscal Consolidation Episodes on Public Opinion in Non-crisis Times; Including Interaction Terms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Life Satisfaction	**Confidence**	**Trust Nat. Gov.**	**Trust Nat. Parl.**	**EU Good**	**Trust ECB**	**Trust Comm.**
Lagged Dependent Variable	0.398***	0.435***	0.137	0.322	0.705***	0.348*	0.436**
	(0.073)	*(0.059)*	*(0.268)*	*(0.195)*	*(0.042)*	*(0.152)*	*(0.169)*
Fiscal consolidation	0.025	–0.263*	–0.148	0.179	–0.072***	0.060	–0.013
	(0.045)	*(0.130)*	*(0.156)*	*(0.170)*	*(0.018)*	*(0.109)*	*(0.071)*
Fiscal consolidation*High debt country	0.056	0.051	0.000	0.000	0.042*	0.000	0.000
	(0.057)	*(0.126)*	*(0.000)*	*(0.000)*	*(0.021)*	*(0.000)*	*(0.000)*
Fiscal consolidation*Euro area country	–0.139***	0.056	0.063	–0.393*	0.035**	0.008	0.009
	(0.030)	*(0.128)*	*(0.068)*	*(0.190)*	*(0.015)*	*(0.053)*	*(0.041)*
Fiscal consolidation*Real GDP growth	–0.000	0.073***	0.005	0.029	0.008**	–0.024	–0.009
	(0.015)	*(0.020)*	*(0.056)*	*(0.037)*	*(0.003)*	*(0.019)*	*(0.012)*
Revenue–based fiscal consolidation	–0.015	–0.064	–0.013	–0.183	0.015	–0.010	0.010
	(0.046)	*(0.067)*	*(0.058)*	*(0.122)*	*(0.009)*	*(0.040)*	*(0.050)*
High debt country	–0.062	–0.034	–0.240	0.001	–0.016	0.011	–0.020
	(0.075)	*(0.161)*	*(0.125)*	*(0.106)*	*(0.022)*	*(0.033)*	*(0.025)*
Real GDP growth	0.017	0.091***	0.006	0.018	0.005*	0.015***	0.006***
	(0.012)	*(0.019)*	*(0.019)*	*(0.012)*	*(0.003)*	*(0.004)*	*(0.001)*
Unemployment rate	–0.020**	–0.038***	–0.029***	0.022	0.002	0.003	0.000
	(0.009)	*(0.012)*	*(0.005)*	*(0.014)*	*(0.002)*	*(0.004)*	*(0.004)*
CPI inflation	–0.015	–0.019	0.034	–0.018	–0.002	0.003	0.001
	(0.011)	*(0.013)*	*(0.062)*	*(0.035)*	*(0.001)*	*(0.006)*	*(0.005)*
Program country	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*
Euro area country	0.021	–0.115	–0.176*	–0.054	–0.037*	–0.030	–0.107*
	(0.039)	*(0.100)*	*(0.074)*	*(0.094)*	*(0.019)*	*(0.042)*	*(0.053)*
Public debt to GDP (std.), t–1	–0.040	–0.051	0.058	–0.263***	–0.030*	–0.141***	–0.063*
	(0.029)	*(0.076)*	*(0.059)*	*(0.035)*	*(0.016)*	*(0.016)*	*(0.027)*
Observations	317	360	123	153	366	153	153
Number of groups	25	26	26	26	26	26	26

Note: Pooled OLS with Driscoll-Kraay standard errors, sample 1970 to 2013 (or longest available). Dependent variables are indicated in the columns. Country fixed effects and time dummies are always included (and not shown for brevity). See Table 1 for the definition of the variables.

should thus focus on whether fiscal adjustments spur less public upheaval if they are embedded in an appropriate narrative. That is, a sophisticated communication policy may achieve that the public better understands both the necessity and the medium to long term benefits of fiscal consolidations and thus better copes with such adjustments.

Another potentially useful extension would be to factor in the effect of asset prices, in particular house prices that are correlated both with consumer confidence and with a government's fiscal stance. Dealing with heterogeneity and going beyond country aggregates is another obvious direction, which the Eurobarometer data allow. For example, one could divide the population in each country in interesting subgroups (say, employed and not employed) and check if these characteristics are relevant conduits of the effect of fiscal austerity on public opinion.

The design of our study aims at capturing differences in public opinion that may be attributable to a government's fiscal stance or episodes of fiscal consolidation. This is different from directly investigating citizen's reactions to certain fiscal consolidation episodes. Such a qualitative analysis of fiscal consolidation episodes would lend itself to expand on our findings. For instance, future research could take into consideration attributes of certain consolidation policies, such as their perceived fairness, which might impact the degree of discontent with or support for these policies.

This paper intended to give a first flavour of potential impacts of austerity on public opinion. In light of the issues raised above, there is still ample space for future research on this topic.

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COMMENT TO "DOES FISCAL AUSTERITY AFFECT PUBLIC OPINION?" BY ANNA KALBHENN AND LIVIO STRACCA

Luiz de Mello[*]

1 Introduction

Public opinion attitudes towards changes in fiscal policy play an important role in the success of fiscal consolidation programmes. Concern among households and businesses about the adverse effects of fiscal austerity on activity tends to create negative confidence effects that weigh on the recovery over and above conventional Keynesian channels. These effects can nevertheless be offset, at least in part, by a confidence boost brought about by a commitment – followed by concrete action – by policymakers to redress fiscal imbalances that are deemed unsustainable. Motivated by the large medium-term budgetary consolidation needs of most advanced economies after the global crisis, a large literature has indeed emerged on the effects of fiscal policy on activity, including on the role played by confidence.[1]

The paper by Anna Kalbhenn and Livio Stracca contributes to this literature by providing evidence on the causal links that may exist between fiscal consolidation, measured by outcome indicators such as the headline and cyclically adjusted budget balances, as well as the composition of adjustment between revenue and expenditure, and various public opinion indicators, including metrics for life satisfaction, consumer confidence and trust in national and European institutions. The authors focus on the experience of European countries during 1973-2013 and find that fiscal outcomes are in general poor predictors of public opinion, conditional on a standard set of controls. Somewhat stronger results are reported for attitudes regarding membership to the European Union and towards European institutions (Commission and ECB), although the sign and magnitude of the parameter estimates are not robust across model specifications.

2 Fiscal policy and public opinion: options for further work

Rather than dismissing the existence of public opinion effects of fiscal policy moves, the empirical literature would benefit from additional analysis on the possible reasons why the estimating strategy pursued by the authors may have failed to uncover stronger statistical linkages. Indeed, the charts presented in the paper show a clear uptick in the public opinion indicators after episodes of consolidation.

For example, could important information be lost in the data aggregation? While the macro variables are controlled for, attitudes vary considerably among individuals and households, whose characteristics are not taken into account in the analysis based on aggregate data. To be sure, it would be useful in future research to complement the analysis by evidence based on individual or household-level data.

It is also possible that failure to find a statistically significant effect of austerity on life satisfaction, consumer confidence and public opinion trust in institutions is due to reverse causality. The identification strategy pursued by the authors is based on the use of internal instruments, but

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[1] See de Mello, L. (2013), "What Can Fiscal Policy Do in the Current Recession? A Review of Recent Literature and Policy Options", *Hacienda Pública Española (Review of Public Economics)*, Vol. 204, pp. 113-39, for a recent review of the empirical evidence.

the lag structure of the relevant responses may be more complex than that envisaged by the authors. For example, are the results robust to a longer lag structure? Thus, it would be useful to gauge the validity of the instruments based on more complex lag distributions. Also, the complexity of the interrelations between fiscal policy moves and agent reactions requires additional work on the identification strategies and estimators that could be used to deal with reverse causality.

Another consideration is whether or not the indicators of fiscal austerity used in the empirical analysis are the most appropriate for gauging public opinion effects. It can be argued that *ex post* measures of budget outturns do not capture *ex ante* effects, which may be more relevant when assessing the impact of policies on perceptions and attitudes to policy more generally. In this regard, alternative metrics, such as fiscal shocks or policy announcements, could be experimented in future research.

Finally, the literature would benefit from further analysis on the choice of estimator and control variables to be included in the estimating equations. The presence of a truncated dependent variable would call for experimenting with probit, for example. As for additional controls, trust in institutions is known to depend on political attitudes of the electorate, which could be captured by indicators of the political orientation of governments. As mentioned above, the use of disaggregated data would allow for controlling for personal and household characteristics that are known to affect people's attitude to policy.

3 Conclusions

Evidence on the effects of policy on the public opinion is particularly important in the current juncture, when governments are struggling to regain the confidence of citizens in their ability to address the challenges posed by the global crisis. Fiscal policy is a case in point. However, whether initiatives to restore the sustainability of the public finances enhance or thwart confidence in government and institutions is a complex empirical question that will need to continue to be addressed in future research. To this end, a number of promising areas emerge, including not least the need to deal with agent heterogeneity, which calls for further analysis based on disaggregated data, as well as for more robust identification strategies to address reverse causality, which goes beyond the use of internal instruments. Further work in this area will contribute to the literature that has been motivated by the crisis on the effectiveness of fiscal policy as a demand management tool and the role of confidence effects when assessing empirically the potency of fiscal multipliers.

WHEN DOES IT PAY TO TAX? EVIDENCE FROM STATE-DEPENDENT FISCAL MULTIPLIERS IN THE EURO AREA

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The impact of fiscal policy on economic growth is investigated within a panel of euro area member states over the period 2004-2011. We mainly consider fiscal impulses identified by (a) changes in the structural primary balance, complemented by evidence from (b) the IMF narrative shocks developed by Devries *et al.* (2011) and (c) a VAR-based measure of unanticipated policy announcements. Aggregate fiscal multipliers are estimated in the region of 0.5, although we find considerable variation depending on the fiscal mix, the degree of openness and the state of the economy. During episodes of recession, tax hikes become significantly more costly in terms of output than expenditure cuts. This appears to be related to increases in the share of hand-to-mouth consumers, proxied by the unemployment rate. Fiscal effects are generally more muted in open economies and during periods of positive growth. Country-specific features in Greece lead to significantly higher estimates, possibly in excess of unity in 2011, reflecting predominantly sizeable revenue effects.

1 Introduction

The long-standing debate regarding the effects of fiscal policy on economic activity has produced a voluminous body of empirical evidence. At the risk of over-simplifying, analyses can be grouped into two broad categories, depending on whether fiscal shocks are (a) generated endogenously, or (b) determined exogenously.

Studies in the first category involve the estimation of dynamic systems, in which policy shocks are identified through various forms of restrictions on the model's dynamics. Recent T-VAR studies (Baum and Koester 2011; Auerbach and Gorodnichenko 2012; Batini *et al.* 2012; Baum *et al.* 2012; Hernandez de Cos and Moral-Benito 2013) allow for threshold non-linearities in the fiscal effect and typically find that spending multipliers increase significantly during periods of economic slack. However, despite introducing parameter flexibility, T-VAR analyses typically rely on the identification scheme proposed by Blanchard and Perotti (2002), which requires an exogenous estimate of the tax elasticity.[1] A more fundamental criticism is that in the presence of "fiscal foresight" the MA representation of the VAR is not invertible and the fiscal shocks are not identified.[2]

Studies falling under the second category use direct observations on fiscal shocks obtained either through conventional cyclical adjustment, or via the narrative approach. The appeal in this approach lies in that it addresses the "fiscal foresight" critique. However, valid fiscal shocks which are uncontaminated by other fluctuations are difficult to come by and conventional cyclical

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We are most grateful for very helpful comments to participants at the 18th International Conference on Macroeconomic Analysis and International Finance in Rethymno, May 2014 and the 16th Banca d'Italia Workshop on Public Finance in Perugia, April 2014.

The views expressed are those of the authors and do not necessarily reflect those of the Bank of Greece.

[1] Auerbach and Gorodnichenko note that tax elasticities may vary over the cycle and report revenue multipliers to be very sensitive to the assumed elasticity.

[2] See, for example, Favero and Giavazzi (2012).

adjustment is well documented to be far from perfect.[3] Narrative measures, on the other hand, offer an increasingly popular alternative. Recent studies employing narrative fiscal shocks report sizeable revenue multipliers, typically in excess of unity, (Romer and Romer 2010; Mertens and Ravn 2012; Perotti 2012; Cloyne 2013),[4] while the effects on public spending tend to be comparatively modest (Ramey and Shapiro 1998; Ramey 2011).[5] Parameters, however, are typically assumed to be time-invariant.[6]

The purpose of the paper is to estimate the effect of fiscal policy on economic activity combining elements from the two approaches. Hence we consider fiscal impulses identified by (a) changes in the structural primary balance, complemented by evidence from (b) the IMF narrative shocks developed by Devries *et al.* (2011) and (c) a VAR-based measure of unanticipated policy announcements. We employ direct observations on fiscal shocks to provide estimates of state-dependent fiscal multipliers for the euro area, with explicit references to the case of Greece. We simultaneously consider multiple sources of non-linearity, allowing fiscal effects to differ according to exogenously determined states for the degree of openness, the state of the economy and the policy mix.

Apart from a generic interest in the euro area, looking at a currency union has one important practical advantage. As noted, for example, in Guajardo *et al.* (2011) differences in the estimated effects of taxation and government spending could arise due to the conduct of monetary policy. While this may be a valid criticism when monetary policy is set at the national level, in the context of a currency union monetary policy can be convincingly argued not to respond systematically to any individual country's fiscal policy.

Focusing on the euro area, however, also comes at a cost, as it does not allow us to carry out our main analysis using narrative shocks.[7] Instead, we use the measure of the structural primary balance, providing an informal indication on possible bias using the available narrative shocks. Also, our approach rids us from the curse of dimensionality of VAR analyses, allowing us to include a non-trivial set of control variables.

The rest of the paper is organized as follows: Section 2 presents the main findings, building up from a baseline specification. Section 3 reports robustness checks for panel dimensions and provides an informal comparison with alternative measures of fiscal impulses, generated using the IMF narrative data set. Section 4 concludes.

2 Methodology and empirical results

2.1 Baseline specification

We estimate the following baseline specification:

$$Y_{it} = \mu_i + \lambda_t + \delta Y_{i,t-1} + \alpha F_{it} + \boldsymbol{\beta}' \boldsymbol{X}_{it} + \varepsilon_{it} \quad (1)$$

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[3] See Guajardo *et al.* (2011).

[4] Less sizeable revenue effects have been reported for the US by Favero and Giavazzi (2012), although their analysis is challenged by Perotti (2012).

[5] Guajardo *et al.* (2011) present very similar evidence using narrative panel data on both revenue and spending for 17 OECD member states.

[6] Owyang *et al.* (2013) have recently introduced threshold effects in an analysis of narrative spending shocks for the US and Canada. They allow the spending multiplier to differ according to a single, exogenously determined threshold in unemployment, finding mixed evidence.

[7] The single available data source on euro area countries in Devries *et al.* (2011) unfortunately covers only 10 member states (Austria, Belgium, Spain, Finland, Germany, France, Ireland, Italy, Netherlands and Portugal).

where Y_{it} is the real GDP growth rate observed for country $i = 1, 2, \dots, M$ during period $t = 1, 2, \dots, T$, μ_i and λ_t are country and period-specific effects, respectively, F_{it} is the fiscal impulse with impact multiplier α, $\mathbf{X}_{it}$ is a k-vector of non-fiscal regressors with constant loadings $\boldsymbol{\beta} = [\beta_1, \beta_2, \dots, \beta_k]'$, and ε_{it} is a zero-mean error term.

We define the fiscal impulse F_{it} as the annual change in the structural primary balance. We include in $\mathbf{X}_{it}$ the following core variables: (i) economic sentiment growth, (ii) Δ(unemployment rate), (iii) current period and first lag of real credit growth, (iv) trade balance growth rate and (v) Δ(private investment).[8]

Accounting for endogeneity and the lagged dependent variable, equation (1) is estimated with GMM. We apply first-differences in the tradition of Arellano and Bond (1991), hereafter GMM_1, as well as the forward orthogonal deviations proposed by Arellano and Bover (1995), hereafter GMM_2. In both cases, we employ the two-step estimator using White diagonal weighting matrices.[9] White-period robust standard errors are reported throughout.[10]

Estimates of (1) are reported in Table 1 under column I for both GMM_1 and GMM_2. All coefficients are found to be significant and are signed in line with our priors. Both estimators return identical values for α = –0.34. However, this estimate does not take account of possible non-linearities arising from the degree of trade openness or the state of the economy, nor does it account for the effect of the policy mix.

2.2 Non-linear fiscal multipliers

We proceed by introducing non-linearity in the fiscal multiplier, allowing for state-dependent estimates. In particular, we reformulate (1) as:

$$Y_{it} = \mu_i + \lambda_t + \delta Y_{i,t-1} + \alpha F_{it} + \boldsymbol{\beta}' \boldsymbol{X}_{it} + \sum_{j=0}^{p} \gamma_j F_{it} D_{it}^{j} + \varepsilon_{it} \quad (2)$$

where D_{it}^{j} is a binary variable taking values of either zero or unity, defining an exogenously determined state j. The γ_j's capture the marginal effect of state j on the fiscal multiplier α, so that when $D_{it}^{j} = 1$ the fiscal multiplier is given by the sum $(\alpha + \gamma_j)$.

We expand the baseline $\mathbf{X}_{it}$ to include (vi) debt growth relative to Germany and (vii) Δ(coordinated_consolidation) and define the following indicator dummies: $D_{it}^{0} = spending\_based$, denoting expenditure share of at least ¾ in the fiscal mix; $D_{it}^{1} = open\_economy$, denoting GDP share of exports plus imports above the EA average; $D_{it}^{2} = recession$, denoting negative real GDP growth. We additionally allow the fiscal multiplier in Greece to be influenced by country-specific factors beyond those captured by trade openness, the fiscal mix and the incidence of recession, by defining the self-explanatory indicator dummies $D_{it}^{3} = Greece$ and $D_{it}^{4} = Greece\ in\ 2011$.

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[8] Definitions and sources of all variables are provided in the data appendix. All data are collected for EA17 members, namely: Austria, Belgium, Cyprus, Germany, Estonia, Spain, Finland, France, Greece, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal, Slovenia and Slovakia.

[9] System GMM is another popular alternative, provided that changes in instrumenting variables are not correlated with fixed effects, e.g. Roodman (2009a). The presence of sizeable output gaps in EA17 during 2004-2011 indicates persistent deviations from steady-state, suggesting that the system GMM assumption is likely to be violated in the period under investigation.

[10] The large number of instruments generated by the GMM estimators is likely to result in downward bias in standard errors, as well as to a weak test of instrument validity, e.g. Roodman (2009b). While the former does not affect the consistency of the estimated parameters, the latter is potentially hazardous. In all cases we report Sargan-test p-values for full instruments and collapsed third-lag instruments.

Table 1, columns II-VIII report the estimates for both estimators, GMM_1 and GMM_2. Relative debt growth and coordinated consolidation are each found to have distinct negative effects on growth, beyond those explained by the core variables. In addition, we find unambiguous support in favour of non-linear fiscal effects. We find fiscal multipliers to be more muted in open economies, during periods of positive growth and for spending-based fiscal impulses. Both estimators find evidence of significantly more negative fiscal effects in Greece, beyond those captured by D_{it}^0, D_{it}^1 and D_{it}^2. GMM_1 also reports a significant and sizeable increase in the fiscal multiplier in the year 2011, although GMM_2 finds no significant effect.

Figure 1 plots the state-dependent effects of a fiscal consolidation by 1 per cent of GDP, based on the estimates reported in Table 1, column VIII under GMM_1. The estimated multipliers are found to be rather muted, although there is considerable variation across different states. Values range from statistically insignificant non-Keynesian effects of less than 0.1, reported in the case of spending-based consolidation in open economies during periods of positive growth, to significant Keynesian effects around -0.5, in the case of non-spending based consolidations undertaken in closed economies during periods of recession. Idiosyncratic features in Greece lead to magnified fiscal effects by an estimated -0.2. Based on GMM_1, the multiplier in Greece exceeded unity in 2011.

2.3 Distinct revenue and expenditure shocks

The effect of the policy mix was captured in the context of (2) by means of the exogenously determined D_{it}^0. The definition of a spending-based fiscal impulse according to D_{it}^0, however, is arbitrary and estimates can be sensitive to different definitions. In this section we introduce distinct revenue and expenditure shocks, modifying equation (2) as

$$Y_{it} = \mu_i + \lambda_t + \delta Y_{i,t-1} + \boldsymbol{\beta}'\boldsymbol{X}_{it} + \alpha_s S_{it} + \alpha_{R,0} R_{i,t} + \alpha_{R,1} R_{i,t-1} + \\ + \sum_{j=1}^{p} \gamma_{s,j} S_{it} D_{it}^j + \sum_{j=1}^{p} \gamma_{R,j} R_{it} D_{it}^j + \varepsilon_{it} \quad (3)$$

where S_{it} and R_{it} denote spending and revenue shocks, respectively. The coefficients $\gamma_{s,j}$ and $\gamma_{R,j}$, j = 1, 2, 3 capture the effects of *open_economy*, *recession* and *Greece* on the impact multipliers of spending and revenue, respectively. Table 2 reports the estimates under GMM_1 and GMM_2 for S_{it} and R_{it} measured by the change in the ECB measures of structural primary expenditure and structural revenue, respectively. Figure 2 illustrates the effects of expenditure and revenue shocks of 1 per cent of GDP, based on the estimates reported in Table 2, column VII under GMM_1.

As in the case of the aggregate fiscal impulse, the use of distinct spending and revenue shocks verify that fiscal effects tend to be larger in closed economies and during episodes of recession. While spending and revenue effects do not display significant differences during periods of positive growth, the incidence of recession is found to predominantly affect the revenue multiplier, leading to significantly greater revenue effects. Overall, however, estimates remain modest, ranging from statistically insignificant non-Keynesian effects of less than 0.05 in the case of spending shocks in open economies, to significant Keynesian effects of about –0.7 in the case of revenue shocks in closed economies during recessions.

Both estimators verify our earlier finding that the fiscal multiplier in Greece is influenced by country-specific factors beyond those captured by trade openness and the incidence of recession. The use of distinct revenue and spending shocks reveals that the idiosyncratic features of Greece concern predominantly the revenue side, leading to a revenue multiplier of approximately –0.9 during recessions.

2.4 Investigating rising revenue multipliers during recessions

The episodes of recession in our sample cover significant increases in unemployment. Rising unemployment rates can be argued to increase the share of hand-to-mouth consumers, leading to higher marginal propensity to consume. This would tend to magnify the effects of revenue shocks affecting directly disposable income, such as income taxes.[11] Furthermore, a rising share of hand-to-mouth consumers may shift consumption preferences towards lower-taxed necessities, increasing the income sensitivity of consumption taxes.

To assess the extent to which our recession estimates are picking out the effects of rising shares of hand-to-mouth consumers, we re-estimate (3) including the indicator dummy D_{it}^{4}, which is defined here to pick out observations following episodes of sizeable increases in the unemployment rate, in excess of 1 percentage point. Table 3 summarizes the results. The introduction of unemployment effects renders the coefficients on the recession dummies insignificant, leaving the remaining estimates largely unaffected. In addition, the unemployment effects are found to be very sizeable and significant as regards the revenue multiplier, but seem to have no impact on expenditure. Both of these observations speak in favour of the interpretation given above that, in the sample under consideration, rising revenue multipliers during recessions are likely to reflect rising shares of hand-to-mouth consumers.[12]

Figure 3 illustrates the output response to fiscal shocks of 1 per cent of GDP, based on the estimates in Table 3, column II under GMM_1. Two observations are worth pointing out. First, the incidence of unemployment has a particularly strong magnifying impact on the revenue multiplier, while leaving the spending multiplier largely unaffected.[13] Second, trade openness is very forgiving when consolidating on the spending side, but it offers very little insulation against revenue shocks when unemployment is on the rise.

In the case of Greece, our estimates confirm a significantly more sizeable revenue multiplier, rising well above unity after severe unemployment episodes. The spending multiplier is considerably smaller, it is only marginally affected by the incidence of unemployment and, according to GMM_2, it is not significantly different from the euro-area estimate.

3 Robustness checks

3.1 Sensitivity to panel dimensions

Figure 4 illustrates the sensitivity of the state-dependent fiscal multipliers at $t = 3$ to the exclusion of individual cross-sections. The vertical axis measures the state-dependent multiplier with 1 and 2 standard error bands, while the horizontal axis indicates the excluded cross-section. Full-sample estimates are denoted by dashed lines and refer to Table 1, column VII under GMM_1. Certain point estimates appear to be sensitive to dropping individual cross-sections. For instance, excluding Estonia significantly reduces the revenue multiplier in closed economies during expansions, while the exclusion of the Netherlands increases significantly the revenue multiplier in

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[11] See Mankiw (2000). Using micro data from the Consumer Expenditure Survey, Johnson *et al.* (2006) and Parker *et al.* (2011) document a substantial response of household spending, particularly for liquidity-constrained households, to the temporary tax rebates of 2001 and 2008.

[12] Kaplan and Violante (2014) argue that high marginal propensities to consume need not be restricted to low-income groups, but may also apply to middle-class households, provided the latter have recently converted all of their liquid assets into housing. This could be of relevance, considering that in our sample the decline in economic activity and the rise in unemployment may coincide with the burst of housing bubbles.

[13] Evidence that unemployment does not significantly affect spending multipliers have recently been reported for the US by Owyang, Ramey and Zubairy (2013), using narrative fiscal impulses over the past century.

open economies. Nevertheless, no single cross-section appears to be driving our overall findings, namely, that fiscal effects are smaller in open economies, on the spending side and during periods of positive growth.

Figure 5 illustrates the robustness of the estimated multipliers to shifting forward the estimation starting date from 2004 to 2005 and to 2006. In all cases, estimation ends in 2011. Differences in the estimated multipliers are clearly found to be statistically insignificant and incremental.

3.2 IMF narrative fiscal shocks

Cyclically-adjusted measures of fiscal policy are likely to bias the analysis towards downplaying the contractionary effects of discretionary fiscal consolidation, due to measurement error, reverse causality, or both. This is demonstrated, for example, in Guajardo *et al*. (2011), who compare multipliers obtained using the cyclically-adjusted primary balance (CAPB) with multipliers obtained from narrative fiscal shocks constructed in Devries *et al*. (2011). Although the structural primary balance used here is somewhat more refined than the CAPB, the critique of measurement error still holds. Reverse causality issues we expect to be less relevant, due to the employment of GMM.

Figure 6 (left column) reports the output responses based on the IMF narrative fiscal shocks. We use the same specification as Guajardo *et al*. (2011), applying GMM_1. The estimates provide merely a broad indication and are not directly comparable to our main results, as the IMF narrative fiscal shocks are not available for seven euro area members.[14] Error bands are very wide due to the reduced number of observations. Point estimates indicate a very strong revenue effect, cumulating to –1.21 within two years, which is remarkably close to the figure reported by Guajardo *et al*. (2011) (–1.29 at $t = 2$). We find the expenditure effect to be rather muted and largely insignificant after the second period. Based on this very crude comparison we infer that, while under-estimation is possible, it appears to concern mainly the revenue effect.

3.3 VAR-based fiscal innovations

Discretionary fiscal policy need not be orthogonal to information available to economic agents. This is obviously the case whenever policy makers make fiscal adjustments in response to cyclical conditions, which is the source of the reverse causality bias in the case of cyclically-adjusted measures of fiscal policy. The same concerns, however, may also apply to shocks identified through the narrative approach, for reasons outlined in Favero and Giavazzi (2012) and in Perotti (2012).

We obtain measures of unanticipated policy announcements by including the IMF narrative policy shocks directly in a panel VAR given by

$$\mathbf{Z}_{it} = \mu_i + \lambda_t + B(L)\mathbf{Z}_{i,t-1} + \varepsilon_{it} \tag{4}$$

where $\mathbf{Z}_{it}$ includes the following variables: Y_{it}, F_{it}, the narrative fiscal shocks, Δ(economic sentiment), Δ(unemployment rate), stock market growth and debt growth relative to Germany. The VAR in (4) is estimated for $B(L)$ of order 1 using OLS, allowing for country and period-specific effects μ_i and λ_t. We identify unanticipated fiscal innovations as the Generalized Impulses discussed in Garratt *et al*. (2012) in the equation of F_{it}.

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[14] Cyprus, Estonia, Greece, Luxembourg, Malta, Slovenia and Slovakia.

We estimate two versions of (4). The first uses the aggregate narrative fiscal shock F_{it}. In the second, F_{it} is replaced by the distinct narrative revenue and spending shocks, R_{it} and S_{it}, respectively. Figure 6 (middle column) plots the GDP responses to unitary Generalized Impulses in the equations for F_{it}, R_{it} and S_{it}. Similar to the single equation specification discussed above, the responses indicate a sizeable revenue effect in excess of unity and an insignificant spending effect. The equations of the narrative shocks do not involve significant coefficients on lagged output growth, which supports the validity of the narrative approach.

As an additional benchmark, we report multipliers obtained from the VAR in (4), replacing narrative fiscal shocks with Δ(structural primary balance). The resulting effects are plotted in Figure 6 (right column) and are in line with our overall findings. As expected, the responses appear more muted compared to those obtained using the narrative shocks, which is in line with the evidence reported in Guajardo *et al*. (2011).

4 Concluding remarks

Our analysis confirms that looking for the value of *the* fiscal multiplier is an elusive quest. Different fiscal instruments can have different effects under different conditions across different economies. During episodes of recession, we find that tax hikes become significantly more costly in terms of output than expenditure cuts. This appears to be related to increases in the share of hand-to-mouth consumers, proxied by the unemployment rate. Fiscal effects are generally more muted in open economies and during periods of positive growth. However, when unemployment is on the rise, trade openness offers very little insulation against revenue shocks.

The use of the structural primary balance is likely to be a source of bias. Based on the reported evidence from the narrative shocks, it appears less likely that we are underestimating the effects of expenditure shocks. The narrative evidence also confirms sizeable revenue effects, in line with the related literature and well above those of spending shocks.

As regards Greece, we find consistent evidence of a sizeable country-specific effect, which originates primarily on the revenue side. Unlike analyses of countries where monetary policy is set at the national level, the estimated difference between revenue and spending multipliers in Greece can safely be regarded not to reflect upon monetary policy. Likely sources include one or more of the following:

i) A particularly low degree of openness. Based on our measure of openness, Greece has systematically ranked among the three least open economies within the sample. However, the fact that the country-specific effect originates mainly from the revenue side suggests that it is more likely to reflect:
ii) The severity of the recent unemployment episodes, and/or
iii) Country-specific features of tax evasion, which tend to increase income inequality, shifting the tax burden to low-income groups with high marginal propensity to consume.[15]

As a final remark, it is important to point out that, just like the concept of *the* multiplier, is misleading, so is the dilemma between revenue and spending. As evidenced in DSGE studies, *the* revenue and *the* spending multipliers may conceal significant differences between individual revenue and expenditure instruments.[16] In answering the title question, our evidence suggests "not when unemployment is on the rise".

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[15] Pappa *et al.* (2014) illustrate that tax hikes become substantially more costly than spending cuts in the presence of tax-evasion and corruption, which is argued to be particularly relevant in the case Greece.

[16] See Coenen *et al.* (2012) and for the case of Greece, Philippopoulos *et al*. (2012) and Papageorgiou (2012).

Table 1

Model with Aggregate Fiscal Shock Measured by Δ(Structural Primary Balance)

Dependent variable: Real GDP growth rate									Sample: 2004-2011, Observations: 122, Cross-sections: 17							
Estimator	**GMM_1**								**GMM_2**							
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**
(Real GDP growth rate)$_{t-1}$	-0.26 *** *(0.03)*	-0.22 *** *(0.03)*	-0.23 *** *(0.02)*	-0.19 *** *(0.03)*	-0.21 *** *(0.02)*	-0.18 *** *(0.02)*	-0.08 *** *(0.02)*	-0.09 *** *(0.01)*	-0.04 *** *(0.02)*	0.01 *(0.02)*	-0.10 *** *(0.02)*	-0.02 *(0.02)*	0.04 *(0.03)*	-0.03 ** *(0.01)*	0.04 ** *(0.02)*	0.06 *** *(0.02)*
Δ(Structural Primary Balance)	-0.34 *** *(0.03)*	-0.31 *** *(0.05)*	-0.36 *** *(0.04)*	-0.49 *** *(0.04)*	-0.37 *** *(0.03)*	-0.13 *** *(0.03)*	-0.37 *** *(0.05)*	-0.35 *** *(0.04)*	-0.34 *** *(0.02)*	-0.28 *** *(0.03)*	-0.39 *** *(0.03)*	-0.44 *** *(0.03)*	-0.41 *** *(0.04)*	-0.15 *** *(0.02)*	-0.36 *** *(0.03)*	-0.33 *** *(0.02)*
Economic Sentiment growth rate	0.07 *** *(0.01)*	0.07 *** *(0.01)*	0.08 *** *(0.01)*	0.09 *** *(0.01)*	0.09 *** *(0.01)*	0.09 *** *(0.01)*	0.12 *** *(0.01)*	0.11 *** *(0.01)*	0.12 *** *(0.00)*	0.13 *** *(0.00)*	0.13 *** *(0.01)*	0.14 *** *(0.00)*	0.16 *** *(0.00)*	0.14 *** *(0.00)*	0.18 *** *(0.01)*	0.18 *** *(0.01)*
Δ(unemployment rate)	-0.51 *** *(0.11)*	-0.38 *** *(0.10)*	-0.41 *** *(0.14)*	-0.80 *** *(0.05)*	-0.52 *** *(0.07)*	-0.45 *** *(0.08)*	-0.41 *** *(0.11)*	-0.28 *** *(0.09)*	-0.71 *** *(0.04)*	-0.55 *** *(0.06)*	-0.71 *** *(0.05)*	-0.82 *** *(0.04)*	-0.67 *** *(0.04)*	-0.63 *** *(0.03)*	-0.59 *** *(0.04)*	-0.56 *** *(0.06)*
Real credit growth rate	0.07 *** *(0.01)*	0.06 *** *(0.01)*	0.06 *** *(0.01)*	0.07 *** *(0.01)*	0.06 *** *(0.01)*	0.07 *** *(0.01)*	0.05 *** *(0.01)*	0.07 *** *(0.01)*	0.05 *** *(0.01)*	0.04 *** *(0.01)*	0.06 *** *(0.01)*	0.07 *** *(0.01)*	0.05 *** *(0.01)*	0.07 *** *(0.01)*	0.06 *** *(0.00)*	0.06 *** *(0.01)*
(Real credit growth rate)$_{t-1}$	0.07 *** *(0.01)*	0.08 *** *(0.01)*	0.05 *** *(0.02)*	0.03 *** *(0.01)*	0.06 *** *(0.01)*	0.06 *** *(0.01)*	0.02 * *(0.01)*	0.03 *** *(0.01)*	0.05 *** *(0.01)*	0.05 *** *(0.01)*	0.04 *** *(0.01)*	0.04 *** *(0.00)*	0.05 *** *(0.00)*	0.04 *** *(0.01)*	0.03 *** *(0.00)*	0.03 *** *(0.01)*
Trade balance growth rate	0.07 *** *(0.01)*	0.06 *** *(0.01)*	0.06 *** *(0.01)*	0.03 ** *(0.02)*	0.04 *** *(0.01)*	0.06 *** *(0.01)*	0.05 *** *(0.01)*	0.05 *** *(0.01)*	0.03 ** *(0.01)*	0.03 *(0.02)*	0.03 *** *(0.01)*	0.03 *** *(0.01)*	0.05 *** *(0.02)*	0.03 *** *(0.01)*	0.03 *** *(0.01)*	0.03 *** *(0.01)*
Δ(private investment)	0.51 *** *(0.02)*	0.53 *** *(0.03)*	0.56 *** *(0.03)*	0.45 *** *(0.04)*	0.47 *** *(0.02)*	0.52 *** *(0.03)*	0.47 *** *(0.03)*	0.48 *** *(0.02)*	0.51 *** *(0.04)*	0.47 *** *(0.05)*	0.50 *** *(0.05)*	0.45 *** *(0.03)*	0.45 *** *(0.03)*	0.47 *** *(0.04)*	0.44 *** *(0.03)*	0.45 *** *(0.04)*
Relative debt growth rate		-0.02 *** *(0.00)*					-0.02 *** *(0.00)*	-0.02 *** *(0.00)*		-0.03 *** *(0.01)*					-0.02 *** *(0.00)*	-0.02 *** *(0.00)*
Δ(coordinated_consolidation)			-0.05 *** *(0.01)*				-0.03 *** *(0.00)*	-0.03 *** *(0.01)*			-0.04 *** *(0.01)*				-0.03 *** *(0.00)*	-0.03 *** *(0.01)*
Open_Economy*Δ(Structural Primary Balance)				0.44 *** *(0.05)*			0.35 *** *(0.08)*	0.27 *** *(0.06)*				0.43 *** *(0.06)*			0.30 *** *(0.03)*	0.28 *** *(0.04)*
Spending_based*Δ(Structural Primary Balance)					0.29 *** *(0.03)*		0.21 *** *(0.05)*	0.15 *** *(0.03)*					0.60 *** *(0.05)*		0.30 *** *(0.05)*	0.28 *** *(0.05)*
Recession*Δ(Structural Primary Balance)						-0.31 *** *(0.04)*	-0.17 *** *(0.06)*	-0.15 *** *(0.05)*						-0.29 *** *(0.03)*	-0.15 *** *(0.03)*	-0.18 *** *(0.03)*
Greece*Δ(Structural Primary Balance)								-0.21 *** *(0.04)*								-0.16 *** *(0.02)*
Greece*y2011*Δ(Structural Primary Balance)								-0.47 *** *(0.07)*								-0.02 *(0.09)*
Test Statistics																
Period dummies redundant (*p*-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sargan test (*p*-value)																
all instruments	0.28	0.21	0.36	0.37	0.43	0.19	0.40	0.56	0.30	0.34	0.42	0.29	0.33	0.41	0.46	0.36
collapsed instruments	0.23	0.32	0.13	0.23	0.37	0.40	0.46	0.44	0.29	0.32	0.22	0.26	0.22	0.42	0.33	0.24
Instrument rank																
all instruments	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105
collapsed instruments	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54

Notes: GMM_1 denotes Arellano Bond (first differences) 2-stage with White diagonal weights. GMM_2 denotes Arellano Bover (forward orthogonal deviations) 2-stage with White diagonal weights. Significance is indicated by "*", "**" and "***" at the 10 percent, 5 percent and 1 percent levels respectively. White period robust standard errors in brackets. "Coordinated_consolidation" is the percentage of euro area member states, other than country i, registering an improvement in their structural primary balance. "Open_economy" indicates GDP share of exports plus imports above the EA17 average. "Spending_based" denotes that the change in structural primary spending accounts for at least ¾ of the total change in the structural primary balance. "Recession" denotes real GDP growth < 0.

Table 2

Model with Distinct Spending and Revenue Shocks Measured by Δ(Structural Primary Spending) and Δ(Structural Revenue)

Dependent variable: Real GDP growth rate														Sample: 2004-2011, Observations: 122, Cross-sections: 17
Estimator	**GMM_1**							**GMM_2**						
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
(Real GDP growth rate)$_{t-1}$	-0.27 ***	-0.22 ***	-0.27 ***	-0.23 ***	-0.24 ***	-0.12 ***	-0.14 ***	-0.05 **	-0.00	-0.10 ***	-0.01	-0.03 ***	0.00	-0.01
	(0.01)	*(0.03)*	*(0.02)*	*(0.02)*	*(0.02)*	*(0.03)*	*(0.02)*	*(0.02)*	*(0.02)*	*(0.03)*	*(0.02)*	*(0.01)*	*(0.02)*	*(0.02)*
Δ(Structural Primary Spending)	0.33 ***	0.39 ***	0.35 ***	0.49 ***	0.23 ***	0.32 ***	0.29 ***	0.25 ***	0.23 ***	0.28 ***	0.46 ***	0.12 ***	0.36 ***	0.28 ***
	(0.07)	*(0.06)*	*(0.08)*	*(0.05)*	*(0.05)*	*(0.06)*	*(0.05)*	*(0.04)*	*(0.03)*	*(0.04)*	*(0.03)*	*(0.02)*	*(0.03)*	*(0.03)*
Δ(Structural Revenue)	-0.42 ***	-0.38 ***	-0.42 ***	-0.44 ***	-0.21 ***	-0.26 ***	-0.25 ***	-0.33 ***	-0.27 ***	-0.41 ***	-0.39 ***	-0.07 **	-0.23 ***	-0.17 ***
	(0.04)	*(0.04)*	*(0.05)*	*(0.06)*	*(0.05)*	*(0.05)*	*(0.03)*	*(0.04)*	*(0.02)*	*(0.04)*	*(0.04)*	*(0.03)*	*(0.03)*	*(0.03)*
Δ(Structural Revenue)$_{t-1}$	-0.33 ***	-0.28 ***	-0.33 ***	-0.28 ***	-0.26 ***	-0.19 ***	-0.17 ***	-0.16 ***	-0.17 ***	-0.18 ***	-0.10 **	-0.12 ***	-0.09 **	-0.10 **
	(0.03)	*(0.04)*	*(0.03)*	*(0.04)*	*(0.03)*	*(0.04)*	*(0.03)*	*(0.04)*	*(0.02)*	*(0.05)*	*(0.04)*	*(0.03)*	*(0.04)*	*(0.04)*
Economic Sentiment growth rate	0.08 ***	0.08 ***	0.09 ***	0.10 ***	0.10 ***	0.12 ***	0.12 ***	0.13 ***	0.13 ***	0.14 ***	0.15 ***	0.16 ***	0.17 ***	0.17 ***
	(0.01)	*(0.01)*	*(0.01)*	*(0.00)*	*(0.01)*	*(0.01)*	*(0.00)*	*(0.01)*	*(0.00)*	*(0.00)*	*(0.01)*	*(0.00)*	*(0.01)*	*(0.01)*
Δ(unemployment rate)	-0.59 ***	-0.46 ***	-0.55 ***	-0.61 ***	-0.50 ***	-0.39 ***	-0.37 ***	-0.75 ***	-0.64 ***	-0.77 ***	-0.84 ***	-0.60 ***	-0.59 ***	-0.60 ***
	(0.07)	*(0.05)*	*(0.07)*	*(0.07)*	*(0.07)*	*(0.07)*	*(0.05)*	*(0.07)*	*(0.05)*	*(0.11)*	*(0.08)*	*(0.05)*	*(0.04)*	*(0.05)*
Real credit growth rate	0.07 ***	0.05 ***	0.07 ***	0.07 ***	0.07 ***	0.05 ***	0.06 ***	0.05 ***	0.02 ***	0.05 ***	0.04 ***	0.05 ***	0.05 ***	0.04 ***
	(0.01)	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.00)*	*(0.00)*
(Real credit growth rate)$_{t-1}$	0.07 ***	0.08 ***	0.07 ***	0.04 ***	0.07 ***	0.03 ***	0.04 ***	0.06 ***	0.06 ***	0.05 ***	0.05 ***	0.05 ***	0.04 ***	0.04 ***
	(0.01)	*(0.01)*	*(0.02)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.00)*	*(0.01)*	*(0.01)*	*(0.00)*	*(0.00)*	*(0.01)*
Trade balance growth rate	0.05 ***	0.05 ***	0.05 ***	0.04 ***	0.05 ***	0.04 ***	0.04 ***	0.03 ***	0.03 ***	0.03 ***	0.04 ***	0.03 ***	0.03 ***	0.03 ***
	(0.01)	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.00)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*
Δ(private investment)	0.50 ***	0.55 ***	0.51 ***	0.50 ***	0.47 ***	0.51 ***	0.48 ***	0.49 ***	0.45 ***	0.48 ***	0.49 ***	0.47 ***	0.48 ***	0.47 ***
	(0.02)	*(0.03)*	*(0.03)*	*(0.02)*	*(0.03)*	*(0.04)*	*(0.02)*	*(0.06)*	*(0.03)*	*(0.05)*	*(0.02)*	*(0.04)*	*(0.02)*	*(0.03)*
Relative debt growth rate		-0.02 ***				-0.02 ***	-0.02 ***		-0.03 ***				-0.02 ***	-0.02 ***
		(0.00)				*(0.00)*	*(0.00)*		*(0.00)*				*(0.00)*	*(0.00)*
Δ(coordinated_consolidation)			-0.02 *			-0.01	-0.01 ***			-0.04 ***			-0.03 ***	-0.03 ***
			(0.01)			*(0.01)*	*(0.00)*			*(0.01)*			*(0.00)*	*(0.00)*
Open_Economy* Δ(Structural Primary Spending)				-0.37 ***		-0.42 ***	-0.33 ***				-0.49 ***		-0.43 ***	-0.32 ***
				(0.08)		*(0.08)*	*(0.05)*				*(0.06)*		*(0.04)*	*(0.04)*
Open_Economy* Δ(Structural Revenue)				0.28 ***		0.35 ***	0.29 ***				0.20 ***		0.25 ***	0.14 ***
				(0.07)		*(0.05)*	*(0.05)*				*(0.05)*		*(0.03)*	*(0.04)*
Recession*Δ(Structural Primary Spending)					0.07	0.15 ***	0.07					0.02	0.10 **	0.03
					(0.06)	*(0.04)*	*(0.06)*					*(0.04)*	*(0.05)*	*(0.04)*
Recession* Δ(Structural Revenue)					-0.51 ***	-0.35 ***	-0.40 ***					-0.83 ***	-0.46 ***	-0.42 ***
					(0.09)	*(0.08)*	*(0.06)*					*(0.05)*	*(0.12)*	*(0.12)*
Greece*Δ(Structural Primary Spending)							0.12 *							0.08
							(0.06)							*(0.05)*
Greece* Δ(Structural Revenue)							-0.26 ***							-0.38 ***
							(0.07)							*(0.07)*
Test Statistics														
Period dummies redundant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Δ(Structural Primary Spending)$_{t-1}$ redundant	0.70	0.03	0.10	0.05	0.07	0.08	0.59	0.66	0.11	0.05	0.41	0.06	0.26	0.90
Sargan test (p-value)														
all instruments	0.54	0.38	0.37	0.57	0.56	0.50	0.56	0.31	0.44	0.21	0.37	0.48	0.34	0.30
collapsed instruments	0.38	0.32	0.37	0.60	0.57	0.50	0.36	0.20	0.25	0.16	0.39	0.39	0.36	0.27
Instrument rank														
all instruments	114	114	113	114	114	114	114	114	114	114	114	114	114	114
collapsed instruments	55	55	55	55	55	55	55	55	55	55	55	55	55	55

Notes: GMM_1 denotes Arellano Bond (first differences) 2-stage with White diagonal weights. GMM_2 denotes Arellano Bover (forward orthogonal deviations) 2-stage with White diagonal weights. Significance is indicated by "*", "**" and "***" at the 10 percent, 5 percent and 1 percent levels respectively. White period robust standard errors in brackets. "Coordinated_consolidation" is the percentage of euro area member states, other than country i, registering an improvement in their structural primary balance. "Open_economy" indicates GDP share of exports plus imports above the EA17 average. "Recession" denotes real GDP growth < 0.

Table 3

Introducing Unemployment Effects in the Model with Distinct Spending and Revenue Shocks in Table 2

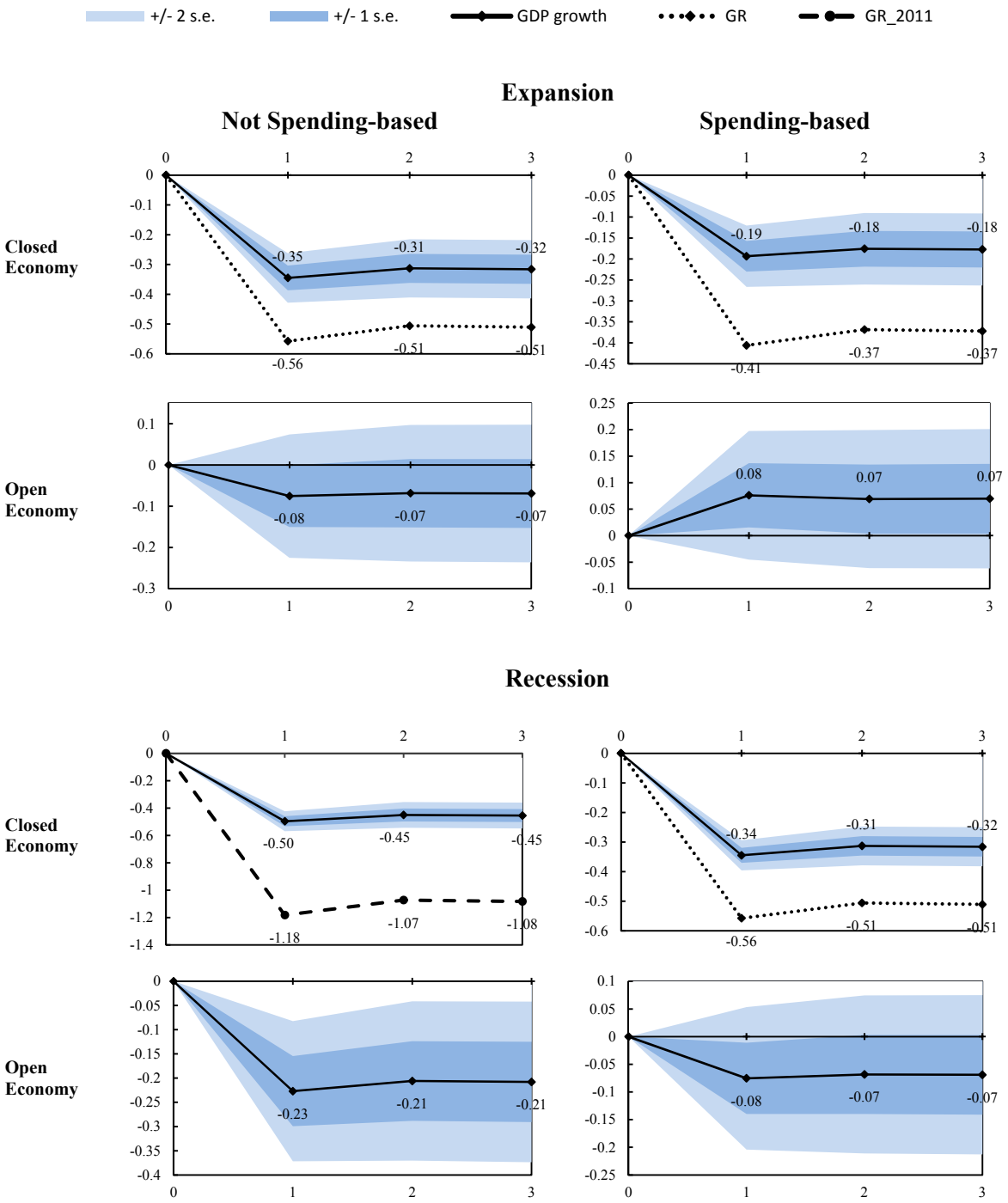
Dependent variable: Real GDP growth rate	Sample: 2004-2011, Observations: 122, Cross-sections: 17			
Estimator	GMM_1		GMM_2	
	I	II	I	II
(Real GDP growth rate)$_{t-1}$	–0.15 *** *(0.02)*	–0.15 *** *(0.02)*	–0.06 * *(0.03)*	–0.07 ** *(0.03)*
Δ(Structural Primary Spending)	0.27 *** *(0.04)*	0.26 *** *(0.03)*	0.26 *** *(0.04)*	0.29 *** *(0.05)*
Δ(Structural Revenue)	–0.29 *** *(0.03)*	–0.29 *** *(0.03)*	–0.18 *** *(0.02)*	–0.20 *** *(0.02)*
Δ(Structural Revenue)$_{t-1}$	–0.26 *** *(0.05)*	–0.25 *** *(0.03)*	–0.18 *** *(0.04)*	–0.20 *** *(0.03)*
Economic Sentiment growth rate	0.10 *** *(0.00)*	0.10 *** *(0.00)*	0.16 *** *(0.01)*	0.16 *** *(0.00)*
Δ(unemployment rate)	–0.53 *** *(0.09)*	–0.51 *** *(0.08)*	–0.75 *** *(0.07)*	–0.75 *** *(0.06)*
Real credit growth rate	0.06 *** *(0.01)*	0.06 *** *(0.01)*	0.05 *** *(0.01)*	0.05 *** *(0.01)*
(Real credit growth rate)$_{t-1}$	0.04 *** *(0.01)*	0.04 *** *(0.01)*	0.05 *** *(0.01)*	0.04 *** *(0.00)*
Trade balance growth rate	0.05 *** *(0.01)*	0.05 *** *(0.01)*	0.04 *** *(0.01)*	0.03 ** *(0.02)*
Δ(private investment)	0.49 *** *(0.03)*	0.50 *** *(0.02)*	0.48 *** *(0.04)*	0.48 *** *(0.03)*
Relative debt growth rate	–0.02 *** *(0.00)*	–0.02 *** *(0.00)*	–0.03 *** *(0.00)*	–0.03 *** *(0.01)*
Δ(coordinated_consolidation)	–0.03 *** *(0.01)*	–0.03 *** *(0.00)*	–0.02 *** *(0.01)*	–0.02 *** *(0.01)*
Open_Economy*Δ(Structural Primary Spending)	–0.15 ** *(0.06)*	–0.17 *** *(0.06)*	–0.32 *** *(0.06)*	–0.36 *** *(0.06)*
Open_Economy*Δ(Structural Revenue)	0.14 *(0.11)*	0.15 ** *(0.07)*	0.08 *(0.06)*	0.07 *(0.05)*
Recession*Δ(Structural Primary Spending)	–0.06 *(0.08)*		–0.03 *(0.04)*	
Recession*Δ(Structural Revenue)	0.01 *(0.14)*		–0.19 *(0.13)*	
Greece*Δ(Structural Primary Spending)	0.20 ** *(0.09)*	0.17 ** *(0.08)*	0.00 *(0.07)*	–0.02 *(0.06)*
Greece*Δ(Structural Revenue)	–0.40 *** *(0.08)*	–0.39 *** *(0.06)*	–0.43 *** *(0.08)*	–0.47 *** *(0.06)*
[Δ(Unemployment rate)$_{t-1}$ > 1]*Δ(Structural Primary Spending)	0.05 *(0.06)*	0.06 *(0.06)*	0.07 *(0.08)*	0.11 *(0.06)*
[Δ(Unemployment rate)$_{t-1}$ > 1]*Δ(Structural Revenue)	–0.75 *** *(0.17)*	–0.70 *** *(0.12)*	–0.64 *** *(0.13)*	–0.68 *** *(0.10)*
Test Statistics				
Period dummies redundant (p-value)	0.00	0.00	0.00	0.00
Δ(Structural Primary Spending)$_{t-1}$ redundant (p-value)	0.13	0.08	0.33	0.20
Recession coefficients redundant (p-value)	0.73		0.27	
Sargan test (p-value)				
all instruments	0.58	0.62	0.26	0.35
collapsed instruments	0.36	0.31	0.34	0.44
Instrument rank				
all instruments	114	114	114	113
collapsed instruments	55	55	55	55

Notes: GMM_1 denotes Arellano Bond (first differences) 2-stage with White diagonal weights. GMM_2 denotes Arellano Bover (forward orthogonal deviations) 2-stage with White diagonal weights. Significance is indicated by "*", "**" and "***" at the 10 percent, 5 percent and 1 percent levels respectively. White period robust standard errors in brackets. "Coordinated_consolidation" is the percentage of euro area member states, other than country *i*, registering an improvement in their structural primary balance. "Open_economy" indicates GDP share of exports plus imports above the EA17 average.

Figure 1

Cumulative Response of Real GDP Growth to a 1 pp Improvement in the Structural Primary Balance

(estimated in Table 1, GMM_1, column VIII)

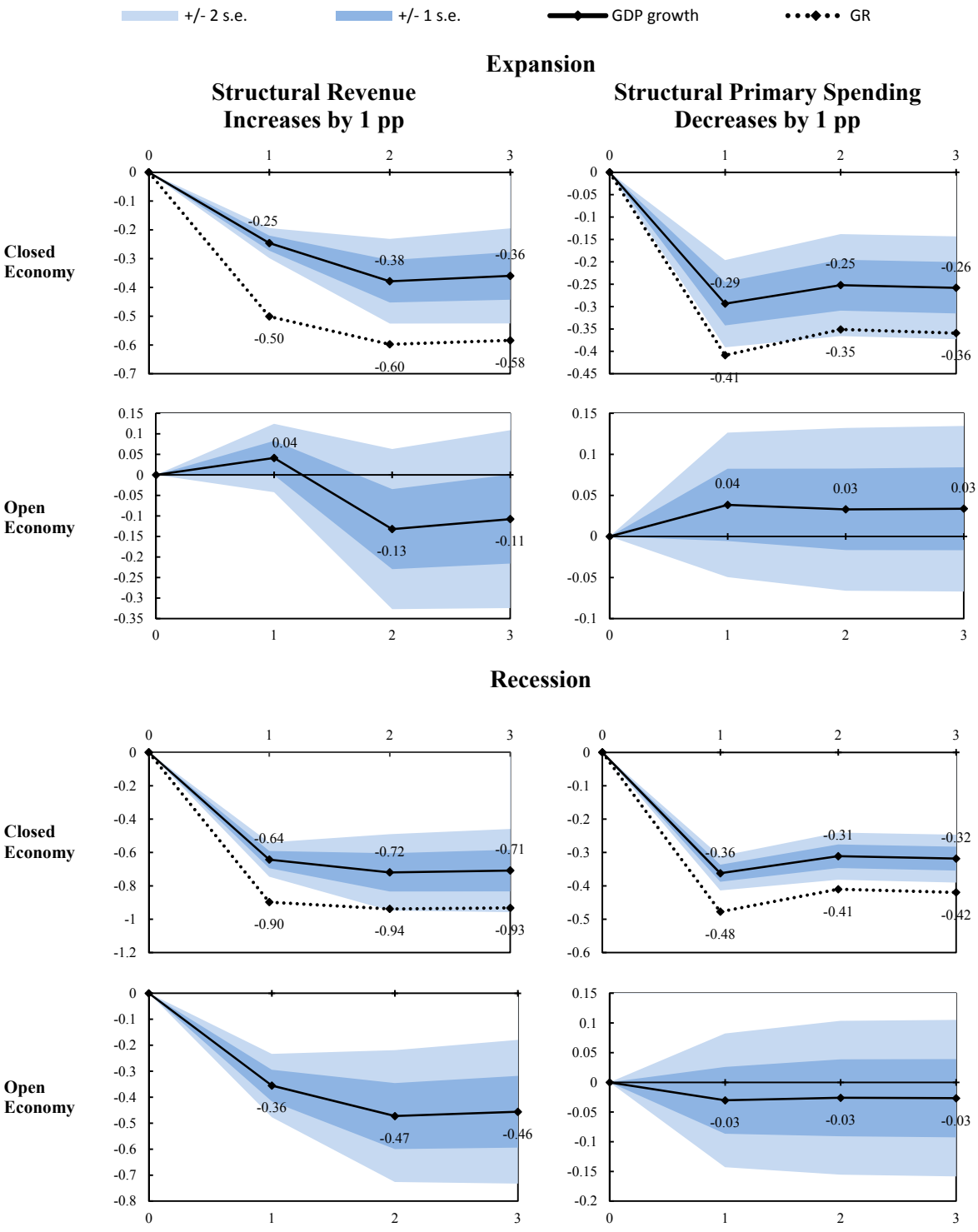


Notes: Open economy if the GDP share of exports plus imports exceeds the euro area average. Spending-based if the change in structural primary spending accounts for at least ¾ of the total change in the structural primary balance. Recession when real GDP growth < 0.

Figure 2

Cumulative Response of Real GDP Growth to a 1 pp Shock in Structural Primary Spending/Revenue

(estimated in Table 2, GMM_1, column VII)

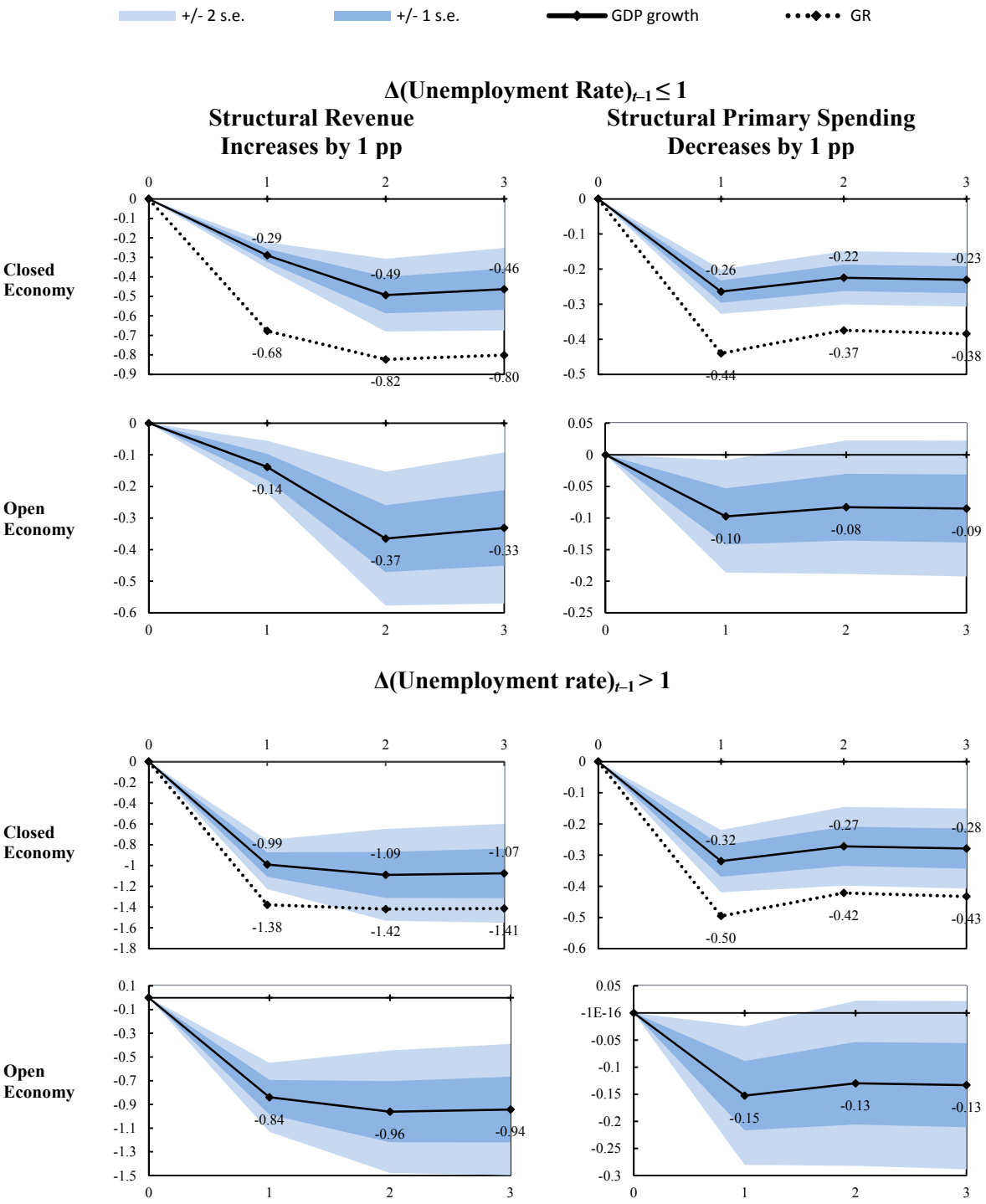


Notes: Open economy if the GDP share of exports plus imports exceeds the euro area average. Recession when real GDP growth < 0.

Figure 3

Cumulative response of real GDP growth to a 1 pp shock in Structural Primary Spending/Revenue

Estimated in Table 3, GMM_1, column II

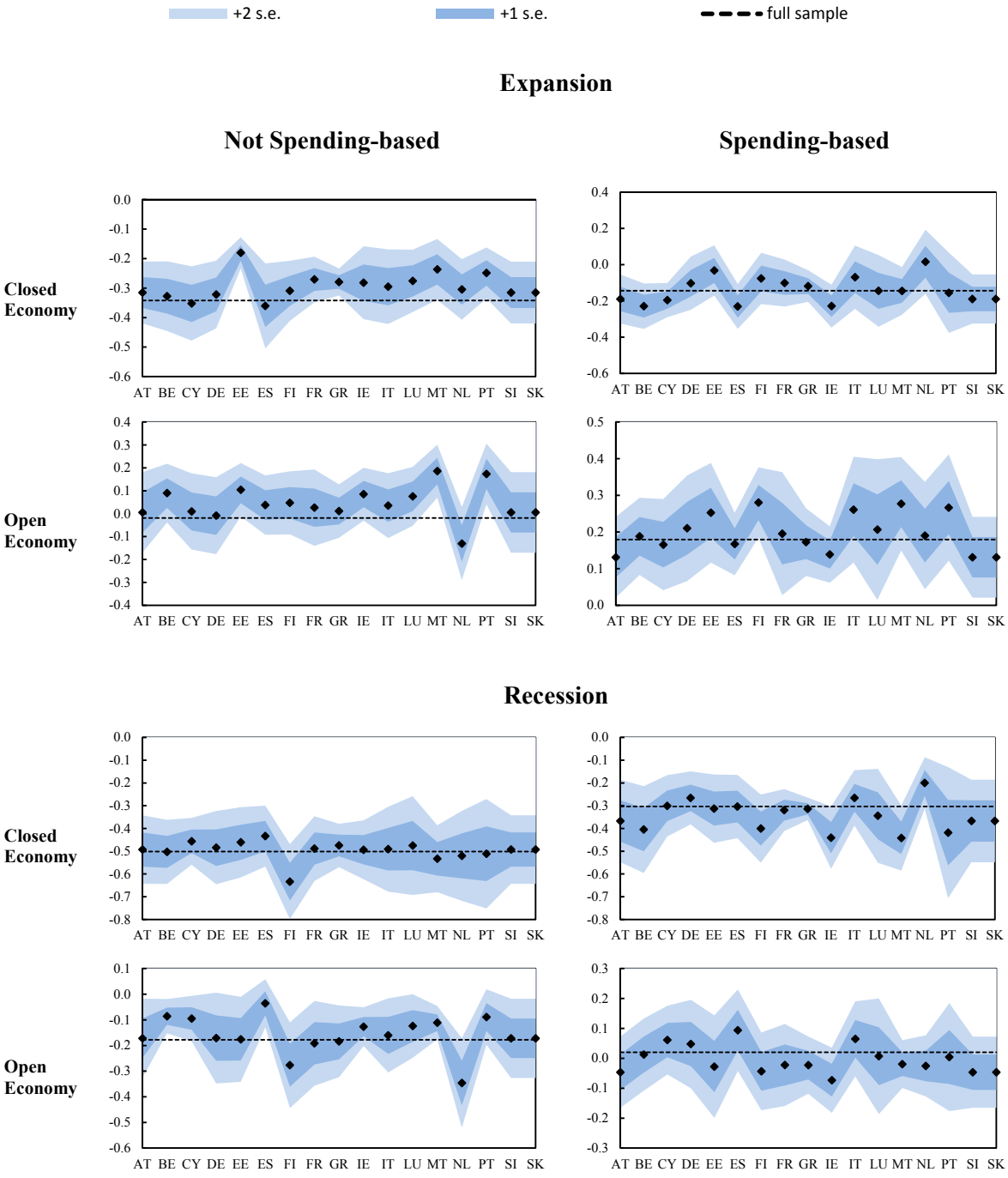


Notes: Open economy if the GDP share of exports plus imports exceeds the euro area average. Large increases in unemployment Recession when real GDP growth < 0.

Figure 4

Robustness of the Fiscal Multiplier at $t = 3$ (Vertical Axis) to the Exclusion of Cross-section i (Horizontal Axis)

(full sample estimates in Table 1, GMM_1, column VII)

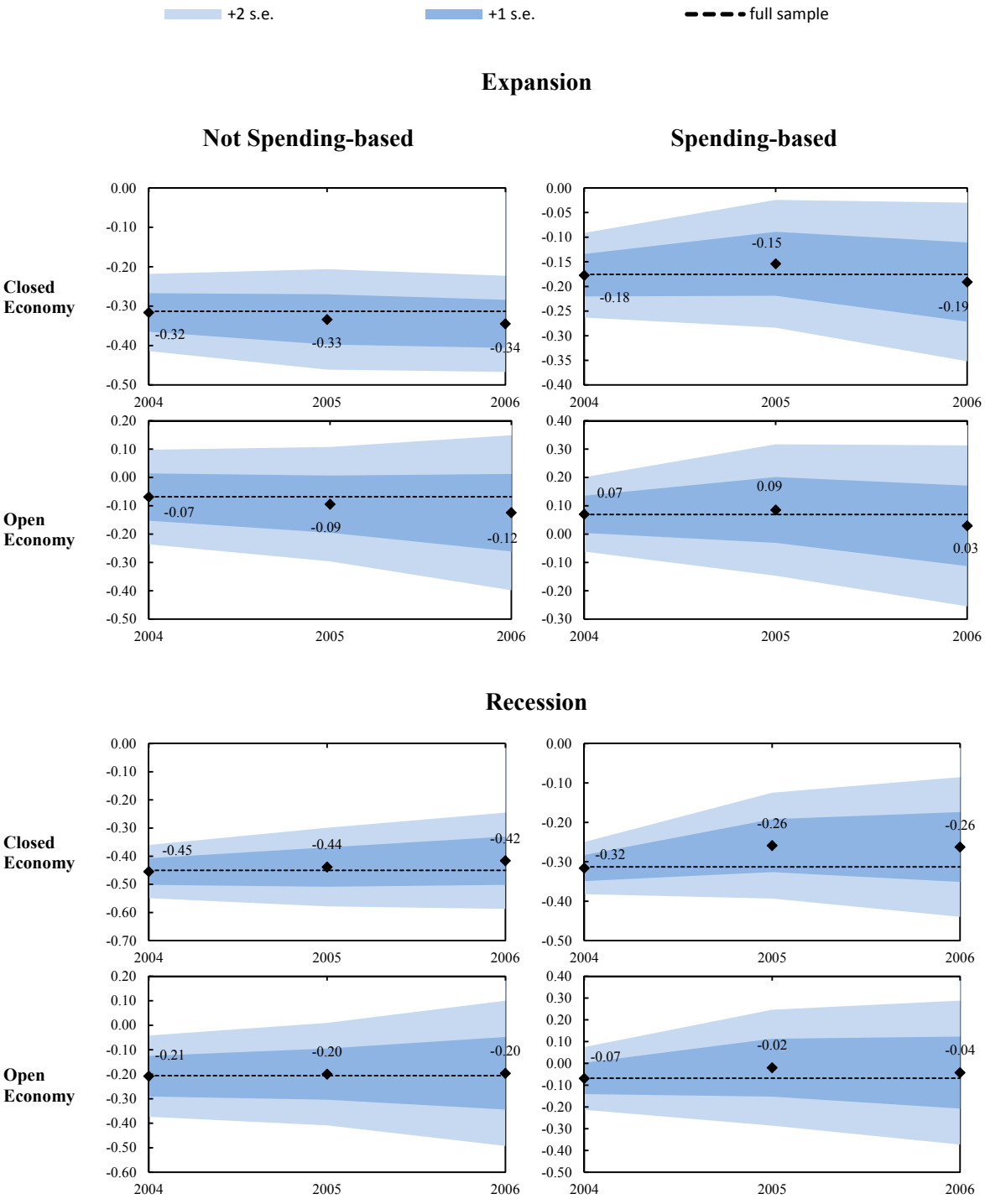


Notes: Open economy if the GDP share of exports plus imports exceeds the euro area average. Spending-based if the change in structural primary spending accounts for at least ¾ of the total change in the structural primary balance. Recession when real GDP growth < 0.

Figure 5

Robustness of the fiscal multiplier at $t = 3$ (vertical axis) to the estimation starting date (horizontal axis)

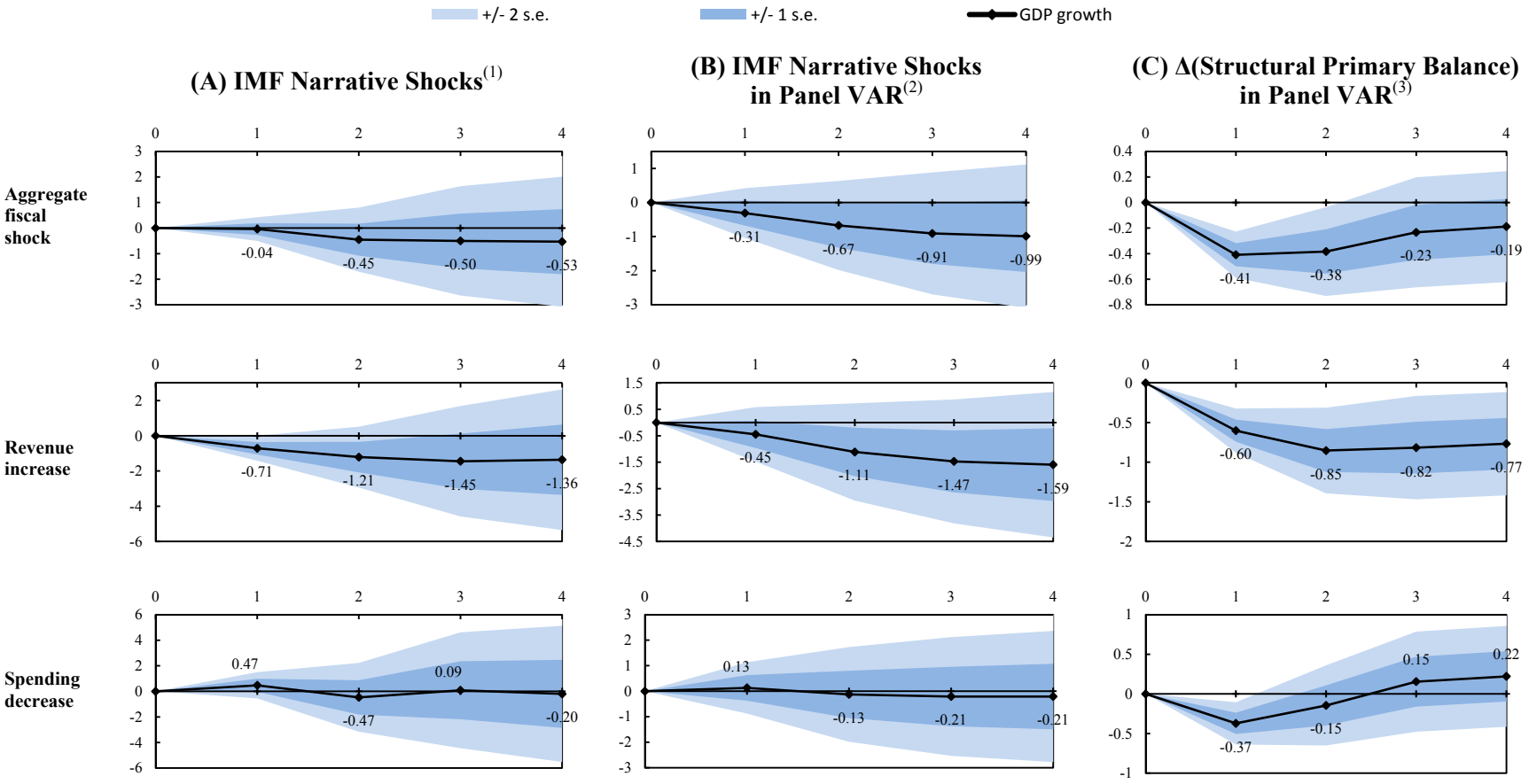
(full-sample values for t = 0, 1, 2, 3 are reported in Figure 1)



Notes: The horizontal axis indicates estimation starting date. All estimation ends in 2011. Open economy if the GDP share of exports plus imports exceeds the euro area average. Spending-based if the change in structural primary spending accounts for at least ¾ of the total change in the structural primary balance. Recession when real GDP growth < 0.

Figure 6

Cumulative Response of Real GDP Growth to: (A) IMF Narrative Shocks; (B) IMF Narrative Shocks in a Panel VAR; (C) Δ(Structural Primary Balance) in a Panel VAR



(1) Using the single equation specification in Guajardo *et al.* (2011), which involves the first two lags of real growth and the current period, first and second lag of the fiscal shocks, while allowing for fixed and period effects.
(2) Defined in equation (4) in the text.
(2) VAR specification identical to (B).

DATA APPENDIX

Variable	Description	Source
Real GDP growth rate	annual growth rate (percent)	Eurostat
Structural primary balance	percent of trend GDP. Defined as cyclically-adjusted primary balance excluding temporary measures.	ECB, WGPF
Structural primary expenditure	percent of trend GDP. Defined as cyclically-adjusted expenditure excluding interest payments and temporary measures.	ECB, WGPF
Structural revenue	percent of trend GDP. Defined as cyclically-adjusted revenue excluding temporary measures.	ECB, WGPF
Economic Sentiment	annual growth rate (percent). For Ireland the Consumer Confidence Indicator is used instead due to unavailability of ESI.	DG ECFIN
Unemployment rate	annual average (percent)	Eurostat
Real credit growth rate	Domestic credit to private sector deflated by the GDP deflator (annual growth rate)	WDI
Private investment	Total gross fixed capital formation less government gross fixed capital formation (percent of GDP)	Eurostat
Trade balance	percent of GDP	Eurostat
Coordinated Consolidation	Calculated as the percent of euro area countries with Δ(structural primary balance) > 0, excluding country *i*.	ECB, WGPF
Relative Debt	Government consolidated gross debt in country *i* (in percent of GDP) relative to Germany	Eurostat
Stock market index	Share price indices (rebased) - annual data, 2005=100. Deflated by the GDP deflator.	Eurostat

List of Instruments

Variable	Lag	Description	Source
Real GDP growth rate	2-12	annual growth rate (percent)	Eurostat
Structural primary balance	2	percent of trend GDP. Defined as cyclically-adjusted primary balance excluding temporary measures.	ECB, WGPF
Structural primary expenditure	2	percent of trend GDP. Defined as cyclically-adjusted expenditure excluding interest payments and temporary measures.	ECB, WGPF
Structural revenue	2	percent of trend GDP. Defined as cyclically-adjusted revenue excluding temporary measures.	ECB, WGPF
Economic Sentiment	1-2	annual growth rate (percent). For Ireland the Consumer Confidence Indicator is used instead due to unavailability of ESI.	DG ECFIN
Unemployment rate	3-4	annual average (percent)	Eurostat
Real credit growth rate	4	Domestic credit provided by banking sector deflated by the GDP deflator (annual growth rate)	WDI
Trade balance	2,3	percent of GDP	Eurostat
Average austerity	2,3	Average value of Δ(structural primary balance) across EA17 countries excluding country *i*, in percent of trend GDP.	ECB, WGPF
Private investment	3	Total gross fixed capital formation less government gross fixed capital formation (percent of GDP)	Eurostat
Relative Debt	2	Government consolidated gross debt in country *i* (in percent of GDP) relative to Germany	Eurostat

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COMMENT TO "WHEN DOES IT PAY TO TAX? EVIDENCE FROM STATE-DEPENDENT FISCAL MULTIPLIERS IN THE EURO AREA" BY GEORGE HONDROYIANNIS AND DIMITRIOS PAPAOIKONOMOU

Jan Babecký[*]

The objective of the paper is to estimate a set of fiscal multipliers for a panel of 17 Euro-area countries for the period 2004-11 employing several alternative techniques, namely (i) changes in the structural primary balance; (ii) the IMF narrative shocks approach (Devries *et al.*, 2011); and (ii) the VAR-based measure of unanticipated policy announcements.

According to the results, aggregate fiscal multipliers reach the value of about 0.5. However, there is a large variation in multipliers, whose values depend, for example, on economic stance (higher multipliers during recessions), openness (lower multipliers for more open economies), the share of hand-to-mouth consumers (the higher the share, the higher the multipliers), and the policy mix.

The main contributions of the paper are the following:

1) Obtaining the estimates of fiscal multipliers *combining* the alternative approaches of two types, which are based on the assumption of:
   a) Exogenous fiscal shocks. The underlying techniques are based on the changes in the structural primary balance and the IMF narrative shocks approach (Devries *et al.*, 2011).
   b) Endogenous fiscal shocks. The associated method is the VAR with unanticipated policy announcements.
2) Addressing non-linearities, such dependence of multipliers on the economy openness (open vs. closed economy) and the business cycle stance (expansion vs. recession).
3) Focus on the estimates for the Euro Area aggregate and an illustration/derivation of the multipliers for Greece.

General comments and suggestions

The paper demonstrates that there could be benefits of combining several alternative approaches to derive the values of fiscal multipliers. Extensive robustness checks are provided. The results are, in general, intuitive.

A first suggestion would be to compare the results of this paper with the rich literature on fiscal multipliers and to discuss what is similar, what is new. To facilitate this comparison, the authors might consult a summary of 89 studies on fiscal multipliers provided by Gechert and Will (2012). Using meta-analysis techniques, Gechert and Will (2012) report similar results regarding the role of openness, economic stance, the share of hand-to-mouse consumers, etc. However, their meta analysis allows concluding another key insight, which goes beyond the scope of the current study: dependence of fiscal multipliers on the setting and the method chosen, e.g., empirical estimates vs. multipliers derived from DSGE models.

Second, results of the paper regarding the role of the policy mix could/should also be compared with the existing literature. For example, another meta-analysis by Gecher (2013) provides a very informative review of 104 studies on multiplier effects. The author presents rich

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evidence on how the values of multipliers depend on the choice of fiscal categories, such as public spending, tax and transfers, public investment, etc.

Third, regarding the estimation method, it might be useful to perform several more checks:

- Poolability tests: Is the group of 17 Euro Area countries a homogeneous "poolable" sample? Member countries evidently differ in, for example, the degree of openness.
- Consider weighting schemes (for example, by GDP), in order to avoid a situation that the exclusion of e.g. Estonia significantly affects estimates for the entire Euro Area aggregate (which is currently the case).
- Perform residuals checks: The estimated equations (Tables 1-3) are somewhat "too good to believe": most of the repressors are significant at 1 per cent, which might suggest the presence of influential outliers.

Fourth, on the conceptual side, it would be worth discussing the applicability of the assumption of exogenous fiscal shocks (including the narrative approach) to small open economies, which is relevant to the Euro Area member countries. While the assumption of exogenous fiscal shocks is, in general, relevant for a large (stable) economy, which is hit by relatively rare fiscal shocks, the situation for small open economies is different. Those economies are almost continuously hit by shocks. Some of these shocks (e.g., to spending/taxes) are not always exogenous, but might represent a result of another factors (external shocks) and eventually also a (quite frequently) changing legislation.

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TOWARDS A (SEMI-)NARRATIVE ANALYSIS OF FISCAL POLICY IN EU MEMBER STATES

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This paper presents a new dataset for measuring discretionary – or action-based – fiscal policy in selected EU Member States. Drawing on experience of compiling estimates of the impact of fiscal policy measures over several years within the European System of Central Banks, it represents a first attempt to document, check and if necessary re-estimate the impact of these measures, as well as to extend this information further backwards in time. The intention is to produce a dataset which is reliable, detailed, available to the public, and which may be regularly updated, improved, and extended to other countries in the future. This dataset may have several potential uses, including the estimation of fiscal multipliers and tax elasticities, the assessment of fiscal effort, and the analysis of the stance of fiscal policy and its composition more generally. In this paper, we use a preliminary version of the dataset to present some estimates of fiscal multipliers.

1 Introduction

The great recession and the subsequent sovereign debt crisis have brought with them renewed interest in the interaction between fiscal policy and the rest of the economy. But research in this area is hampered by the difficulty of actually measuring fiscal "policy".

It has long been understood that the government surplus/deficit is not a measure of the stance of fiscal policy, because tax receipts and spending on some social benefits react to fluctuations in economic activity. For this reason, in recent times, the analysis of fiscal policy has relied heavily on the measurement of the cyclically-adjusted (primary) balance. Various institutions and governments have developed methods of calculating this indicator (for the OECD, see Giorno *et al.*, 1995; Van den Noord, 2000; Girouard and André, 2005; for the European Commission see Larch and Turrini, 2009 and Mourre *et al.*, 2013; and for the ESCB see Bouthevillain *et al.*, 2001). For a number of years, the evolution of the structural budget balance (the cyclically-adjusted balance net of certain one-off and temporary measures) has played a prominent role in EU fiscal surveillance in the context of the Stability and Growth Pact.

It has nonetheless become increasingly understood that the change in the cyclically-adjusted primary balance (CAPB) is also not a particularly good gauge of the stance of fiscal policy, at least if the intention is to measure "discretionary" or "active" policy. Cyclical adjustment is based on estimated or assumed "typical" relationships between cyclical government revenue and spending and GDP, which may represent a fair, simplified view of the world "on average, over the medium-term". But in any given year, however, the tax-to-GDP ratio will tend to fluctuate because of changes in the tax composition of GDP (both at the macro and micro level),[1] because taxes are levied on things which do not form part of current period GDP (e.g., property transactions) and

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The opinions expressed in this paper are those of the authors and not necessarily of their respective institutions.

[1] At the macro level, the wage/profit and domestic/external demand shares of GDP will not be constant. At the micro level, amongst other things, the income distribution and the composition of consumption will not be constant.

because of leads and lags in tax collection (e.g., loss carry forward in corporation tax).[2] Similarly, spending on unemployment benefits will often depend not only on the rate of unemployment, but also unemployment duration (as the longer-term unemployed drop out of contributory benefit and move to less generous non-contributory benefits).

To this it is worth adding that cyclical adjustment implies that the "neutral" path of non-cyclical spending (*i.e.*, consistent with an unchanged structural balance) is growth in line with that of potential–trend GDP. But major shocks to GDP also affect potential/trend GDP. This has been seen during the recent recession in several euro area Member States, when potential/trend GDP growth actually turned negative. In crisis hit eurozone countries in recent years, steep spending cuts were necessary just to stabilise the structural spending-to-trend GDP ratio, let alone reduce it.

All this implies that the change of the CAPB is partly determined by factors correlated with the economic cycle. The assumptions underlying the identification of tax shocks in studies on the effects of fiscal policy on output using Structural VARs (e.g., Blanchard and Perotti, 2002) would be subject to the same critique.

Given the – by now quite well known – limitations of the change in the CAPB as a gauge of discretionary fiscal policy, there have recently been increasing attempts to seek alternative measures or complementary analyses.

Within the European System of Central Banks, the analysis of fiscal policy has for some years been based in large part on the "*Disaggregated Framework for the Analysis of Structural Developments in Public Finances*" (Kremer *et al.,*2006). The purpose of this framework is to explain the evolution of the structural balance in terms of the main driving factors. On the revenue side, these include – but are not limited to – changes to tax legislation.[3]

In the context of implementing the Stability and Growth Pact, the European Commission has recently started putting more weight on the "bottom-up" identification of specific "measures" to complement its traditional assessment of "fiscal effort" based on the evolution of the structural balance.[4] The EU Economic Policy Committee's Working Group on Output Gaps (OGWG) has also started collecting information on the impact of discretionary tax measures from EU Member States. This has been done primarily with a view to exploring the extent to which tax changes have contributed to fluctuations in the overall elasticity of tax receipts to GDP (Barrios and Fargnoli, 2010, and Princen *et al.*, 2013).

For the United States, Romer and Romer (2010) have pioneered the so-called "narrative approach" in their estimation of the macroeconomic effects of tax changes. They use narrative records such as presidential speeches and Congressional reports to identify the size, timing and principal motivation of tax measures during the period 1945-2007. Cloyne (2010, 2013) has replicated this analysis for the United Kingdom, using the estimates contained in financial statements to construct a narrative account of discretionary tax shocks for the UK during 1945-2009. Hayo and Uhl (2013) have replicated the approach for Germany, identifying tax

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[2] Cyclical adjustment does not assume a constant tax-to-GDP ratio per se, but as long as tax elasticities assumed in the method are close to 1, as they usually are, then cyclical adjustment does assume a tax-to-GDP ratio that is *ceteris paribus* fairly stable from one year to the next.

[3] In the case of government revenues, the framework involves analysing changes in the (structural) revenue-to-(trend) GDP ratio in terms of "fiscal drag", "decoupling of the tax base from GDP", "legislation changes" and a "residual" (*i.e.*, anything left over).

[4] The European Commission's AMECO database now contains series for "discretionary measures" broken down between current and capital revenue and current and capital expenditure, reflecting the aggregate total of measures reported by country desks in the context of producing the Commission's macroeconomic and fiscal forecasts. But the time series is very short, the data is very aggregated, and there is no information on compilation methods.

measures for the period 1974-2010 using the Finanzbericht, an annual publication of the German Federal Ministry of Finance.

At the IMF, Devries *et al.* (2011) have constructed an action-based dataset of fiscal consolidation for 17 OECD countries over the period 1978-2009. This dataset was built from information contained in contemporaneous policy documents, including budgets, budget speeches, central bank reports, stability and convergence programmes and IMF and OECD reports. It has been used to analyse the macroeconomic effects of fiscal consolidation (IMF, 2010).

Even so, the availability of narrative, action-based datasets of fiscal policy – and research using such datasets – is still very limited. This is not surprising given the considerable amount of time and expertise required to gather comprehensive and reliable information on individual measures.

This paper presents the development of a new action-based dataset by public finance experts working within the European System of Central Banks (ESCB). A first, preliminary version of the dataset is available for eight countries and presented in this paper. Datasets for three other countries are also largely completed and more may follow at a later stage.

Compared to the datasets previously mentioned, our dataset has the advantage of building on the experience of gathering information on fiscal policy measures developed over several years within the ESCB. At least for the last 10-15 years, it can draw to a large extent on estimates that have been compiled in real time (in the context of various ESCB projection exercises). It benefits from being compiled by public finance experts of the countries concerned, who, on the one hand, understand the specific nature of the budget documents, political processes, and fiscal data in their countries, while at the same time being subject to a process of peer review, to ensure that the data is compiled in a sufficiently consistent and harmonised way across countries. This largely overcomes an obvious problem – or limitation – with the dataset of Devries *et al.* (2011), namely that they take estimates from a wide range of different types of documents, with no guarantee that the nature of these estimates is consistent across countries and across time. This is likely to be particularly problematic in the case of expenditure for which we propose a measurement methodology rather different from the one adopted by Devries *et al.* (2011).[5] Finally, the dataset includes a rich set of information, being comprehensive and disaggregated, and as such it potentially opens up new avenues of research.

The data may have several potential uses, including the estimation of fiscal multipliers and tax elasticities, the assessment of fiscal effort, and the analysis of the stance of fiscal policy and its composition more generally. In this paper, we use a very preliminary version of the dataset to present some estimates of fiscal multipliers.

This paper is structured as follows. Section 2 explains the origins and the main features of our dataset. Section 3 discusses the issue of endogeneity for the estimation of fiscal multipliers. Section 4 summarises the data compiled so far. Section 5 presents some preliminary estimates of fiscal multipliers using this – still provisional – data. The Appendix describes in more detail the compilation methods as well as the main episodes of fiscal policy identified for each country.

2 Towards an ESCB action-based dataset of fiscal policy

For more than a decade now, public finance economists within the ESCB have collected information on tax and spending measures for EU Member States in the context of regular

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[5] See subsections 2.1.1 "*Combination of 'bottom-up' on taxes and benefits with 'top-down' on other spending"* and 2.1.2 *"Omitted spending"*.

projection exercises. This has been done on the basis of standardised questionnaires following commonly agreed principles and reporting conventions. Given this, public finance economists within the ESCB are relatively well-placed to carry out the task of compiling information on fiscal policy in a way which benefits both from local (country-specific) knowledge and horizontal (across-country) consistency.

Even so, the compilation of a reliable and well-documented dataset with a view to publication and use in research remains a very time consuming task. There are many practical difficulties to overcome. Reporting conventions, fiscal questionnaires and the experts responsible have changed over time. In some cases information may have been lost or discarded and needs to be re-built from scratch. It is not always easy for today's expert to quickly verify the work of his or her predecessor (*i.e.*, to know where a particular number came from or how it was derived). In the past, information was collected with a view to looking forward (understanding the projection) rather than looking back (analysing the past). There may, in particular, be cases where *ex ante* estimates used at the time of the projection should now, in the light of data, be revised *ex post*. The development of the present dataset is the first step in a process of checking the existing information on fiscal measures which may have already been collected over the past 10-15 years, identifying and rectifying potential errors and omissions, documenting sources and estimation methods, and, to the extent possible, extending the data further back in time.

2.1 Principals and methods of data compilation

Our approach is both comprehensive and disaggregated. We look at fiscal policy (*i.e.*, the government accounts) as a whole. In this sense, our dataset differs from other action-based datasets that we are aware of, which are either limited to taxes (Romer and Romer, Cloyne, Hayo and Uhl, OGWG), or fiscal consolidation (Devries et al, 2011). At the same time we compile information at a disaggregated level in order to make possible studies on the effects of the composition of fiscal policy. Revenue and expenditure are disaggregated as follows:

Revenue	Expenditure
Taxes on income and wealth	Social transfers in cash
Of which payable by corporations	Of which pensions
Of which payable by households	Of which other
Taxes on production and imports	Government consumption
VAT	Compensation of employees
Taxes on products other than VAT	Wages and salaries
Other taxes on production	Employers' social contributions
Actual social contributions	Intermediate consumption
Employers' actual social contributions	Social transfers in kind via market producers
Employees' actual social contributions	Other (including sale of goods and services)
Other actual social contributions	Subsidies
Capital taxes	Other current transfers payable
Property income receivable	Gross capital formation
Current transfers receivable	Capital transfers payable
Capital transfers receivable	

Our dataset is annual because (spending) budgets, tax collection calendars and many tax liabilities (e.g., personal and corporate income tax) are essentially annual in nature. Most available estimates of the impact of measures are also annual as is much of the micro public finance data that may be used to construct our own estimates of the impact of measures whenever other published estimates are unavailable or unsatisfactory. Still, the systematic collection of information on when measures entered into force could facilitate the construction of quarterly data at a later stage. This has already been done to create a quarterly series of tax shocks for Portugal (Pereira and Wemans, 2013).

We aim to identify at the very least all measures the impact of which would round up to 0.1 per cent of GDP. But in general we try to include also much smaller measures (especially given that a number of small measures together can constitute a significant "package").

2.1.1 Combination of "bottom-up" on taxes and benefits with "top-down" on other spending

In terms of how to go about measuring active fiscal policy, the correct distinction is not between "revenue" and "spending" but rather between "taxes and benefits" and "other spending".

In the case of taxes and benefits, it is relatively clear what is meant by a "measure", namely a change to the legislation which determines tax liabilities and benefit entitlements. The problem is mainly to identify the measures (via documentary evidence) and then to estimate their impact on the budget balance. The case is a bit complicated for pensions, as some measures affecting this category are very much forward looking (e.g., increases in retirement age after a certain transition period). Therefore, only measures on pensions with a relatively immediate impact (such as a deviation of indexation from the usual benchmark) have been included. As far as non-tax revenue is concerned, sometimes there maybe measures that are in the nature of a tax but are recorded as property income or transfers receivable. They are few and far between but they are included in our dataset (and in this paper are subsumed under the heading of tax measures).

For most government spending other than social benefits (intermediate consumption, subsidies, investment…etc), the concept of a "measure" is less useful. If the budget of a particular year points to new investment spending of "X billion", but outturn data shows that investment actually fell or increased by less than usual in that year (perhaps because local governments were cutting back their investment spending), what do we record? Is this an action-based spending increase or a spending cut? If the government "does nothing", what happens to government consumption and investment? If government consumption rises by 2 per cent, but inflation and/or (trend) economic growth is exceeding this rate: is this a spending increase or a spending cut? It all depends on the benchmark we have in mind, what we consider "neutral", which is somewhat subjective.

This is, perhaps, the main criticism that we would have of the approach followed by Devries *et al.* (2011), namely, that it takes at face value figures presented for spending cuts in various different documents without questioning the original approach to – or logic behind – these estimates.

For such categories of spending, rather than trying to identify individual measures, in our view it makes more sense to identify explicit benchmarks for what we might consider neutral spending growth and to measure "policy" as the outturn compared to this benchmark. In this sense, we estimate the impact on the budget of changes to taxes and benefits "bottom-up", but most other spending "top down".[6]

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[6] The European Commission has adopted a somewhat similar approach to measuring the "Discretionary Fiscal Effort" (DFE), mixing a "bottom-up" approach on the revenue side with a "top-down" approach on the expenditure side (see European Commission, 2013).

2.1.2 "Omitted spending" (fluctuations in spending which we do not want to attribute to "policy")

Payment of debt interest (and rent) is not at the discretion of government, so fluctuations in property income payable are completely omitted from our measure of fiscal policy.

Net acquisitions of non-financial, non-produced assets do represent actions of the government, but ones which are unlikely to have an impact on total economy aggregates (as usually ownership is simply transferred across sectors). This item of the government accounts is omitted from our measure of fiscal policy.

Also within other components of the accounts, there will from time-to-time be one-off or permanent shifts reflecting transactions/flows which merely shift ownership or funds across sectors of the economy, but without significantly affecting the underlying fiscal position and being unlikely to affect economic growth. Obvious examples are large, one-off capital transfers related to injections of capital into banks or public enterprises, and changes to the delineation of general government caused by entities being reclassified in- or out-side of general government. In the case of spending being measured "top-down", these influences need to be identified and "omitted" from the dataset so that they are not attributed to fiscal policy.

2.1.3 Sources and methods for estimates of the impact of tax and benefit measures

The estimates should be the ones that are deemed to be the most accurate. Typically, the principle sources will be budget documents and/or documents which accompanied the relevant legislation during its passage through parliament. However, these estimates should be cross-checked and alternative and/or additional estimates should be made when this is considered feasible and appropriate.

One obvious case is when outturn data makes it possible to pin down the actual impact of a measure *ex post* and this differs from the official estimate produced *ex ante*. This will typically be the case when a new tax is introduced such that the effect can be derived directly from detailed tax data.

Another reason to deviate from previously published estimates is to ensure a greater degree of consistency across countries and across time. An example of this would be the impact of changes to excise duty rates, in which case it may be possible to derive estimates that are more accurate and consistent over time on the basis of information on duty rates, tax receipts/liabilities, and price indices. A consistent and logical approach should be followed, over time, to things such as the adjustment of tax allowances and brackets and excise duty rates to inflation. Furthermore, in many countries, official estimates of the impact of fiscal measures will be based on "budgetary" (often "cash") accounting concepts which differ from national accounts (e.g., regarding the time of recording of tax receipts, or the recording of tax credits as expenditure or negative revenue. Adjustments may need to be made for this. In case we are aware that a quantitatively significant measure happened, but cannot find any estimate of the impact in official documents, then there is no alternative but to produce an estimate.

2.1.4 Spending benchmarks

With respect to our implementation of the "top-down" approach to "other spending", three spending "benchmarks" are presently considered. These are:

- *Nominal trend GDP* (trend of real GDP x GDP deflator): This benchmark has the advantage of mimicking the neutral spending assumption underlying cyclical adjustment therefore enabling an intuitive comparison between our action-based dataset and the evolution of the

cyclically-adjusted primary balance (which is then explained by the fundamentally different approach to taxes and benefits). It has the disadvantage that trend GDP growth itself (and hence the measurement of fiscal policy using this benchmark) is affected by economic fluctuations.

- *GDP deflator:* The idea is to establish a benchmark so that what we capture as policy is growth in "real spending". In this regard, the GDP deflator has the advantage of being the principle deflator in national accounts. It has the disadvantage that government policy itself impacts the deflator and in some cases (e.g., a cut in government wages) is partly self-defeating as far as this measure is concerned. (NB: this is also true of the nominal trend GDP benchmark and cyclical adjustment generally!)
- *Consumer price index:* Using CPI (or an alternative headline price index) as the benchmark largely (although not fully) overcomes the problem of interaction between government spending and the benchmark. It may also make the analysis of spending more consistent with the analysis of taxes and benefits, to the extent that income tax brackets, duty rates and benefit entitlements are generally uplifted using the same price index as the benchmark.

2.1.5 Documentation

It is intended that the dataset will be rich in terms of information. This means that, to the extent possible, for each measure, the following information is reported:

- *Description of the measure*: information on which tax/benefit is affected and the nature of the measure (e.g., introduction of a new tax or benefit, change to a tax rate, allowance or benefit entitlement…etc).
- *Impact:* Estimate of the impact on government revenue/spending in millions of euro (or national currency) and in percent of GDP
- *ESA Code*: of the revenue or spending aggregate affected
- Date of entry into force: day or month
- Date announced: day or month (if known)
- Source(s): In the case of estimates taken from official/external sources, this will be the document concerned. In the case of own estimates, this will be the data source(s) used to compile the estimate
- Comments: Any other information deemed useful. Examples would be things like how an "own estimate" was derived, if the measure was part of a package, if implementation of the measure was brought forward or delayed compared to what was initially announced, or if the measure resulted from the adaptation of a previously announced measure that was never implemented.

2.2 Data coverage and status

At present, datasets have been compiled for the following countries covering the following time spans:[7]

- Denmark (1999-2012)
- Spain (1996-2012)
- France (1995-2012)
- Italy (1991-2012)

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[7] In many cases, datasets already cover 2013 but this year is not covered by the present analysis. Datasets are already largely compiled for the Czech Republic, Latvia and Slovakia but we not yet ready enough to be included in this paper.

- Austria (1996-2012)
- Poland (2000-2012)
- Portugal (1996-2012)
- United Kingdom (1988-89/2012-13)[8]

While the datasets have been compiled on the basis of the above-mentioned principles and methods agreed *ex ante*, at the time of writing they are still in the process of being subject to a process of *ex post* peer review. This process involves the identification of potential inconsistencies across countries in the way estimates may have been derived and documented as well as specific problems that may have been encountered so as to develop common approached to address them. In this "second stage" the datasets will be further harmonised and improved by identifying past practices.

The sources and methods used to compile the datasets for each country are explained in more detail in the Appendix. Table 1 provides a schematic overview.

3 An endogeneity issue?

Romer and Romer (2010) addressed a potentially relevant problem affecting the estimation of the impact of fiscal changes on the macro-economy: if a given fiscal action is motivated by a desire to respond to cyclical fluctuations, this raises reverse causality concerns.[9] In other words, there is an omitted variable bias in any regression of output on a measure of fiscal actions as part of the latter is often correlated with other developments in the economy. At the heart of the narrative approach pioneered by them is the idea that tax changes can be broadly characterized by their motivation. In this respect, the principal motivations for tax changes in the United States are identified as being (i) to offset a change in government spending; (ii) to offset some factor other than government spending liable to affect output in the near future; (iii) to deal with an inherited budget deficit, or (iv) to achieve some long run goal (e.g., higher growth, fairness, smaller government). Romer and Romer (2010) argue that tax changes motivated by factors related to the current and/or prospective future state of the economy are not legitimate observations to use to estimate the effects of tax changes on output. As a result, they exclude from their dataset all measures motivated by either (i) or (ii).

As already noted above, in our dataset we have neither undertaken a systematic categorization of measures in terms of motivation, nor have we sought to exclude particular measures for motivational reasons. It should preliminarily be noted that measures motivated under (i) would not be a problem in our case because we can control for spending measures in a regression.[10] As for measures motivated by (ii), the fact that we have not excluded them is partly for reasons of principle and partly for reasons of practicality.

First, in most EU Member States, political systems are less "presidential" than in the United States and they involve the interplay of multiple institutions and constituencies (Government, Parliament, political parties, unions, business associations, etc.) with a usually more prominent

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8 The United Kingdom is an outlier in the sense that no pre-existing information had been collected on the impact of fiscal measures on a Financial Year basis. But it was deemed possible to construct a dataset from scratch given a relative wealth of published information on policy costings, tax liabilities and benefit entitlements.

9 In Romer and Romer (2010) the argument is discussed in terms of tax changes only, but it clearly applies to spending changes too. Devries *et al.* (2011) applied the same reasoning also to expenditure.

10 Since spending changes affect the macroeconomy, a tax change implemented to compensate the latter would be endogenous and would bias the regression coefficient. However, if the "omitted" variable (the spending change) is included in the regression the problem would disappear.

role. It is therefore much more difficult to know with reasonable certainty the intentions behind a finance bill or to equate the intentions of the government with statements made in particular speeches or policy documents. Multiple objectives should, in any case, mean less predictability and less endogeneity.

Second, it is our view that, with the exception of the response to the great recession in 2008/09, fiscal policy in EU Member States over the period considered has not been strongly motivated by the need to respond to cyclical conditions. Rather, fiscal policy, at least since the mid-1990s, has been primarily motivated by the need to comply with the Maastricht convergence criteria, and later the Stability and Growth Pact. Golinelli and Momigliano (2009) surveyed studies on the degree of cyclicality of fiscal policy in the EU and found a wide range of results. Their analysis suggests that the use of *ex post* data from the AMECO dataset and of real time data lead researchers to find weakly counter-cyclical policies, while the use of all other *ex post* data sources broadly lead to finding a-cyclical policies. At the same time, the substantial fiscal consolidation undertaken in basically all countries in our sample from 2010-11/2012 was clearly pro-cyclical.

It may be that fiscal policy in the United States (at least that of the federal government) tends to be more activist because the operation of the automatic stabilisers is more limited, in part because limits on state borrowing cause sub-national fiscal policy to be pro-cyclical. However, even for the United States, Romer and Romer find hardly any case of tax changes driven by cyclical motives after the 1970s.[11] In the case of the United Kingdom, the one country in our sample where fiscal policy is traditionally viewed as being more active, according to Cloyne's dataset, counter-cyclical stabilisation was the main motive behind tax changes between 1945 and 1979; but thereafter, cyclically motivated tax changes are few and far between.[12] "Demand management" fell out of favour at the end of the 1970s.

Third, there is unlikely to ever be a clear dividing line between measures which respond to fluctuations in economic activity and measures which do not. Even if, for example, the principal motivation for a tax increase or a spending cut is to reduce the deficit, surely the size and timing of this intervention is conditioned by the government's view on what the consequences for the economy will be, and this will in turn depend on the perceived cyclical strength/weakness of the economy. In general, it should not be the case that important tax and spending decisions are taken without regard for the state of the economy and the state of the public finances, both of which are intertwined. If this is true, no fiscal measure should really be thought of as "truly exogenous" and dropping any measure may introduce a different bias in the regression.

Finally, we are building a dataset that is intended to serve broader purposes than estimating the impact of tax and spending shocks on output. Excluding some measures may be right for some analyses, but not for others. If our dataset is well documented, future users may be in a reasonable position to adapt our dataset to their purposes, including taking a view on the motivation behind specific measures and/or episodes of policy.

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[11] According to Romer and Romer, "Countercyclical actions were non-existent in the 1980s and 1990s. We find, however, that countercyclical motives were present for part of the 2001 Bush tax cut and all of the post-September 11th cuts contained in the Job Creation and Worker Assistance Act of 2002". The lack of cyclically-motivated tax changes in Romer and Romer's dataset after 1975 can clearly be seen in Panel B of Figure 2 of Romer and Romer (2010).

[12] This can be seen in Figure 2 of Cloyne (2013).

Table 1

Description of Main Features of the Dataset

	Time Coverage		Official/External Estimates	Own Estimates	Indexation	Omitted Spending
	Start Date	**Problems with Earlier Period**	**Main Sources**	**Main Sources**		
Spain	1996	Lack of ESA95 data	Spanish Tax Administration	Economic and Financial Reports accompanying the Social Security Budget	None	Capital transfer to Renfe in 2004 Capital transfers to banks in 2011-12 Sale of Aguas del Ter in 2012
France	1995	Lack of detailed expenditures data	Documentation of budget law, stability programmes	Report and analysis of the Court of Auditors	Consumption taxes, income tax and benefits: CPI of previous year	
Italy	1991	Lack of detailed expenditures data	RPP, Stability programmes and other Government planning documents Estimates contained in background documents accompanying legislation Bank of Italy official publications	Bank of Italy publications ISTAT	None	Expenditure reclassification in 1996 and 1998
Austria	1996	Lack of detailed expenditure data	Stability programmes Estimates contained in background documents accompanying legislation	None	Pensions: Average CPI inflation of August (t–2) to July (t–1)	Effects of reclassification of corporations in 1997 and 2001 Subsidies and capital transfers to state owned enterprises

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 1 *(continued)*

Description of Main Features of the Dataset

	Time Coverage		Official/External Estimates	Own Estimates	Indexation	Omitted Spending
	Start Date	**Problems with Earlier Period**	**Main Sources**	**Main Sources**		
Portugal	1996	Lack of information on the expected impact of measures	Budget reports Legislation analysis Annual reports published by Banco de Portugal Data collected by Banco de Portugal in the context of the "disaggregated framework"	None	Pensions. HICP of previous year after 2008	Capital transfers to financial institutions in 2010, 2011 and 2012 A different accounting of imputed social contributions before and after 2005 The reclassification of some hospitals outside of general government.
Denmark	1999	Lack of data and quality estimates	Danish Ministry of Finance, Danish Ministry of Taxation	None	None	Capital transfers related to Credit Package (Kreditpakken) in 2011 Voluntary Early Retirement Pension (VERP) scheme in 2012
Poland	2000	Low quality of ESA data for years 1995-99, lack of official governmental estimates of new measures	Estimates contained in background documents accompanying legislation Budget Reports Convergence Programmes Supreme Audit Office's (NIK) annual evaluations of state budget execution and monetary policy assumptions	Budget Reports (yearly/monthly) Ministry of Finance data on tax settlements Central Statistical Office Ministry of Labour and Social Policy Bulletins	Excise duty, private income tax, pensions: CPI of current year; the impact of yearly indexation of income thresholds for family benefit – the assumption that the number of beneficiaries will only be determined by the number of children aged 0-24	Sales of UMTS spectrum (scored as negative gross fixed capital formation) The difference between military equipment deliveries and payments (intermediate consumption) Expenditure financed with the EU funds
United Kingdom	1988-89	Lack of quarterly GFS and detailed tax data	Budget, Pre-Budget Reports and Autumn Statements (1998-2012) OBR Tax Measures Database	HM Revenue and Customs Institute for Fiscal Studies Department for Work and Pensions House of Commons Library Department for Communities and Local Government Office for National Statistics	Consumption taxes, income tax and benefits: Retail Price Index excluding mortgage interest payments (RPIX) until 2010-11, CPI thereafter (average during FY). For Business Rates, CPI of previous September	Transfer of nuclear sites from British Nuclear Fuel (public non-financial corporation) to the Nuclear Decommissioning Authority (central government entity) in 2005-06 Capital transfers related to support to the financial system in 2008-09 and 2009-10

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.

4 A preliminary look at the data

This section takes a "horizontal" (cross-country) view of the dataset constructed so far. The intention is twofold: first, to provide preliminarily evidence on fiscal policy in the countries included in the study; and second, to compare our measure of discretionary fiscal policy with other measures. Here we touch only upon broad and general aspects. More detail on a country-by-country basis is provided in the appendix.

Our discussion in this section focuses around a set of charts (one per country) in Figure 1. These charts show the following:

i) The average of our three measures of fiscal policy, *i.e.*, using the three different spending benchmarks. We have averaged the three measures here so as not to overload and confuse the charts in Figure 1, but all three measures are reported in Chart 1 of each country write-up in the Appendix.

ii) The change in the cyclically-adjusted primary deficit as estimated by the European Commission, adjusted in some cases for some well-known one-off transactions.

iii) The consolidation episodes identified by Devries *et al.*

It should be recalled that two of the spending benchmarks are inflation indices. As long as the economy is growing over time, it is normal – by these measures – for fiscal policy to be loosening on average over time. Otherwise, the size of government in relation to the economy would tend to shrink over time.[13] This should be taken into account when interpreting Figure 1.

More generally, it should also be understood that a fiscal policy that is "inactive" according to our measure is not necessarily neutral in the sense of being sustainable. A pertinent example here would be pension spending, in relation to which we measure as policy only the direct effects of changes to pension legislation (especially year-on-year legislated increases). In a context of an ageing population in many countries, policy action is required to make spending on pensions sustainable for the long-term.

4.1 The main episodes of fiscal policy

For only two countries (Italy and the United Kingdom) have we so far been able to extend our dataset back to before the mid-1990s. In the case of Italy, fiscal policy was strongly tightening in the early 1990s as a consequence of the need to deal with the considerable imbalances built up during the 1970s and 1980s and in response to the ERM crisis. In the United Kingdom, fiscal policy had to respond to the large deficit which emerged as a consequence of the recession of the early 1990s. While in Financial Year 1992-93, fiscal policy was loosening, it was tightening during the remainder of the 1990s.

In 1996-97, fiscal policy was tightening in most countries driven by efforts to fulfil the Maastricht convergence criteria.

In the decade 1998-2007, fiscal policy is predominantly loosening in all countries considered. In many cases, this can be seen – at least partly – as a loosening of the purse strings following the fiscal effort undertaken in the run-up to Stage Three of EMU. This loosening of fiscal policy occurred during a period in which cyclical conditions were relatively favourable, especially

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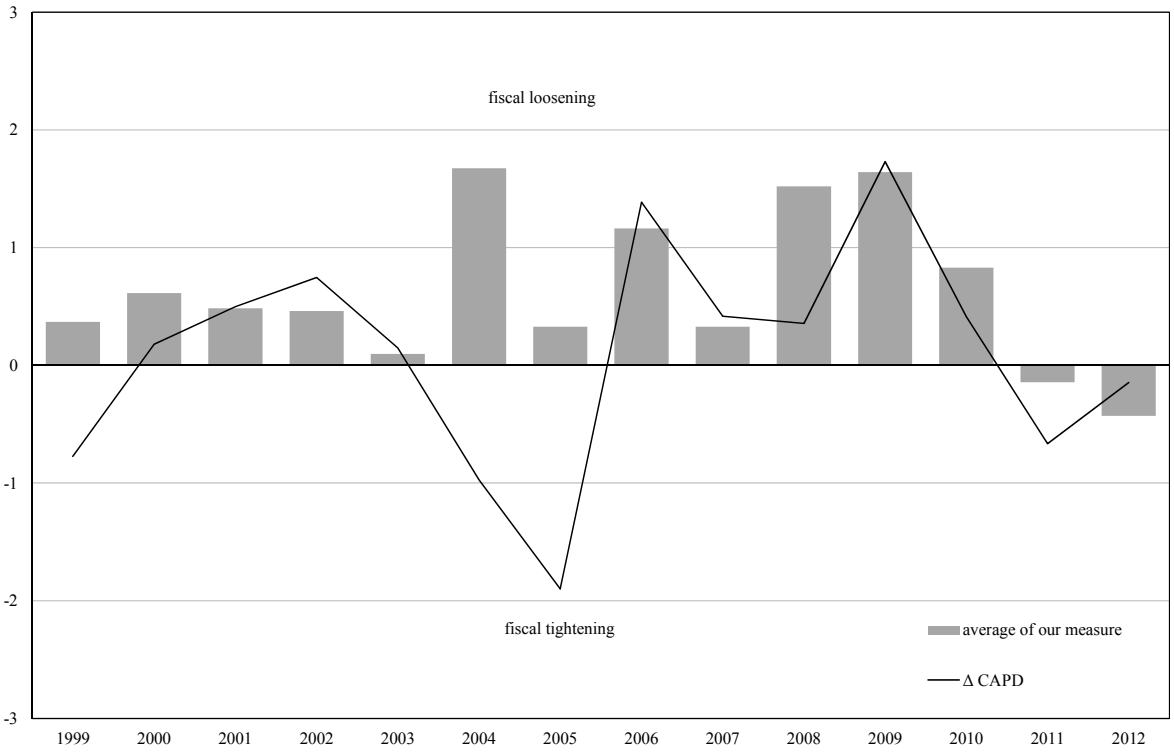
[13] Of course, it could be that the share of government purchases of goods and services (which would broadly correspond to our definition of "other spending") would fall as a share of GDP over time, but this would be offset by rising social spending (especially pensions) leaving the overall share of government spending in GDP more stable.

Figure 1

Fiscal Stance and Average Size of Measures
Denmark



Spain

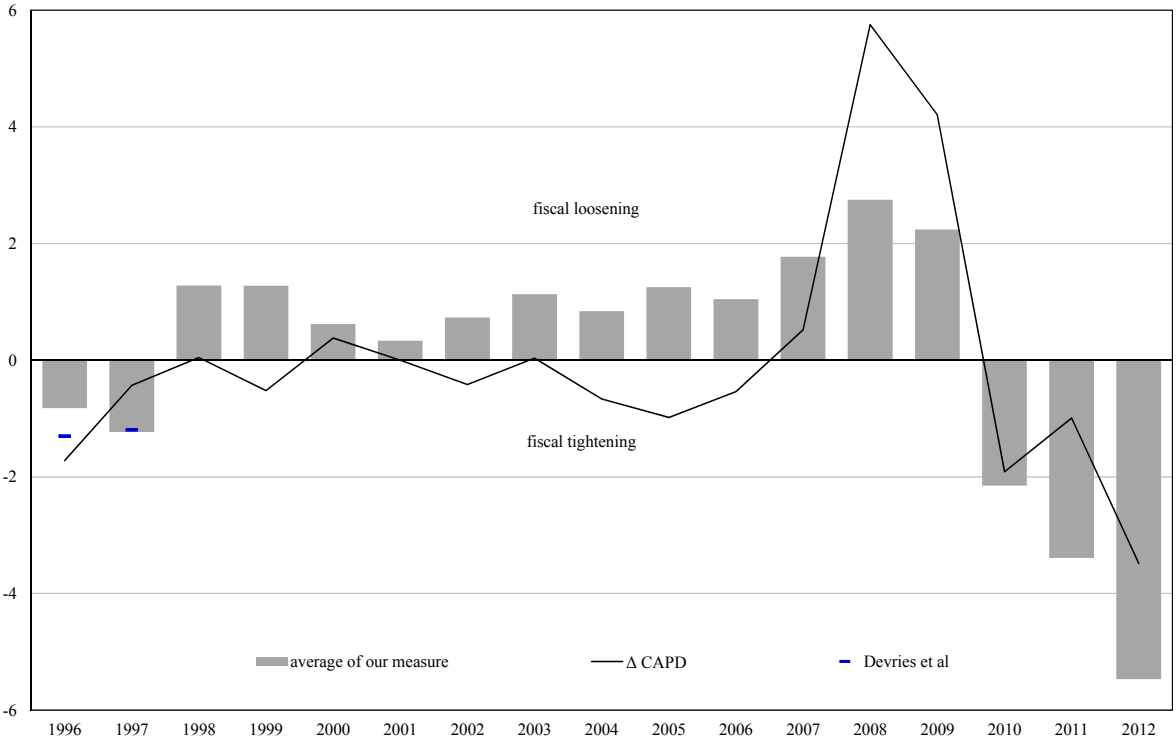
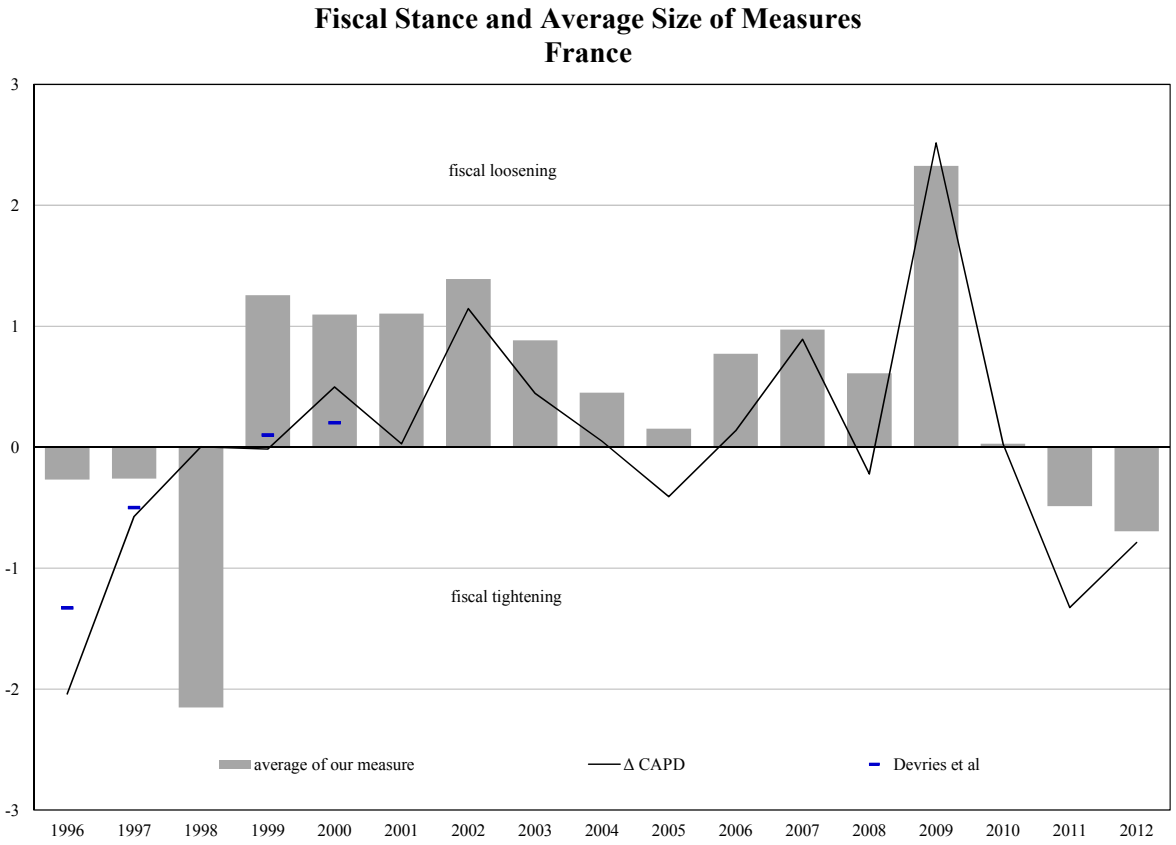


Figure 1 *(continued)*



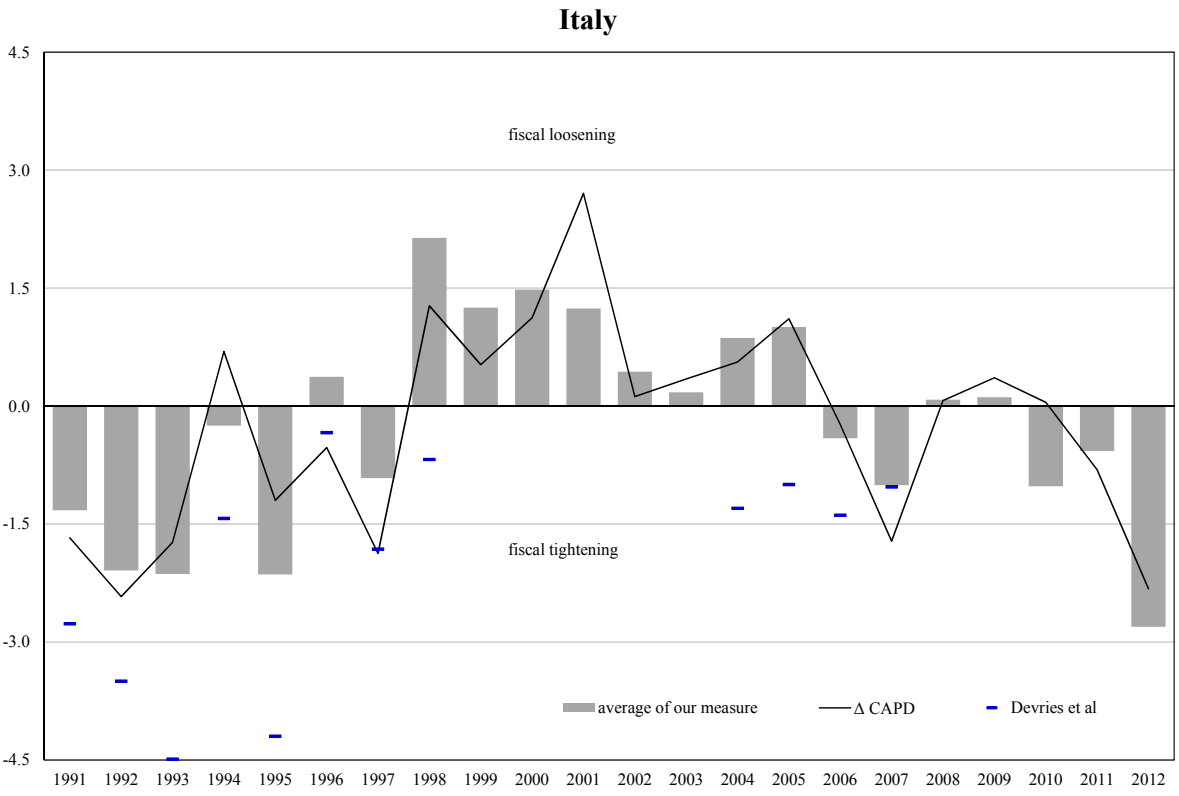
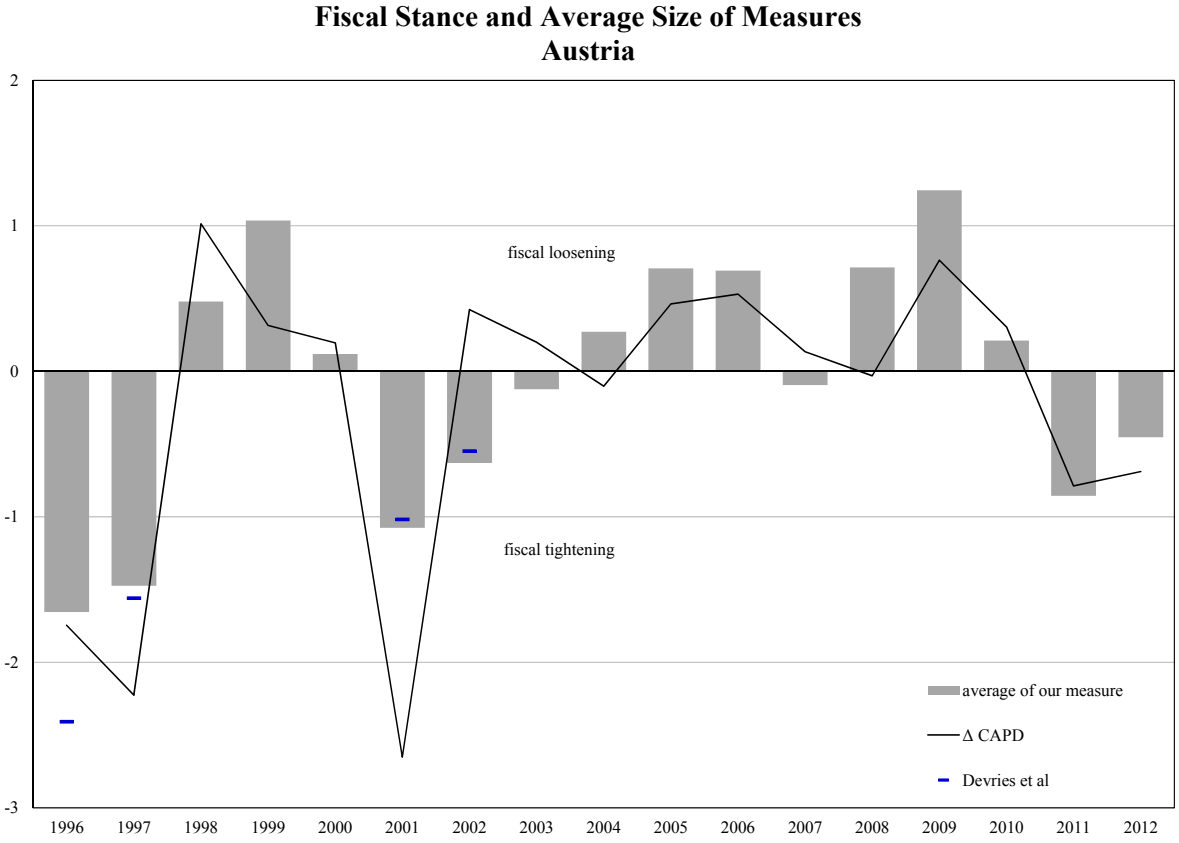


Figure 1*(continued)*



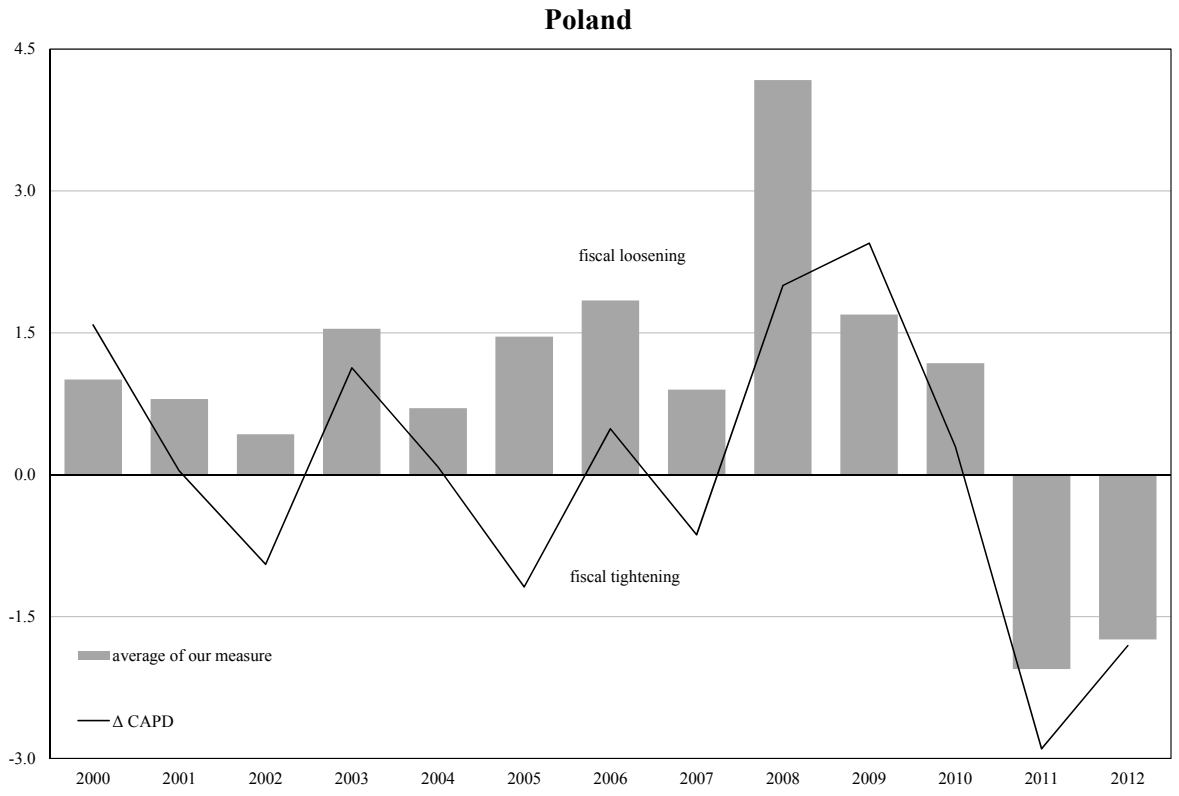
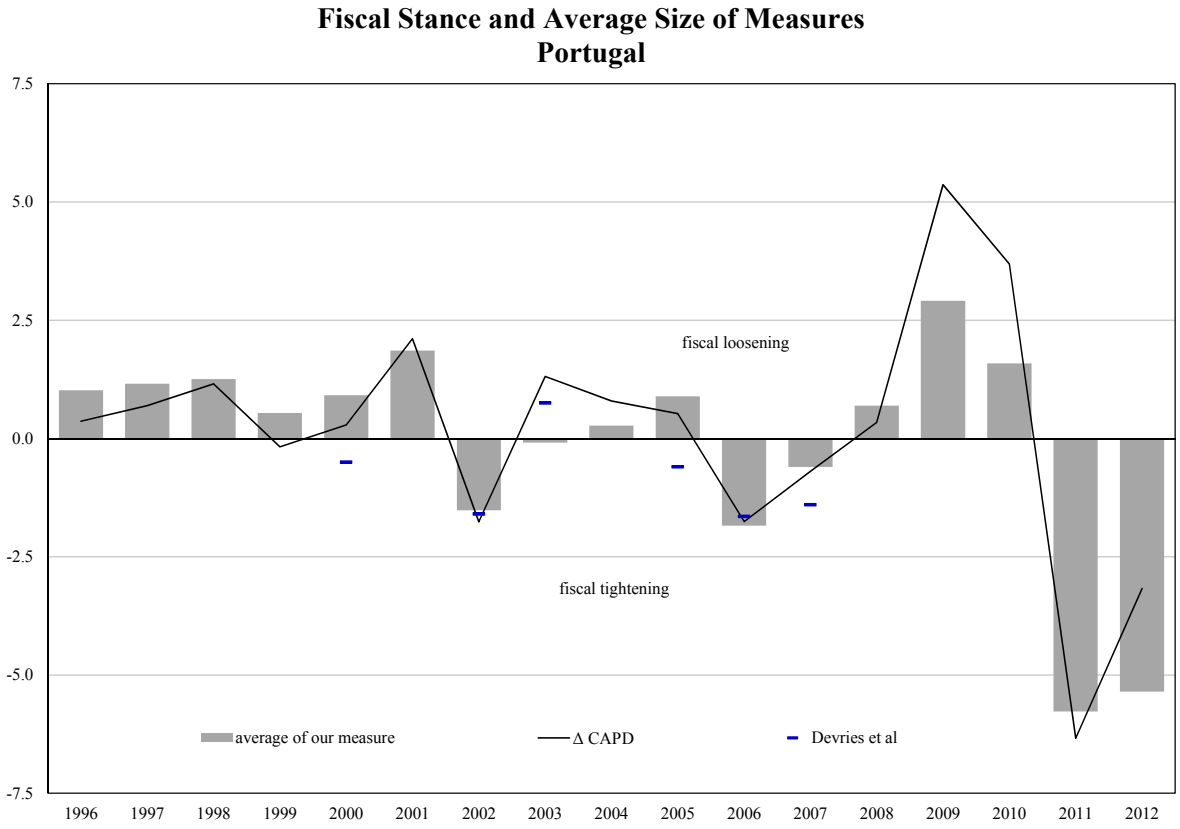
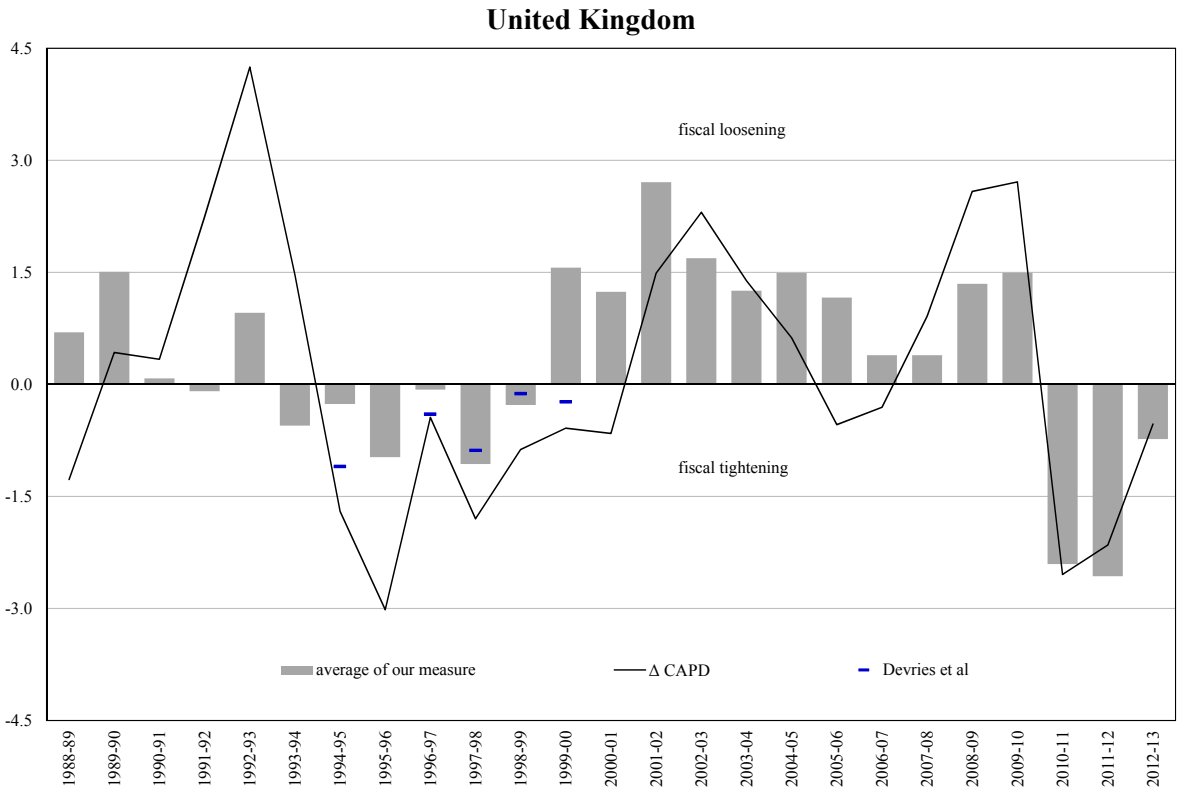


Figure 1*(continued)*





in the first half of the 2000s. Notable episodes of consolidation are identified only in Austria (2001-02), Italy (2006-07) and Portugal (2002-03 and 2006-07).

The last five years of the dataset cover the period of financial crisis, recession and sovereign debt crisis (2008-2012). Initially, the response of fiscal policy (in 2008-09) was to try and support aggregate demand. This coincided with the call at the EU level, in November 2008, for a coordinated fiscal stimulus: the so called European Economic Recovery Plan. This is the only obvious episode in our dataset of fiscal policy responding in a counter-cyclical fashion to macroeconomic conditions. The major exception here is Italy, which presented a small stimulus package, but one which was fully financed, leaving the overall stance of policy unchanged. During 2010-12, fiscal policy was driven by the need to bring down (in some cases very) large deficits. For Spain, Portugal and the United Kingdom, the magnitude of the fiscal consolidation was unprecedented in modern times. For Italy, the fiscal consolidation was large, but not more so than in the early 1990s (according to our measures). Fiscal policy was also tightening in France, Austria and Poland, but by a lesser order of magnitude.

4.2 How does our measure compare to the change in the cyclically-adjusted primary deficit?

There are not many alternatives against which to benchmark our measure(s) of discretionary fiscal policy. Here we compare the evolution of our measure(s) against: (i) the traditional measure of the fiscal stance, *i.e.*, the change in the cyclically-adjusted primary deficit and (ii) the episodes of fiscal consolidation identified by Devries *et al.* (2011).

For the change in the cyclically-adjusted primary deficit (ΔCAPD), we have taken the estimates produced by the European Commission (except in the case of the United Kingdom, for which, in order to have financial year estimates, we have taken figures from the Office for Budget Responsibility). These are the estimates most commonly used for the purpose of research into fiscal policy in EU Member States. Since the idea is to compare our measure with what researchers might normally use to analyse fiscal policy, we have also corrected ΔCAPD for some obvious, large one-off events (e.g., proceeds from sales of UMTS licences, capital transfers recorded in view of injections of capital into banks during the financial crisis). These are things that we would expect to be spotted and adjusted for by researchers.

A casual glance at Figure 1 is enough to confirm that, as long as we have done a reasonable job in developing our measure(s), ΔCAPD is not a good gauge of "active" fiscal policy. Even though in the majority of cases our measure(s) and ΔCAPD move in the same direction and there are some obvious common trends, major differences – both in terms of sign and size – are definitely not rare events. More details on the reasons for this for each country can be found in the appendix, but one obvious explanation is that the tax-to-GDP (excluding the impact of measures) is not stable.

4.3 How does our measure compare to Devries et al. *(2011)?*

The dataset of Devries *et al.* (2011) only refers to episodes of fiscal consolidation. As such, the comparison with our data can only be for some specific years. For those years for which we can make a comparison, the two measures of discretionary policy nearly always go in the same direction and are often broadly similar in magnitude. However, in some years and for some countries differences are not negligible.

In the case of Italy, the measure of fiscal consolidation contained in Devries *et al.* (2011) tends to be systematically larger than in our data. This is not obviously the case for other countries

(although with generally fewer observations to go by). In some cases, years of consolidation identified in Devries *et al.* (2011) are not identified as such in our data. The obvious cases are Italy in 1998 and 2005, Portugal in 2000 and 2005 and the United Kingdom in FY 1999-2000.

The differences between Devries *et al.* and our measure(s) for Italy, Portugal and the United Kingdom are investigated further in Figure 2, which distinguishes between "tax" and "spending", and also shows our three measures for spending using the different benchmarks.

Often, it is possible to identify the main reasons for the differences. To give some examples:

- The different characterization in Italy in 1998 stems mainly from our estimate of the impact of the IRAP reform. This was officially presented as a revenue neutral intervention (and so would be treated as such by Devries *et al.*), but in our view it turned out to imply a loss of revenue. Also in 2004 and 2005 tax policy in Italy was clearly expansionary given the implementation of the tax reform started in 2003.
- In the case of Portugal, in 2000 we have net tax cuts because of changes to the tax on oil products to offset the effect on consumer prices of rising international oil prices; while in 2005 we have the lagged effect of the cut in the main corporate income tax rate from 30 to 25 per cent in 2004.
- In the case of the United Kingdom for FY 1999-2000, Devries *et al.* are measuring the effect of consolidation measures announced in the November 1996 and June 1997 budgets. By 1999-00, however, fiscal policy had turned more expansionary, with, for example, increases in child benefit and income support, the introduction of working tax credit (which we consider here as benefits spending), and winter fuel payments.

In general, we observe that Devries *et al.* (2011) identified consolidation for a particular year based on a package presented in a particular budget, but may have missed the effects in that year of offsetting measures announced earlier or later.

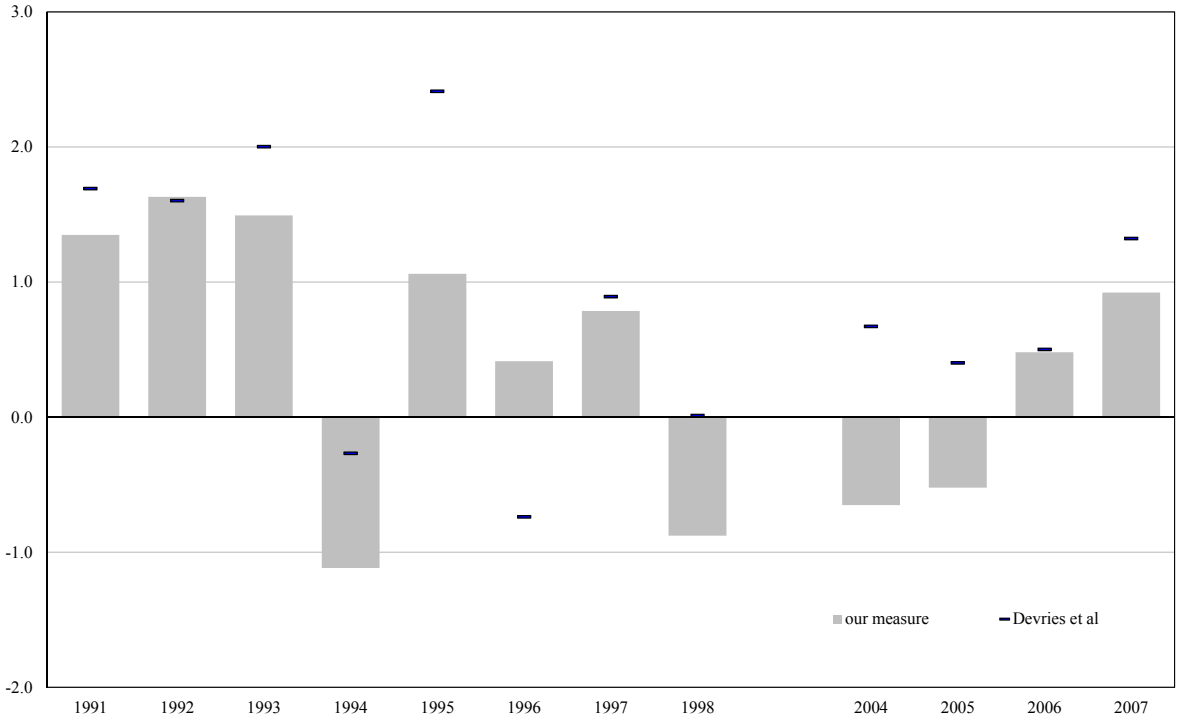
Another general observation is that differences are generally much larger for Italy and Portugal than they are for the United Kingdom, both on the tax side and on the spending side. We consider that this reflects the different nature of the information contained in budget documents in the countries considered.

The United Kingdom stands out as a country where, with very few exceptions, changes to tax and spending are announced on budget day. Moreover, budget documents in the United Kingdom present forecasts for the public sector finances as a whole (and for some years now also on a national accounts basis). The presentation of tax and spending measures is linked very closely to those forecasts, which, moreover, take as a starting point the latest forecast for the public finances in the current year. As a consequence, our measure is generally close to Devries *et al.* for the United Kingdom.

By contrast, in many countries, like Italy and Portugal, budget documents are not in their nature suited to obtaining an overall picture of the active stance of fiscal policy. Especially in the case of spending, budget documents present changes in "appropriations" or "accounts" available for spending by different line ministries, the evolution of which may bear little resemblance to the evolution of actual spending. In many countries, budget documents present spending budgets (appropriations) in relation to the initial budget appropriation of the previous year. There may, however, be either a significant underspend in relation to this budget or the appropriation may have been amplified during the year. So it is quite possible for a budget appropriation to be cut while actual spending increases or vice versa.

Figure 2

Comparison with the IMF Narrative Measures
Italy
Tax



Spend

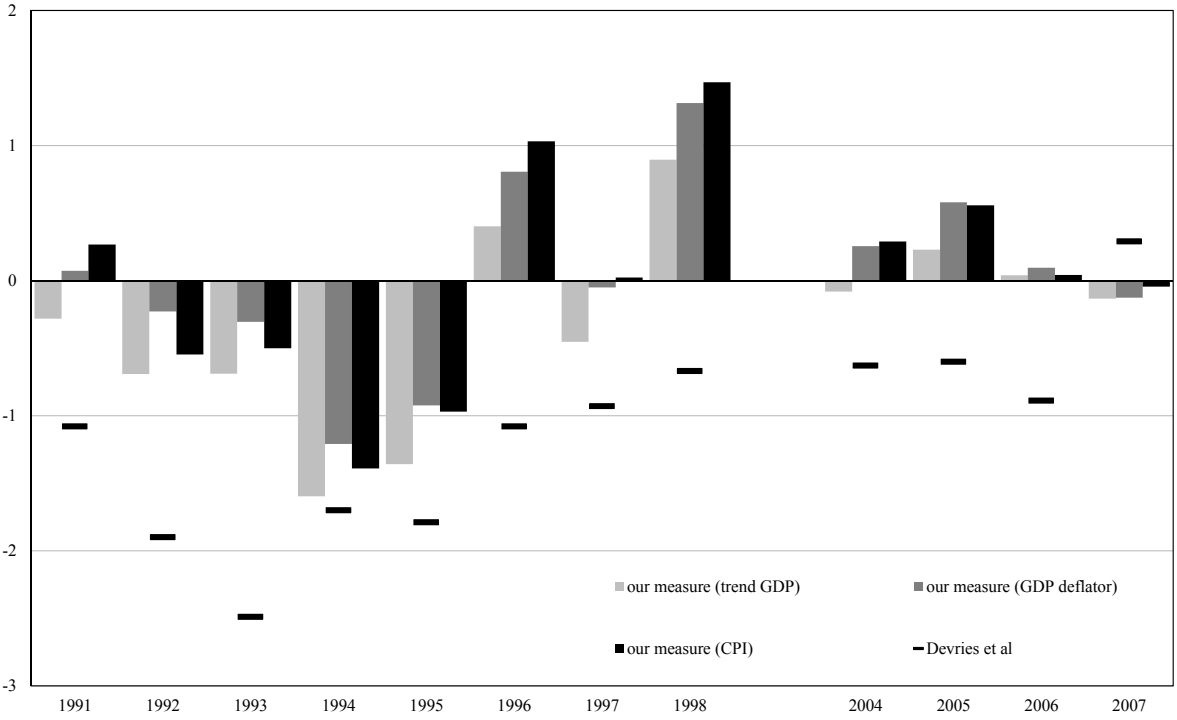
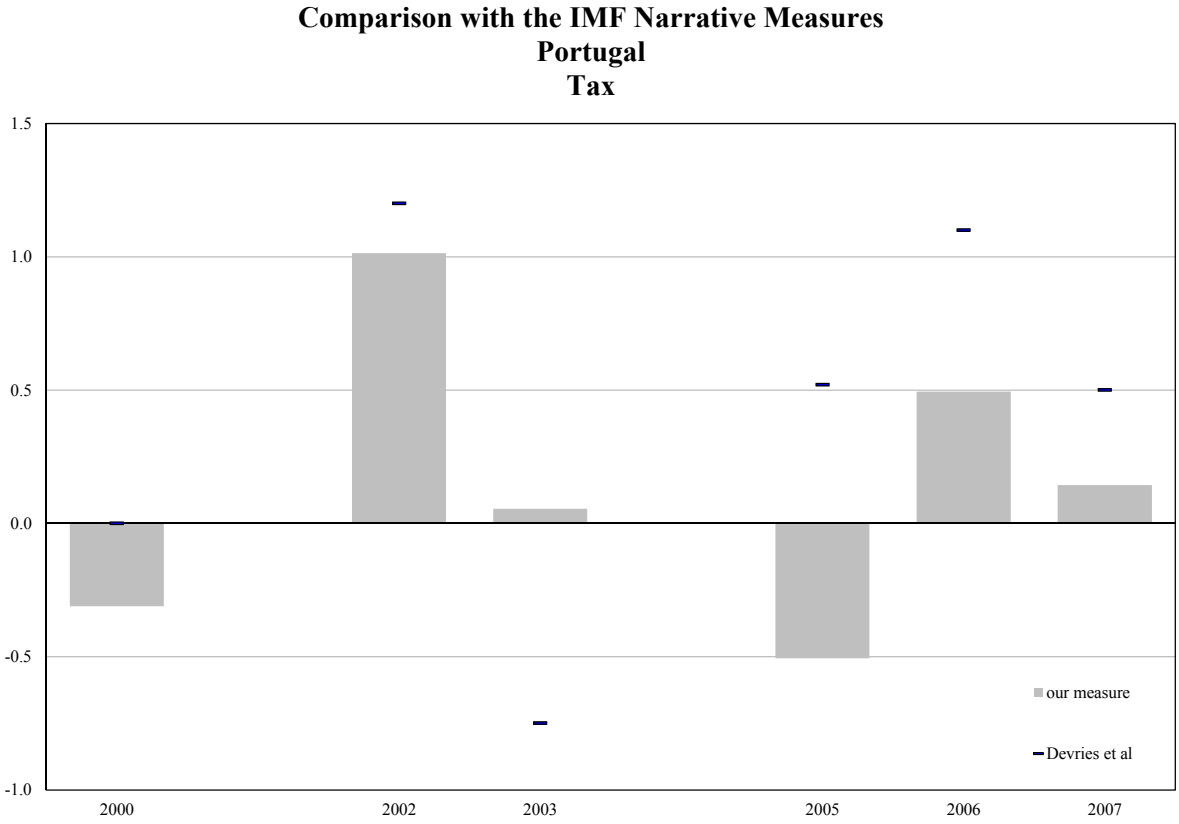


Figure 2 *(continued)*



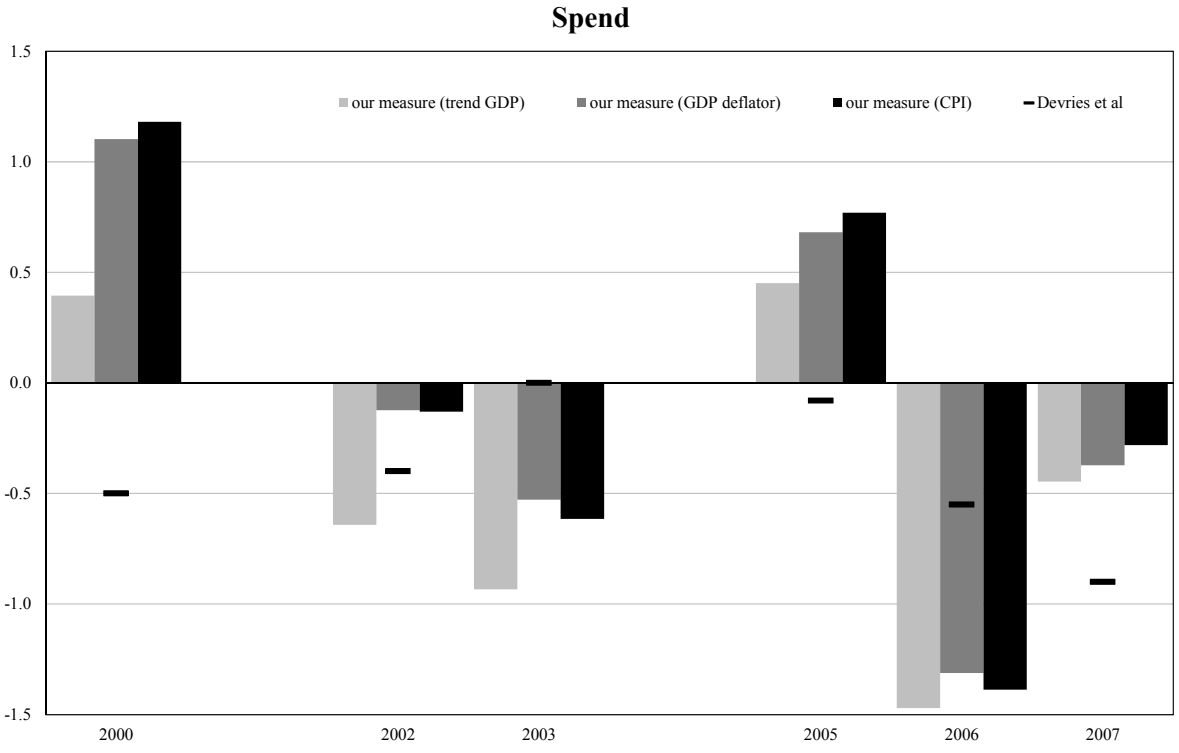
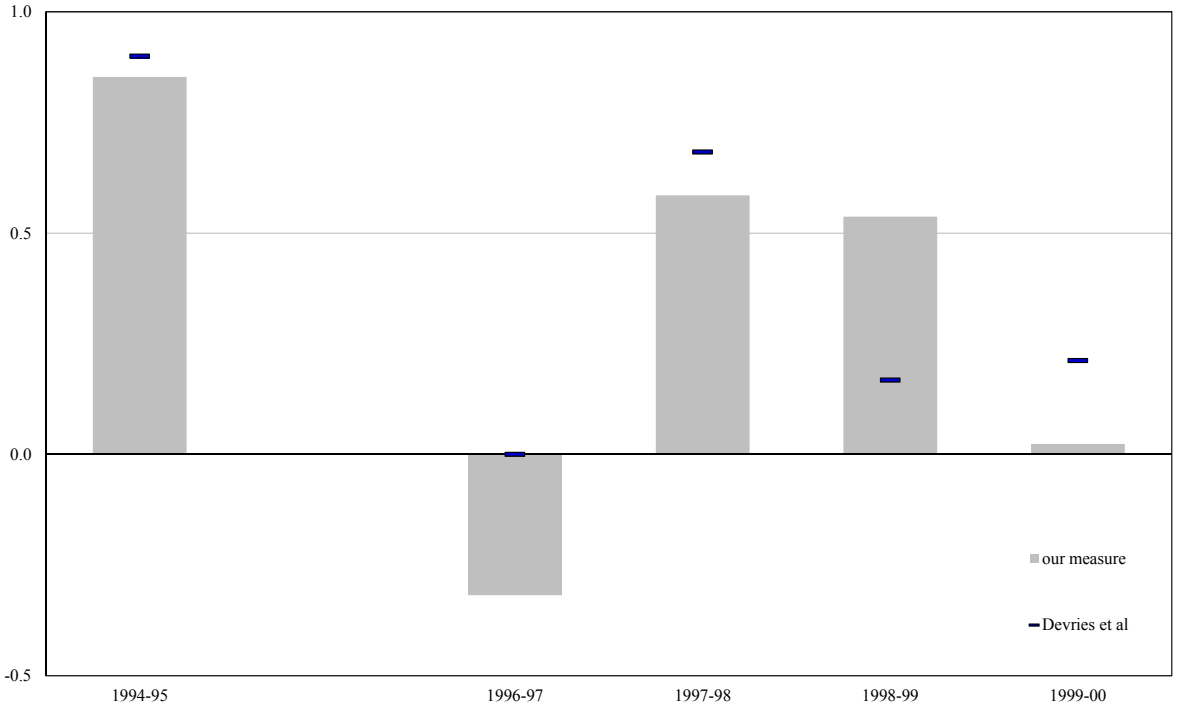
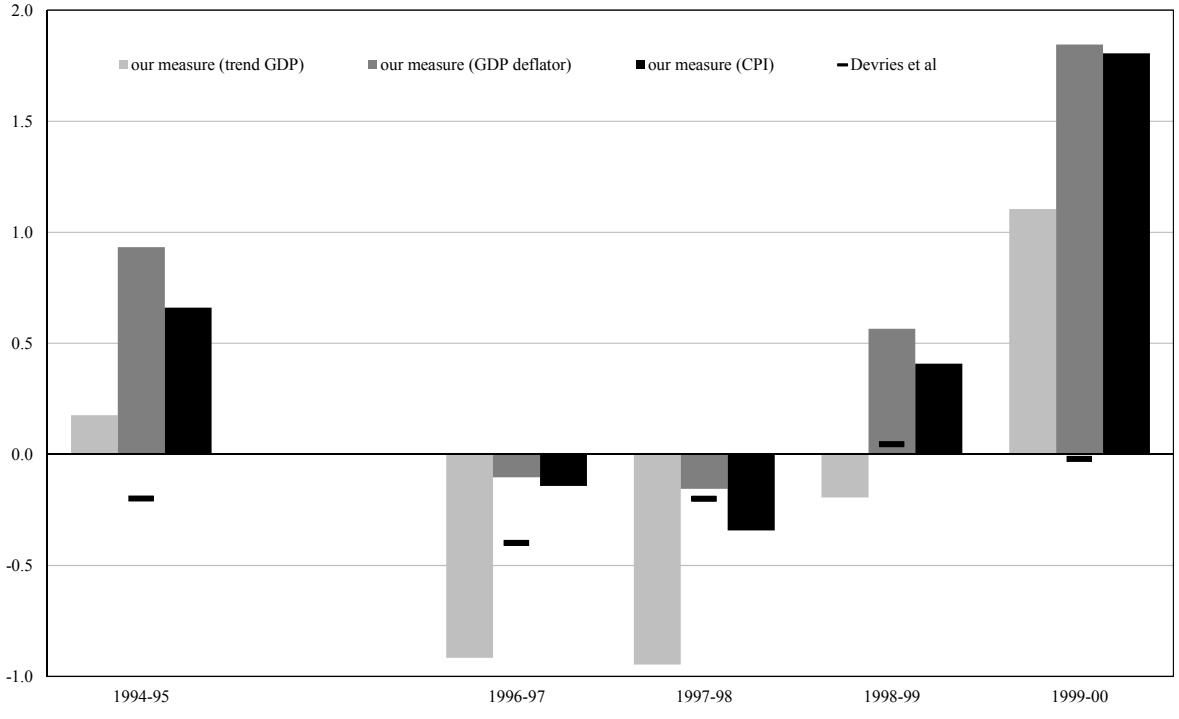


Figure 2 *(continued)*

Comparison with the IMF Narrative Measures
United Kingdom
Tax



Spend



5 Some preliminary estimates of fiscal multipliers

Next, we use the data collected to make some estimates of the impact of discretionary fiscal policy on real economic activity. The estimation of so called *fiscal multipliers* is a quite straightforward application of the data. However, as mentioned in the introduction, we believe that our data could be used for a variety of different purposes, including an evaluation of the cyclicality of fiscal policy (as, for example, in Golinelli and Momigliano, 2009) or to assess the stance of fiscal policy.

The estimates we present here are very preliminary. At the moment the data cover a limited number of countries and are still under a process of revision. Besides fine-tuning the datasets we expect to add more countries (and hence more observations) at later stage. The estimates presented here may therefore change and, hopefully, become more robust. Also, at this stage, the econometric specification is kept simple and does not tackle all potentially relevant factors to be controlled for.

The focus of the exercise is on the effect of fiscal policy in the short term, which our data suggest to be restricted to the first two years, starting from the actual implementation of a measure. Robustness checks with more lags in the econometric specification return coefficients that are not significant.[14] For the baseline regression, we only consider the year of entry into force of the legislated change (year t) and the following one (t+1). At this stage, we do not include in our analysis the year in which the measure is legislated, which is usually (but not always) towards the end of the year before entry into force (year t–1), even though this is feasible given the information collected.

We present estimates for both the impact of discretionary fiscal policy overall (*i.e.*, the sum of tax less spending changes implemented in one year) as well as a breakdown of the effect of measures affecting net taxes (tax minus social benefits) and other spending measures. Our baseline regression specifications take the following forms:

$$\Delta Y_{i,t} = \rho \Delta Y_{i,t-1} + \sum_{s=0}^{1} \beta_s \, adj_{i,t-s} + \gamma_i + \mu_t + \varepsilon_{i,t} \quad (1)$$

and

$$\Delta Y_{i,t} = \rho \Delta Y_{i,t-1} + \sum_{s=0}^{1} \omega_s \, tax_{i,t-s} + \sum_{s=0}^{1} \delta_s \, exp_{i,t-s} + \gamma_i + \mu_t + \varepsilon_{i,t} \quad (2)$$

where subscript *i* indexes countries, subscript *t* indexes years, $Y_{i,t}$ is the logarithm of real GDP, the terms $adj_{i,t-s}$, $tax_{i,t-s}$ and $exp_{i,t-s}$ come from our series of discretionary fiscal measures, being respectively total fiscal policy, net tax measures and spending policy; ε is a mean-zero error term which is country and time specific. The specification includes a one year lag of the dependent variable capturing the normal dynamics of GDP and ρ is its autoregressive coefficient. Equation 1 is estimated by including country and year-fixed effects (the terms γ_i and μ_t respectively) to net out from the multiplier estimates all country and year-specific factors.

Equation (2) recalls the setting of Romer and Romer (2010) adjusted to account for the cross-country dimensionality (by mean of country fixed effects) of our data: our coefficient ω would compare to their tax multiplier after including in their regression episodes of tax changes motivated by expenditure changes.[15]

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[14] This is broadly in line with the finding of Devries *et al.* (2011). Romer and Romer find that the impact of tax measures peaks after 2½ years. Also, we find no evidence of reversion of the impact from the third year onward: the regression coefficients turn marginally negative but not significant at all.

[15] One difference would still remain as Romer and Romer (2010) exclude also episodes of tax changes motivated by the desire to respond to cyclical fluctuations of the economy. However, for the time span covered in our study (1985-2013), they find that such tax interventions are basically not present. See Section 3.

The coefficients of interest are β, ω and δ which represent the direct effects (contemporaneous and lagged) of total fiscal policy, net tax changes and spending policy, respectively. We cumulate the estimated responses at each time lag to recover the cumulative response of real GDP (in logs) to a permanent 1 percent of GDP fiscal adjustment, as well as tax or spending changes. Estimation is by ordinary least squares; robust standard errors of the cumulative responses are calculated via the delta method.

Table 2 provides the results of our econometric specifications. Columns 1 and 2 summarize the results of specification 1, looking at the impact of fiscal adjustment overall. Specifically, column 1 reports the estimated effect of a fiscal tightening amounting to 1 per cent of GDP on real GDP relative to normality (in logs), for our measure of fiscal policy in which other spending is compared to the growth of trend GDP. According to the estimates, a fiscal consolidation amounting to 1 per cent of GDP reduces real GDP by 0.34 per cent in the first year and a cumulative 0.58 per cent after two years. The estimate is in line with what was found by Devries *et al.* (a cumulative impact of 0.62 per cent after two years). It is robust to the approach used to benchmark government spending growth: as shown in column 2, when using CPI as the benchmark, the coefficient is again 0.34 in the first year and just slightly lower (0.53) in cumulative terms in the second year.

Thus, according to these estimates, fiscal policy has a multiplier that is broadly consistent with the 0.5 usually assumed in institutional analyses (see on this Blanchard and Leigh, 2013), and these estimates would certainly reject any hypothesis of self-defeating consolidation.[16] Our regressions do not distinguish between fiscal stimulus and fiscal consolidation, although doing so may be possible at a later stage if more observations can be included in the dataset. Fiscal spillover effects across countries may also be quite relevant, as shown by Auerbach and Gorodnichenko (2013); but, other than controlling for country-specific fixed effects, at present we do not account for such potential cross-country interactions.

Columns 3 and 4 provide the results of specification 2, estimating the impact of changes to net taxes and to other spending (again, in the latter case, using both the trend GDP and CPI benchmarks). The net tax coefficient is always significant: the coefficient is 0.38 or 0.51 in the first year, rising to 0.54 or 0.70 in the second year (depending on the benchmark used to measure spending policy included in the regression). This would be within the range of many previous estimates (see, for example, Jérôme *et al.*, 2008). Turning to other spending, when using CPI as a benchmark, the first year coefficient is 0.31, rising to 0.51 in the second year, and both are significant. When using trend GDP as a benchmark, the coefficient in the first year is small and not significant, while in the second year it is 0.46 and significant. These estimates are relatively low compared to previous studies.

Numerous factors must be considered when analysing the estimates for other spending. First, differently from net taxes, the focus of the analysis on other spending should primarily be on the cumulative effect after two years. Changes to taxes and benefits are in most cases legislated towards the end of year t–1 and fully enter into force already at the beginning of year t. In the case of other expenditure, spending increases or cuts are more likely to take effect during the course of a given year. As such, they are likely to display direct, multiplicative effects in the following year (see footnote 17). Our identifying approach cannot capture this feature. If, for example, a purchase of goods is cancelled in November of year t, we would record it as a spending shock in year t even though this action is likely to produce its (multiplicative) effects only in year t+1.

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[16] Blanchard and Leigh (2013) find evidence of self-defeating consolidation. Apart from their approach being very different from ours, their sample include Greece and Ireland where fiscal consolidation in the last few years took place in a context off (and contributed to) very deep recessions.

Table 2

Regression Results

Variables	Standard Specification				Excluding Wages		Excluding Growth Lag			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Fiscal Adjustment	**Fiscal Adjustment**	**Tax and Expenditure Breakdown**	**Tax and Expenditure Breakdown**	**Tax and Expenditure Breakdown**	**Tax and Expenditure Breakdown**	**Fiscal Adjustment**	**Fiscal Adjustment**	**Tax and Expenditure Breakdown**	**Tax and Expenditure Breakdown**
	Based on Trend GDP	***Based on CPI***	***Based on Trend GDP***	***Based on CPI***	***Based on Trend GDP***	***Based on CPI***	***Based on Trend GDP***	***Based on CPI***	***Based on Trend GDP***	***Based on CPI***
Lagged dependent variable	0.365***	0.288***	0.375***	0.293***	0.378***	0.300***				
	(0.0880)	*(0.0892)*	*(0.0866)*	*(0.0937)*	*(0.0831)*	*(0.0868)*				
Fiscal adjustment (trend GDP)	0.337***						0.375***			
	(0.0931)						*(0.0980)*			
2 years cumulative	0.576***						0.761***			
	(0.110)						*(0.116)*			
Fiscal adjustment (CPI)		0.340***						0.385***		
		(0.0800)						*(0.0826)*		
2 years cumulative		0.526***						0.692***		
		(0.0873)						*(0.0868)*		
Net tax			–0.513***	–0.377**	–0.556***	–0.422***			–0.510***	–0.295
			(0.148)	*(0.165)*	*(0.141)*	*(0.155)*			*(0.168)*	*(0.178)*
2 years cumulative			–0.703***	–0.542**	–0.759***	–0.588***			–0.884***	–0.548**
			(0.213)	*(0.244)*	*(0.198)*	*(0.222)*			*(0.225)*	*(0.263)*
Exp (trend GDP)			0.177		0.230				0.255	
			(0.152)		*(0.178)*				*(0.169)*	
2 years cumulative			0.459**		0.670***				0.653***	
			(0.201)		*(0.225)*				*(0.198)*	
Exp (CPI)				0.311**		0.388**				0.437***
				(0.142)		*(0.174)*				*(0.150)*
2 years cumulative				0.514***		0.754***				0.779***
				(0.174)		*(0.213)*				*(0.157)*
Observations	150	150	150	150	150	150	150	150	150	150
R-squared	0.856	0.863	0.859	0.863	0.863	0.865	0.829	0.849	0.831	0.849
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Second, our aggregate of other spending consists mainly of (i) direct government purchases of goods and services, (ii) government investment and (iii) compensation of government employees. The latter is conceptually different from the other two categories in the sense that increases in compensation of government employees can be due either to higher government employment (which should raise output) or increases in average wages (which should mainly affect prices). The response of government employees to an increase in their average wages may be more similar in nature to how they would react to higher transfers (*i.e.*, a part might be saved). In columns 5 and 6 we present estimates excluding compensation of government employees from our aggregate of other spending. When doing so, the coefficient on spending after two years rises to 0.67 or 0.75 (depending on the spending benchmark used). Last, even if not reported in Table 1, we find that when excluding the crisis years from the dataset (*i.e.*, years 2008-12) the coefficient on spending reaches the level of 0.85 (*i.e.*, still below unity).

To conclude this section, let us briefly return to the issue of endogeneity. As noted in Section 3, if our measure of fiscal policy is not truly exogenous (with respect to the economic cycle), our regressions would suffer from an omitted variable bias which, would reduce the size of our estimated coefficients (if endogenous fiscal policy is counter cyclical). In this regard, it is notable that when we use trend GDP as the benchmark to identify spending shocks (columns 3 and 5), the coefficient estimates for both net taxes and other spending become smaller and, especially in the case of spending, less significant. This suggests that the approach based on trend GDP is likely to introduce some bias and requires further investigation.

Following Devries *et al.* (2011), we also run the four regressions of our standard specification after excluding the lagged dependent variable from among the regressors. The results are reported in columns 7 to 10 of Table 1. This is not a robust and conclusive strategy to address the issue, but it is a relevant first step. If fiscal policy is correlated with the cyclical position of the economy, one would expect to see a correlation between lagged growth and fiscal policy and this would affect the coefficient estimates. By contrast, if controlling for lagged growth does not have an appreciable impact on the multiplier estimates, this would suggest that endogeneity is not impairing our estimates.

The results are somewhat mixed. In general, the coefficient estimates remain in a similar range and mostly remain significant. The coefficient estimates do, however, tend to increase in size, especially after two years. Overall, our conclusion would be that, based on this initial analysis, any endogeneity problem does not seem to be that large; but it is certainly an issue to return to when our dataset is refined and expanded to include more observations.

6 Conclusions

This paper has presented a new dataset for measuring discretionary – or action-based – fiscal policy in selected EU Member States. The data have been constructed by drawing on experience of compiling estimates of the impact of fiscal policy measures over several years within the European System of Central Banks. It represents a first attempt to document, check and if necessary re-estimate the impact of these measures, as well as to extend this information further backwards in time. The intention is to produce a dataset which is reliable, detailed, available to the public, and which may be regularly updated, improved, and extended to other countries in the future. This dataset may have several potential uses, including the estimation of fiscal multipliers and tax elasticities, the assessment of fiscal effort, and the analysis of the stance of fiscal policy and its composition more generally.

In this paper we have described our data and compared our new measure to other measures of fiscal policy widely used in the past literature, namely ΔCAPD and the dataset constructed by

Devries *et al.* (2011). Even though in the majority of cases our measure(s) move in the same direction as these other measures, and there are some obvious common trends, major differences - both in terms of sign and size - are not rare events. Our analysis supports the view that ΔCAPD is not a reliable indicator of the active stance of fiscal policy. Our measure differs from Devries *et al.* mainly because of completeness (capturing all tax and benefits measures rather than just very specific episodes), and because of the different approach we adopt to measuring fiscal policy in relation to most government spending (adjusted for shifts not related to policy and then compared against a benchmarks for the neutral growth rate).

We have then used our data to make some estimates of fiscal multipliers. The estimates we present are sill very preliminary, but the point to fiscal multipliers that are only marginally higher than the standard ones used in institutional analysis and are broadly in line with the ones estimated by Devries et al. (2011). We find no evidence in support of self-defeating consolidation. The issue of endogeneity warrants further investigation when our dataset has been refined and extended. But our initial assessment is that the issue is not likely to alter the bulk of our estimates and conclusions.

APPENDIX

The following pages present country write-ups containing the following information:

- The reasons for the selected time period of the dataset (*i.e.*, in particular the obstacles preventing extension of the data further back in time.
- Details of the sources and methods used to compile the data. These include the main sources and methods used to obtain estimates of the impact of changes to the tax and benefits system, the identification of omitted spending, and any other information deemed useful to understand how the data was compiled.
- A brief analysis of the data (accompanied by a common set of charts). This includes highlighting the main episodes of fiscal policy, how our measure of fiscal policy differs from the fiscal stance, as measured by the change in the cyclically-adjusted primary deficit, the main tax measures introduced during the sample period and how the incidence of tax measures compares with the change in the tax-to-GDP ratio.

The countries included are:

- Denmark
- Spain
- France
- Italy
- Austria
- Poland
- Portugal
- United Kingdom

DENMARK

1 Time period

The dataset for Denmark covers the period from 1999 to 2013. The starting point is chosen to ensure sufficient data coverage and an appropriate quality of the estimations of the impact of tax changes. The dataset is mainly based on publications from the Danish Ministry of Finance and legal documents combined with estimates produced by the Danish Ministry of Taxation.

2 Sources and methods

2.1 Impact of tax and benefit changes

The estimates of the impact of changes to tax and benefits legislation are based on public information from the Ministry of Finance and the Ministry of Taxation. Measures amounting to around or above 0.1 per cent of GDP have been included. However, some measures smaller than 0.1 per cent of GDP have also been included if they were part of a package of measures, which have a total size above 0.1 per cent of GDP. Generally, on the revenue side, the direct effects have been reported and on the spending side the initial measures have been reported (*i.e.*, the 2nd round effects have not been included in the reported size of the measure). Due to the high standard and broad data coverage from the ministries it has not been necessary to make our own estimations.

2.1.1 Other spending

The spending data is that contained in the 2013q3 release of the quarterly national accounts published by Statistics Denmark.

2.1.2 Omitted spending

The Credit Package (in Danish: Kreditpakken) from 2009 offered interest-bearing government loans to banks and mortgage institutions. It resulted in capital injections of hybrid capital of 45 billion DKK carrying an interest rate of 10 per cent in average. In 2011 the capital injection/government loans were written down by 2.5 billion DKK due to losses on loans.

In 2012 people who chose to leave the Voluntary Early Retirement Pension (VERP) scheme where given refunds of their contributions, around 29 billion DKK. The contributions to the VERP scheme were tax deductible and should be taxed when paid out the person when receiving the VERP payments. In 2012, if a person chose to leave the scheme in the time window April to October, the refunds were tax free. The measure had a liquidity effect but no effect on household wealth.

3 Analysis

3.1 The main episodes of fiscal policy

In 1999 fiscal policy tightened slightly as a consequence of the 1998 tax reform, which was implemented in order to ensure more expedient balances (both internal and external).

The loosening of fiscal policy in 1999-2010 is to be seen in a context of persistent overspending in the public sector in this period. Every year from 1999 to 2010 (except 2003) public

consumption in volume terms increased by more than planned by the government in its medium-term plans. This was in particular due to budget overruns in the municipalities. As a consequence, public consumption as a share of potential GDP increased by 3 percentage points from 1999 to 2009. Furthermore, the tax freeze, which had effect from 2002, also contributed to the loosening of fiscal policy up to 2010. Taxes on labour income were also lowered in this period.

In 2008-10 fiscal policy was loosened significantly to mitigate the impact of the financial crisis on economic activity. Public investment projects were initiated, public consumption was allowed to increase more than initial planned, and the 2009-tax reform, which had impact from 2010, was deficit increasing in the short run.

Fiscal policy tightened in 2011-13 as a result of the measures introduced to lower the public deficit after Denmark became the subject of an Excessive Deficit Procedure (in mid-2010). The measures included a freeze of the tax brackets, which otherwise should increase almost in line with wage inflation, and a tightening of the entitlement to unemployment insurance. Furthermore, it was planned to keep public consumption in volume terms at around its 2010 level until 2013. This was backed up by a much stricter sanction mechanism for budget overruns in the municipalities. Subsequently, the public consumption in volumes has been lower than planned and was, in 2013, a little lower than in 2010.

Comparing our measure(s) of fiscal policy with the change in the cyclically adjusted primary deficit estimated by the European Commission the following is noteworthy. In 2004 and 2005 we would characterise fiscal policy as clearly loosening, whereas the fiscal stance as measured by the change in the cyclically adjusted primary deficit was tightening. This can mainly be explained by extraordinarily high tax revenues from North Sea production, corporate tax receipts, in particular from the financial sector, and the tax on pension yields. The higher revenues were *per se* not driven by discretionary changes in the tax system, but rather by the evolution of the tax base.

3.2 Tax measures and changes in the tax-to-GDP ratio

Changes in taxation during 1999-2002 were driven by the 1998 tax reform. Overall, the reform was revenue neutral, but the composition of tax revenues was changed gradually in the period implying that the reform was not revenue neutral in every single year.

During 2002 to 2009 the government imposed a so-called “tax freeze”. Under this freeze, no tax or duty could be raised. More specifically, if a tax or duty was collected as a percentage rate, e.g. VAT, the percentage rate would not be raised. Accordingly, if a tax or duty was collected by an amount in Danish kroners, e.g. gas duty, the amount in Danish kroners would not be raised. If a tax or duty had to be raised, the higher revenue should be used solely to decrease another tax or duty. Furthermore, as part of the tax freeze, a ceiling measured in Danish kroners was introduced for the property value tax.

The tax freeze has an impact on the reported tax measures if the tax revenue normally would have increased but did not due to the freeze. This was the case, for example, when the property value tax did not increase in spite of rising house prices up to 2007.

In 2004 taxes were lowered on labour income, and in 2008 and 2009 the working tax credit and the middle income tax bracket was increased.

In 2009 and 2012 there were two major tax reforms, having impact from 2010 and 2013, respectively. They were to be phased in over a ten year horizon and were both characterised as being deficit funded in the beginning of the phase-in. Thus they contributed to a lowering of the tax-to-GDP ratio from 2010-13.

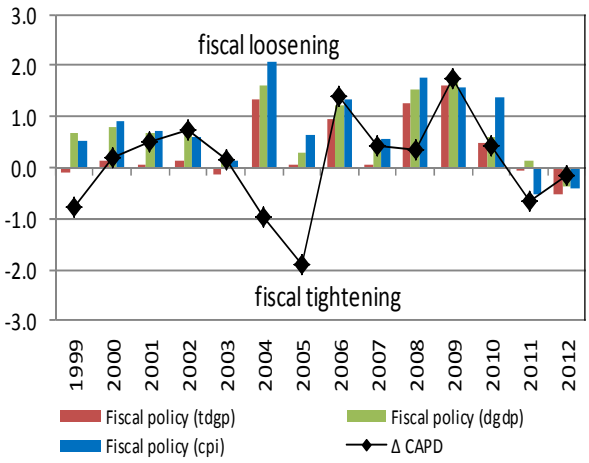
In 2011-13 personal income tax brackets were frozen as part of the measures introduced to comply with the EDP. In 2011 and 2012, however, these measures were counterbalanced by the 2009 and 2012 tax reforms.

Throughout the sample period, the relationship between tax measures and changes in the tax-to-GDP ratio is tenuous. This is mainly explained by fluctuations in tax revenue from the pension yields and from corporate tax, in particular the revenue from oil and gas production in the North Sea and the financial sector, which are quite volatile and not closely correlated with GDP.

Denmark

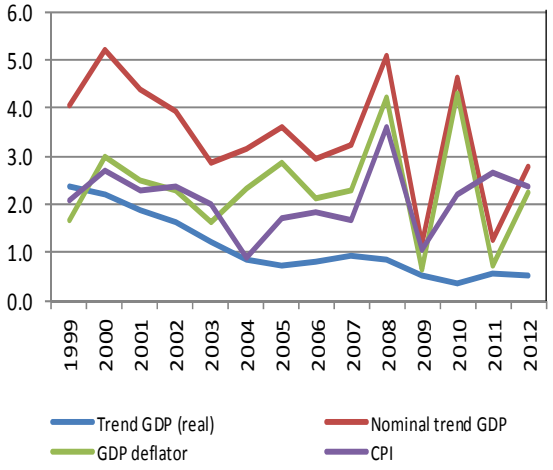
1. Measures of fiscal policy

% of GDP



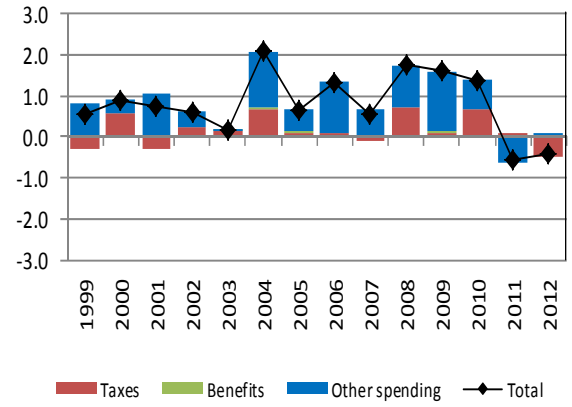
2. Spending benchamrks

annual percentage change



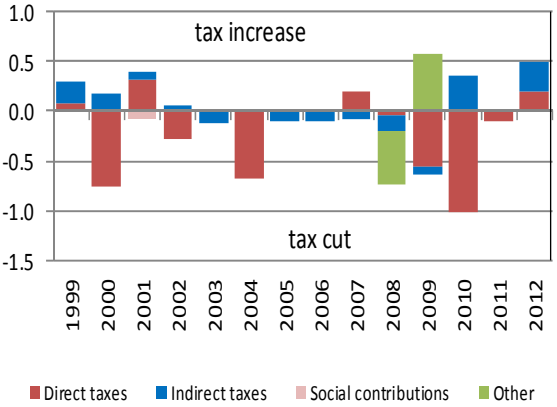
3. Composition of fiscal policy

% of GDP ("other spending" w.r.t. CPI)



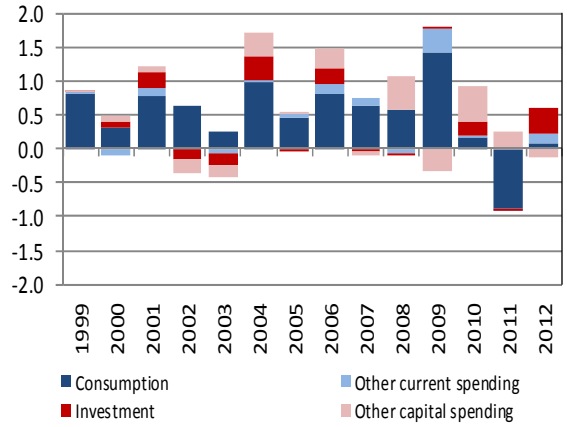
4. Composition of tax measures

% of GDP



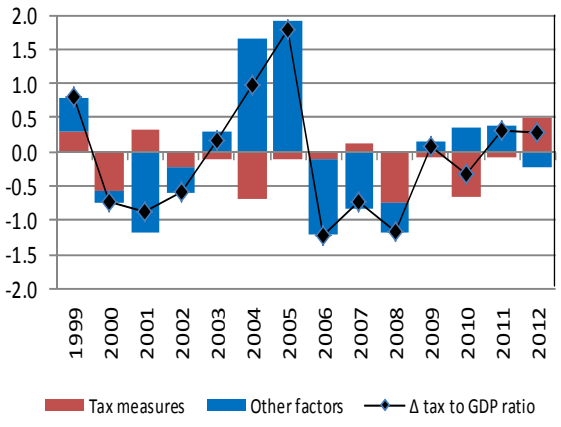
5. Composition of "other spending" w.r.t. inflation

% of GDP



6. Tax measures and changes in tax-to-GDP ratio

% of GDP, per cent



Notes:

Δ CAPD = change in the cyclically adjusted primary deficit estimated by the European Commission, excluding capital transfers to financial institutions in 2011 and the Voluntary Early Retirement Pension Scheme in 2012

REFERENCES (DENMARK)

The Danish Ministry of Finance

- Annual budget draft (years 1999-2013)
- Annual budget bill (years 1999-2013)
- Budget Review, several editions from 1999-2013
- Economic Survey, several editions from 1999-2011
- Publications with the annual agreements between the government and the municipalities and the regions, several vintages from 1998-2013)
- Several publications published when bigger agreements have been made

Skatteministeriet (The Danish Ministry of Taxation)

- Answers to questions raised by members of the Parliament or the Tax Affairs Committee.
- Provenuoversigter (in English: Direct effects from legislation changes), each annual edition from 1998-99 up to 2012-13, accessed online: http://www.skm.dk/skattetal/statistik/provenuoversigter/

Økonomi- og Indenrigsministeriet (The Danish Ministry of Economics and the Interior)

- Economic Survey, several editions from 2011-13

Statistics Denmark

- Danish EDP notification, October 2013, Supplementary table for the financial crisis, online: http://www.dst.dk/da/Statistik/emner/offentlige-finanser/oemu-gaeld-og-oemu-saldo.aspx?tab=dok
- Økonomisk-politisk kalender 1997-2013 (In English: Economic-political calendar 1997-2013), online: http://www.dst.dk/da/statistik/emner/konjunkturindikatorer/okonomisk_politisk.aspx
- National Accounts, Q3 2013, dataset
- Quarterly National Accounts, Q3 2013, dataset

SPAIN

1 Time period

The dataset for Spain presently covers the period from 1996 to 2012. The ESA95 data used to construct the spending side of the dataset extends only back to 1995. The dataset is in the process of being extended before this date, which requires building spending aggregates from other sources (e.g. ESA79 data, old vintages of the State Comptroller's dataset BADESPE and historical records from the social security and employment services). Also, for the period before 1995, estimates of tax measures are only partial and need to be made more complete.

2 Sources and methods

2.1 Impact of tax and benefit changes

The estimates are taken partly from official sources and are partly own estimates based on official sources. As a rule, identified measures with an impact of more than 0.01 per cent of GDP have been included. Measures to tackle tax avoidance have not been included.

2.1.1 Estimates taken from official/external sources

Estimates of the impact on net borrowing of changes to tax legislation are based on official sources. The principle sources for recent years are the annual and monthly reports on tax receipts published by the Spanish Tax Administration (AEAT). These are *ex post* estimates, based on actual data for tax receipts and liabilities, and can therefore be considered as very reliable.

In the case of social benefits, official estimates of the impact on net borrowing of changes to legislation are not usually published, although in some cases estimates have been obtained from the documents which accompanied the relevant law through parliament.

2.1.2 Own estimates

In the case of benefits, the estimates are mainly own estimates based on detailed benefits data. Information is especially detailed for the period since 2000, published in the Economic and Financial Reports which accompany the Social Security Budget. Less information is available prior to this period.

In the case of pensions, legislated increases above (below) the rate of CPI inflation have been considered a discretionary spending increase (cut).

In the case of unemployment benefits and other benefits (except pensions), there have been changes to legislation during the period for which we do not yet have estimates. Pending further investigation, the impact of discretionary changes to these items has been provisionally estimated by calculating hypothetical benchmarks. For example, in the base of unemployment benefits, the benchmark was built from registered unemployment, wage growth in the economy and the evolution of the coverage ratio.

2.2 Other spending

2.2.1 Derivation of spending benchmarks

- *Nominal trend GDP*: Real GDP from the Banco de España database. Trend component derived using HP filter (λ=30) and then reflated by the GDP deflator.
- *GDP deflator*: from Banco de España database.
- *Inflation*: Consumer Price Index (CPI).

2.3 Identification of omitted spending

- Assumption by the central government of RENFE (national railway company) in 2004.
- Capital transfers related to support to the financial system in 2011 and 2012.
- The sale of Agua del Ter by the Government of Catalonia in 2012.

3 Analysis

3.1 The main episodes of fiscal policy

- Fiscal policy was tightening in 1996-97. This was the tail end of the mid-1990s fiscal consolidation, which followed the recession of the early 1990s and was also driven by the need to comply with the Maastricht convergence criteria.
- During 1998-2006 fiscal policy was either broadly neutral or loosening mildly (if "other spending" growth is compared to the growth of trend GDP). Still, throughout this period, spending was growing quite strongly in real terms. There were tax reforms in 1999 and 2003 (mainly personal income tax cuts), otherwise tax policy was fairly quiet over this period.
- Fiscal policy became more expansionary in 2007-09 as the government sought to mitigate the impact of the turnaround in the Spanish housing market, the international financial crisis and recession. While spending growth broadly maintained its earlier course (there were some additional increases in investment spending), there were several, important tax cuts (partly of a temporary nature).
- Since 2010, there has been an unprecedented fiscal consolidation (which gained strength in 2011 and 2012). This has involved significant tax increases, more moderate cuts to benefits, but above all deep cuts in both current and capital spending.

Comparing our measure(s) of fiscal policy with the change in the cyclically adjusted primary deficit, the following is noteworthy. During the period 1998-2006, we would categorise fiscal policy as being mildly expansionary, even though the fiscal stance, as measured by the change in the cyclically-adjusted primary deficit, was either neutral or tightening in most years. This can be mainly explained by the fact that the tax-to-GDP ratio was being pushed higher by receipts from the booming housing market. This situation has unwound dramatically since 2008. As a result, we do not see fiscal policy in 2008-09 as loosening anything like as much as the change in the cyclically adjusted primary deficit would imply. Moreover, in 2011-12, we see a much stronger tightening of fiscal policy than implied by the change in the cyclically adjusted primary deficit.

3.2 Tax measures and changes in the tax-to-GDP ratio

As far as tax policy is concerned, the period up until 2007 was one of relative quite in most years, interspersed with intermittent reforms. In 1997, the introduction of new corporation tax

legislation had a significant revenue raising impact. There were personal income tax reforms in 1999 and 2003 with a revenue-reducing impact.

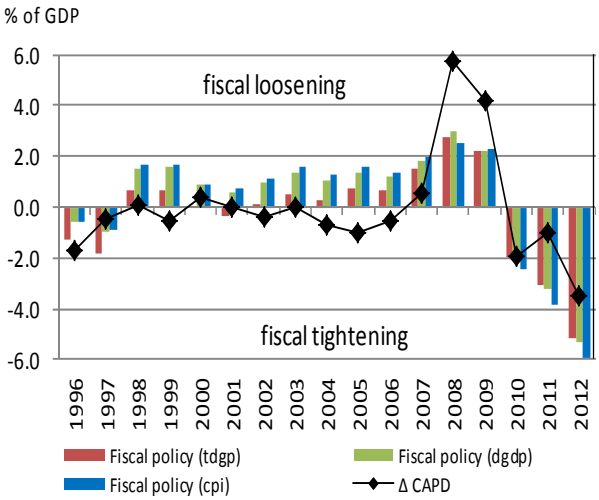
During 2007-09, tax policy was used to provide fiscal stimulus. There were numerous measures, the most important being in the area of personal income tax, including the introduction of a new tax credit for new born children, generous increases in allowances and a rebate on labour income. There were also measures which significantly reduced VAT receipts, although these were mostly of a temporary nature (in particular enabling more small firms to claim VAT on a monthly rather than an annual basis).

Since 2010, there have been significant increases in taxation. These have including two increases in the main and reduced rates of VAT in mid-2010 and in mid-2012. As consequence, the main rate has risen from 16 to 21 per cent and the reduced rate from 7 to 10 per cent. Many of the personal income tax cuts introduced in 2007-08 have been reversed. There have also been several measures aimed at raising personal and corporate income tax receipts, although some of these are, in principle, intended to be temporary.

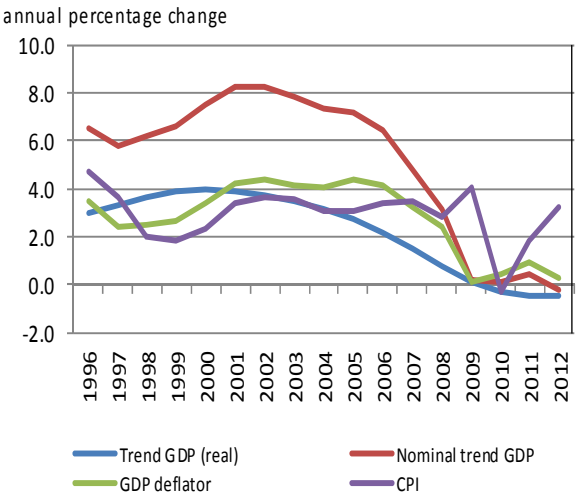
Throughout the sample period, the relationship between tax measures and changes in the tax-to-GDP ratio has been very tenuous. As already noted, from the late 1990s until 2007, the tax-to-GDP ratio was tending to rise in spite of a tax policy that was mostly neutral, with periodic tax cuts. This has its origins mainly in Spain's housing boom, which boosted receipts from VAT and stamp duty as well as personal and corporate income tax receipts on financial profits. This situation has since been reversed. The tax-to-GDP ratio fell dramatically in 2008-09 (by much more than can be explained by tax cuts) and has only risen modestly during 2010-12 in spite of the substantial tax increases.

Spain

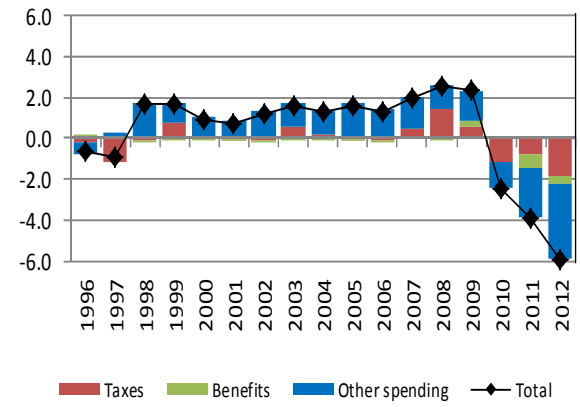
1. Measures of fiscal policy



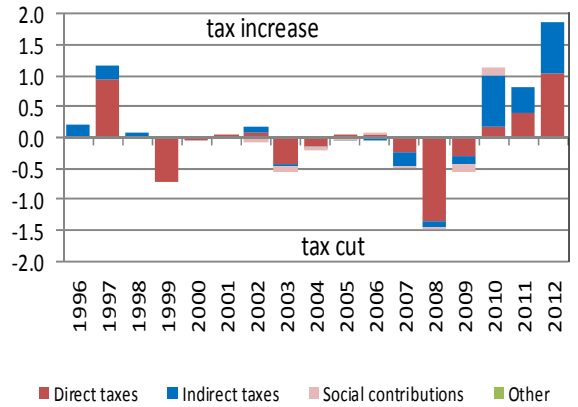
2. Spending benchamrks



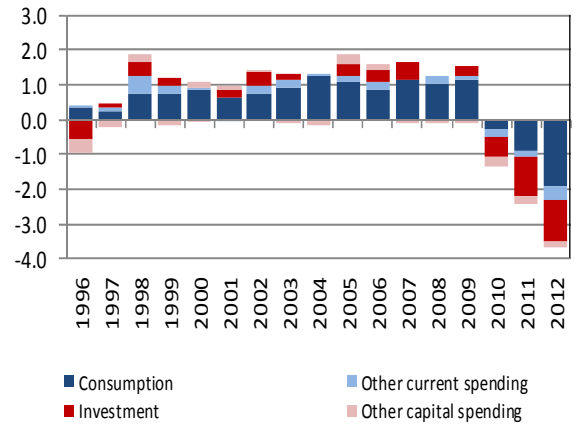
3. Composition of fiscal policy



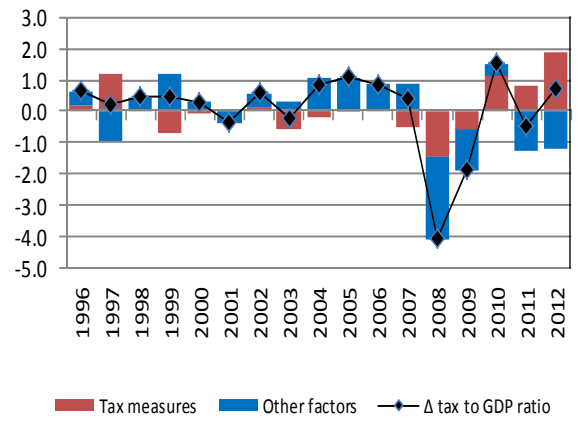
4. Composition of tax measures



5. Composition of "other spending" w.r.t. inflation



6. Tax measures and changes in tax-to-GDP ratio



Notes:

Δ CAPD = change in the cyclically adjusted primary deficit estimated by the European Commission, excluding a large capital transfer to RENFE in 2004, and capital transfers to banks in 2011-2012

FRANCE

1 Time period

The dataset for France covers the period from 1995 to 2012. The starting point is related to the availability of COFOG expenditure data (Classification of the Functions of Government). This data are available only from 1995.

2 Sources and methods

2.1 Impact of tax and benefits changes

The estimates of the impact on net borrowing of changes to taxes and benefits draw on both official sources and on own estimates. Identified measures with an impact of more than 0.05 per cent have been included. However, for recent years, identified measures with a lower impact have been included as they were sometimes numerous and could have a significant impact on the aggregate.

2.1.1 Estimates taken from official/external sources

The Draft Budget Law and the Draft Budget law for Social Security are the main official documents used in order to obtain detailed information on the measures included in Finance Law. These documents give, in general, a complete description of the measures as well as their estimated impact. Some information on these measures could also be found in specific reports prepared by the Parliament and other administrations, in particular the regular report on the tax burden (*Rapport sur les Prélévements Obligatoires*). Another important source of information on the public finances in general – and on changes to the tax and benefits system – is the reports prepared by the Court of Auditors (*Cour des Comptes*). In particular, the Court of Auditors could have a critical assessment regarding the impact of some measures. However, even when they express scepticism about official costings, the auditors do not provide quantitative, alternative estimates.

2.1.2 Own estimates

Own estimates have been made mainly when the impact of a measure was not available, properly specified, or when official estimates seem to have been wide of the mark (which has sometimes been the case for tax measures on tax). Own estimates have also been made regarding the impact of legislated pension increases above or below inflation.

2.2 Other spending

- The expenditure data are taken from the French National Institute of Statistics (INSEE) accounts (2012 notified accounts released in May 2013).

2.2.1 Derivation of spending benchmarks

- *Nominal trend GDP*: Real GDP and GDP deflator are taken from the annual accounts until 2012. Data for the period 2013-15 are taken from BDF forecasts release within the Eurosystem.

Assumptions have been defined in order to extend the sample until 2019 in order to run the HP filter. Cycle and trend component are derived using a smoothing parameter equal to 30.

- *GDP deflator*: is taken from annual national account (INSEE).
- *Inflation*: Consumer Price Index is taken from INSEE.

2.2.2 Identification of omitted spending

- UMTS proceeds in 2000, 2001 and 2012, recording as negative capital transfers payable.

3 Analysis

3.1 The main episodes of fiscal policy

- The first years of our sample (1995-1997) are characterised by a fiscal tightening driven by both tax increases (including an increase in the main VAT rate in August 1995) and spending cuts/restraint.
- During the period 1999-2008 fiscal policy was modesty loosening most of the time, with the exception of 2004-05 (after France was made subject to an excessive deficit procedure.
- Fiscal policy loosened significantly in 2009, as the government responded to the financial and economic crisis by trying to stimulate demand through tax cuts and increases in social benefits. The fiscal stimulus combined with recession led to a sharp deterioration in the public finances in that year.
- Fiscal policy turned neutral in 2010, following which a fiscal consolidation was put in place in 2011 and 2012.

Our measure of fiscal policy tends to broadly coincide with the fiscal stance as measured by the change in the cyclically adjusted primary balance. There are some differences, but they are generally small compared to other countries. This is particularly the case if one considers that, when using the GDP deflator or CPI as a benchmark, it is normal for fiscal policy to be loosening on average.

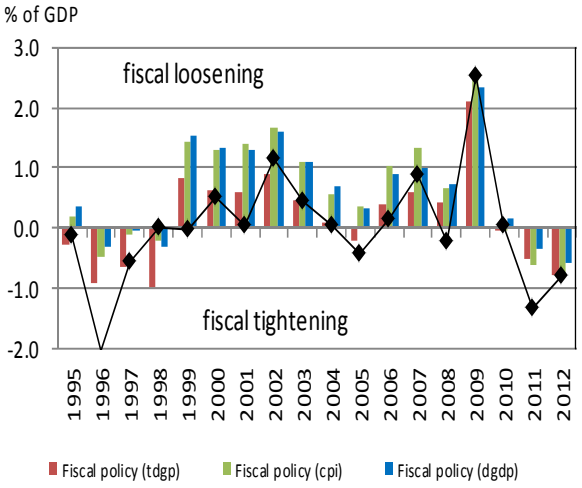
3.1.1 Tax measures and changes in the tax-to-GDP ratio

During the period considered, the share of fiscal burden (in per cent of GDP) related to Central Government has followed a downward trend. The shares of local government and of social security administrations has increased. In this context, the structure of financing of social security administration has been characterized by the creation and increase of some specific contributions (*Contribution Sociale Généralisée* and CRDS).

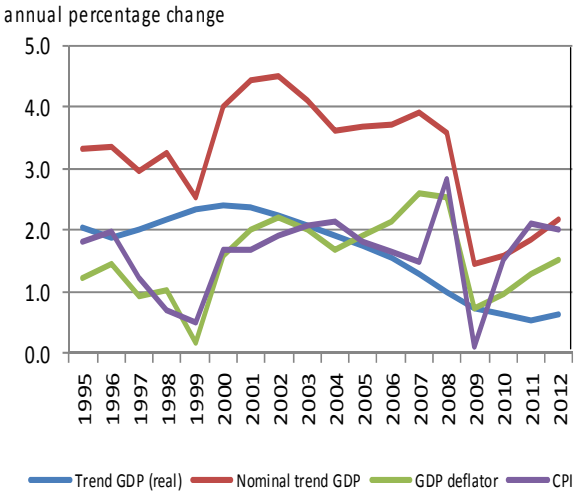
The 2006-09 period has been characterized by tax cuts, mainly cuts in direct taxes in 2009 (the measures were mainly focused on corporate tax during that year). During the 2010-12 period, direct taxes both on households and firms have been increased.

France

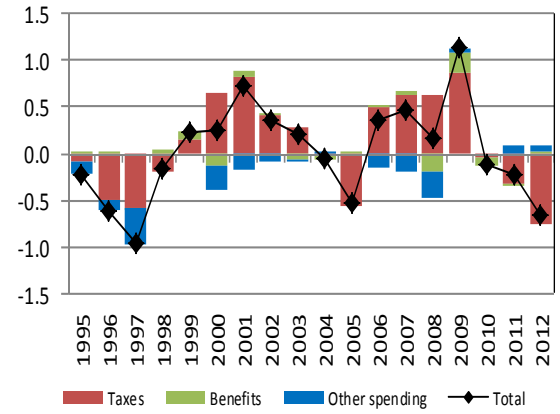
1. Measures of fiscal policy



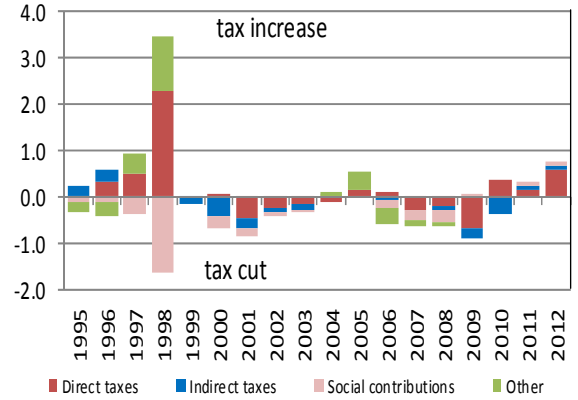
2. Spending benchamrks



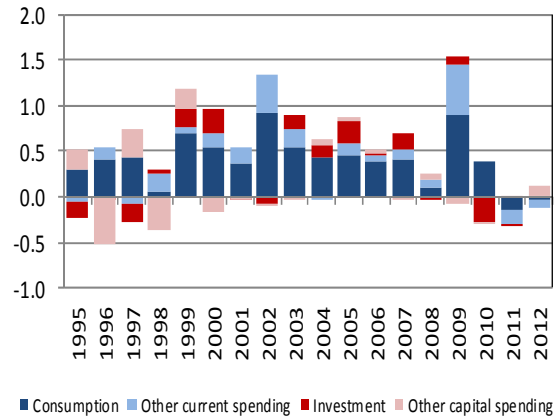
3. Composition of fiscal policy



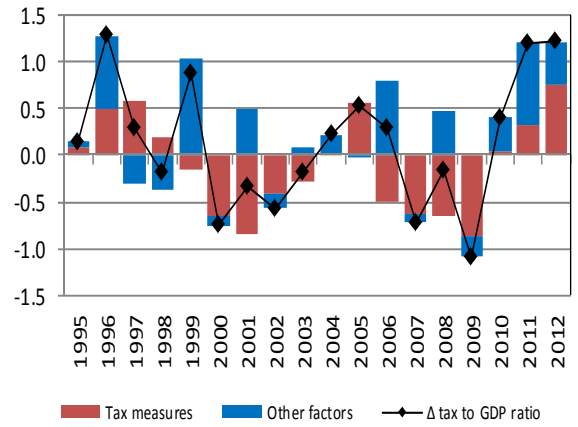
4. Composition of tax measures



5. Composition of "other spending" w.r.t. inflation



6. Tax measures and changes in tax-to-GDP ratio



Notes:

Δ CAPD = Change in the cyclically adjusted primary deficit as estimated by the European Commission

ITALY

1 Time period

The dataset for Italy covers the period from 1991 to 2013. The starting point is imposed by the fact that detailed information on expenditure on an accrual basis is only available from 1990. On the revenue side, given the adopted bottom-up approach, it has been possible to collect data starting from 1987.

2 Sources and methods

2.1 Impact of tax and benefit changes

The estimates of the impact on net borrowing of changes to taxes and benefits are based partly on official/external sources and partly on own estimates based on detailed tax and benefits data. As a rule, identified measures with an impact of more than 0.05 per cent of GDP have been included; if possible at low cost, smaller measures have been included too.

Measures to tackle tax avoidance have generally not been included. The treatment of taxes and benefits indexation is differentiated. On the tax side, given the lack of automatic indexation of tax brackets, tax refunds to compensate for the effect of fiscal drag have generally been excluded from the dataset.[17] The changes in the pension indexation schemes, instead, are considered as fiscal measures because any intervention implies a clearly defined regime change with respect to a standard development.

The data do not record measures to finance the programme in support of laid off workers (*Cassa integrazione guadagni in deroga*). This programme needs to be financed via a legislative measure making funds available to it. However, at the same time, funds are usually made available following a discussion with the unions and the firms' association. If applications for the funds by the restructuring firms were not to exhaust the resources apportioned, the latter would not be spent and re-allocated to other spending programmes. Therefore the mechanism tends to work like an automatic stabiliser.

2.1.1 Estimates taken from official/external sources.

The most important data sources for the estimated impact of measures are:

- *Relazione Previsionale e Programmatica* (RPP), a document published once a year with an official summary of both forecasts and measures approved in the current and previous year. The RPP has been recently replaced by other documents which have been used for later years. Based on the current budgetary cycle, the document of reference is *Documento di Economia e Finanza* (DEF) published in April (along with the Stability programme) and updated in September;
- Overview tables in budgets (the so-called "*Allegato 7*" and, more recently, "*Allegato 3*") and stability programmes;
- The chapters on public finances of the official publications of the Bank of Italy, namely the Annual Report, Economic Bulletin and Testimonies before the Parliament of board members.

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[17] In the past, even though there was no automatic indexation of tax brackets, the budgets have regularly provided resources to compensate for this. More recently, no compensation has been provided. In both cases it is correct to exclude from the dataset both the compensation measures and the lack of them; one would ideally account for the regime switch but it is impossible to identify it. All in all, the amounts involved would always be small.

Most of the time (always in case of a relevant fiscal intervention), each of the sources listed above present estimates of the measures approved. Typically such estimates are similar across documents; but differences may emerge due to different reporting conventions. In all cases, before including an estimate in the dataset, information has been cross-checked and differences explained to ensure consistency. Whenever one of the above documents was not available for a given fiscal intervention or did not describe it (a case occurring only for less relevant fiscal actions), the others available have been used.

2.1.2 Own estimates

Own estimates have replaced the official ones reported in the documents listed above in all cases in which additional information became available and allowed to provide an *ex post* assessment of the impact of the measure. In general, it should be noted that such additional information has been available for tax measures only and were based either on *ad hoc* analyses of the Bank of Italy (documented in the official publications or the research papers) or on official data releases of the statistical office (ISTAT).

The most notable example of the first case is the analysis of the 1998 tax reform. According to the Bank of Italy Annual Report 1998 and Marino *et al.* (2008), this implied a revenue loss of around 0.5 per cent of GDP whereas official estimates described it as a revenue neutral change.[18] Concerning the official data releases of ISTAT, the typical example refers to capital taxes of temporary nature. In the past, the recourse to temporary tax measures has been quite frequent. ISTAT publishes annually the breakdown of capital taxes and this allows us to verify the actual impact of a new tax. Given that these taxes are generally independent of the economic cycle, the official data release of ISTAT can be considered as the best *ex-post* assessment of the measure.

2.2 Other spending

The raw expenditure numbers which are used for Italy are all from the vintage of October 2013. Therefore, they still refer to ESA 1995 definitions.

2.2.1 Derivation of spending benchmarks

- *Nominal trend GDP*: Real GDP and GDP deflator from the ISTAT annual data released in April 2013, extended by the autumn forecast of real GDP by the Bank of Italy through 2015 and by assumptions on 2016 to 2019. Cycle and trend components derived using HP filter (λ=30). Reflation using GDP deflator.
- *GDP deflator*: ISTAT annual data released in April 2013.
- *Inflation*: Consumer Price Index (CPI) on national basis.

2.2.2 Identification of omitted spending

Spending time series have been preliminarily adjusted to account for reclassification of spending items, the most notable examples being the reforms of 1996 and 1998 which implied shifts between compensation of employees and other spending components.

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[18] The analysis of Marino et al. is based on a methodology which excludes the impact of the economic cycle and supports the view that the revenue shortfall recorded is attributable to the tax reform. The loss of revenue was compensated in the same year by the effect of other measures approved outside the reform itself.

3 Analysis

3.1 The main episodes of fiscal policy

Fiscal policy in Italy has been predominantly tightening in the period 1991-2012. Following the substantial increase in government debt and net borrowing during the 1970s and 1980s, fiscal tightening was necessary to ensure the sustainability of the public finances given the large accumulated imbalances. In more detail:

- Fiscal policy tightened substantially between 1991 and 1993. While already in place, fiscal consolidation speeded up quite sharply in 1992 in response to the ERM crisis of the same year. The adjustment was mostly on the revenue side and also including long term interventions such as the major pension reform of 1992.
- A second phase of consolidation was implemented between 1995 and 1997 during the run-up to Stage Three of EMU. The fiscal adjustment had to be quite relevant given the distance between the fiscal indicators and the targets set by the Maastricht Treaty in terms of deficit and debt levels. Once again, it was implemented mostly through intervention on the revenue side (Chart 3).
- Fiscal policy loosened following admission to the EMU (1998-2001). Cyclical conditions were rather favourable in these years, so fiscal policy was pro-cyclical, driven by the intention (often announced in public) to mitigate the effects of the sacrifice required to join EMU. However, the fiscal expansion was not implemented exclusively by reducing the high tax burden achieved in the previous years. Rather, a large part of the fiscal expansion came in the form of higher growth rates of government consumption (and, in 1998, government investment) (Charts 3 and 5).
- In the period 2002-2005 fiscal action remained loose even though the size of action was overall quite modest compared to the previous four years. The impact of the large tax cuts approved and of the relatively high growth rates of expenditure were compensated by sizeable one-off measures on the revenue side.
- In 2006 and 2007 new consolidation measures were implemented, mostly on the tax side.
- The more recent years have been driven by the reaction to the financial and economic crisis. In 2009 a modest stimulus package, mostly on expenditure, was approved but it was fully financed with revenue increases. Since 2010, fiscal policy has tightened significantly in response to the sovereign debt crisis. The fiscal actions involved both tax increases and expenditure cuts.

The characterisation of fiscal loosening and tightening episodes is fairly similar to that as measured by the change in the cyclically adjusted primary deficit, the main differences concerning mainly the size. Yet, some years still display important differences. For example, 2007 and 2010 are characterized by a similar amount of fiscal tightening according to our action-based measure. However, in 2007 the ΔCAPD was bigger than our measure of fiscal action because of significant revenue windfalls, whereas in 2010 it was almost nil because of the very adverse macroeconomic conditions which drastically reduced the effect of the legislated consolidation. In 2001, the fiscal loosening measured by ΔCAPD turned much bigger than the size of legislated measures. Last, in 1994 and 1996 the two measures display an opposite sign (even though the sizes are quite modest in all cases).

3.2 Tax measures and changes in the tax-to-GDP ratio

Our measure of tax policy performs quite well in explaining the dynamics of the tax-to-GDP ratio. Over the whole 1991-2012 period, the cumulated impact of tax measures amounts to almost

5 percentage points of GDP, while the ratio of taxes and social contributions to GDP increased by around 6 percentage points.

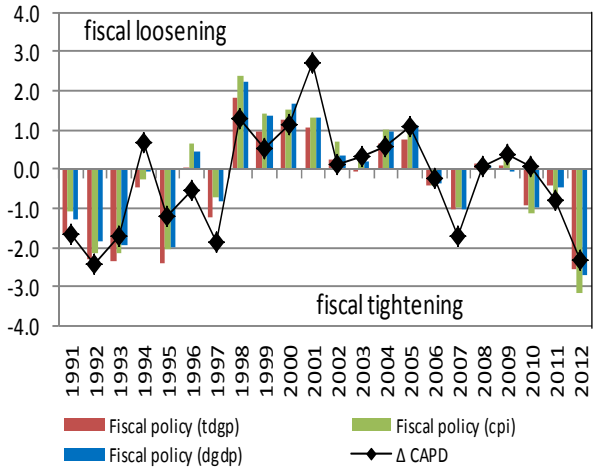
In terms of tax measures, there has been a tendency for indirect taxes to be increased, the biggest interventions being the increases of VAT rates (1991 and 2012), the 1998 tax reform with the introduction of IRAP (1998) and the introduction of the tax on real estate (IMU, 2012). The other important phenomenon recorded by our data is the widespread use of one-off capital taxes, in particular during the periods 1992-97 and 2002-04. Such one-off tax payments refer to both tax amnesties and taxes voluntarily paid for the revaluation of corporations' assets. Changes of direct taxes and social contributions also implied a tax increase over the whole period, even though of a much smaller amount.

In general, and looking at the broad tax aggregates, tax policy has tended to "lean in one direction" in any given year, rather than tax changes offsetting each other. The only notable exception is 1998 when a broad tax reform was passed which replaced direct taxes and social contributions with the introduction of a new indirect tax (IRAP) paid by firms. It should be noted that while ÍRAP is included among indirect taxes, it displays some typical features of a direct tax, namely the fact that a large portion of the tax base is made of compensation of employees. All in all, the IRAP reform induced a loss of revenue even though the announced intention was of a revenue neutral reform.

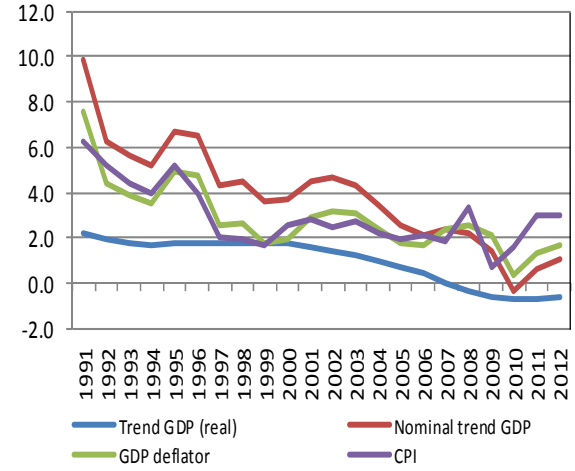
As far as the tax-to-GDP ratio is concerned, Chart 6 signals that our measure of tax changes performs quite well in explaining its evolution over time. Changes not explained by our measure are relevant only in selected years like 1994 when revenue shortfalls were probably linked to the adverse macroeconomic situation or the years 1997 and 2007 characterized by significant revenue windfalls.

Italy

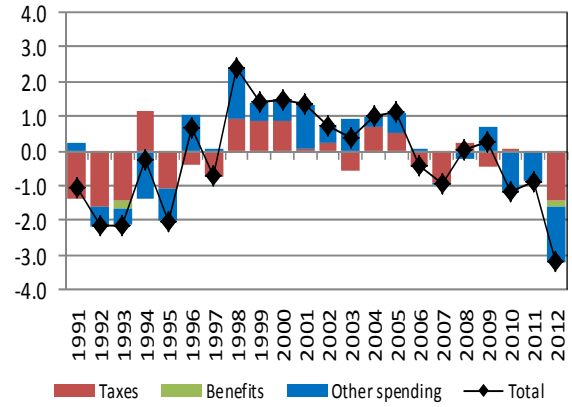
1. Measures of fiscal policy



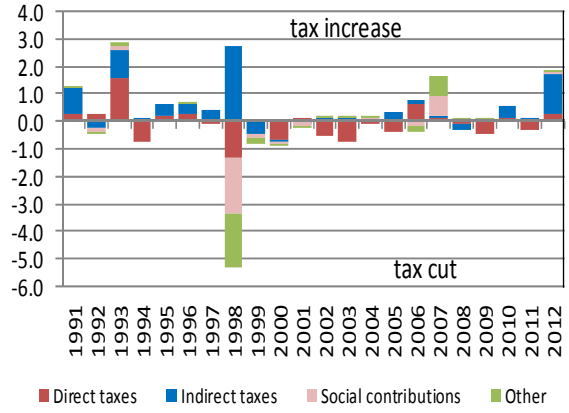
2. Spending benchamrks



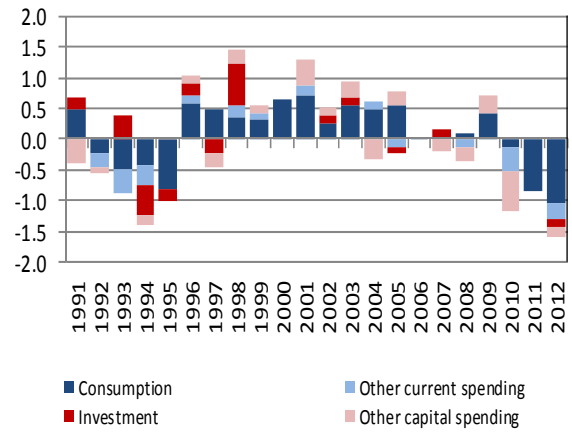
3. Composition of fiscal policy



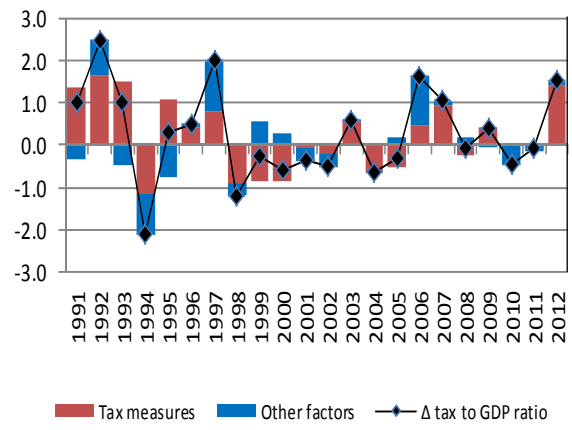
4. Composition of tax measures



5. Composition of "other spending" w.r.t. inflation



6. Tax measures and changes in tax-to-GDP ratio



Notes:

ΔCAPD = Change in the cyclically adjusted primary deficit as estimated by the European Commission

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- Documento di Economia e finanza; yearly releases

Parlamento

- Testi di legge, Relazioni tecniche, Allegati 3 e 7 alle Leggi finanziarie

AUSTRIA

1 Time period

The dataset for Austria covers the period from 1996 to 2012. The starting point of 1996 is imposed by the fact that detailed COFOG (Classification of the Functions of Government) data on government expenditure is only available from 1995 and this data is needed to compile the non-benefits spending part of the dataset.

2 Sources and methods

2.1 Impact of tax and benefit changes

The estimates of the impact on net borrowing of changes to taxes and benefits are based partly on official/external sources and partly on own estimates based on detailed tax and benefits data.

As a rule, identified measures with an impact of more than 0.05 per cent of GDP have been included; if possible at low cost, smaller measures have been included too. Measures to tackle tax avoidance have generally not been included.

All policy changes are assessed in terms of ESA categories. This creates differences to official budgetary publications as some (so-called) tax credits are recorded as negative tax revenue in the budget (but treated as transfer spending in national accounts). Furthermore, certain measures on social contributions are labelled as expenditure measures in budget documents (partly by convention, partly due to the fact that higher pension contributions reduce federal transfers to the social security system). Additionally, some other current taxes (part of "direct taxes" in national accounts) are recorded as indirect taxes in national budgetary statistics.

2.1.1 Estimates taken from official/external sources

While Austria may be a federal country on paper, the central government is responsible for almost all major legislation on taxes, social contributions and monetary social transfers. Therefore the data for Austria relies solely on federal sources. The most important data sources for the estimated impact of measures are:

- explanatory notes on legislation,
- overview tables in budgets and stability programmes, and
- articles on certain measures in non-government documents (e.g. OECD country reports, articles from Austrian research institutes).

It has to be noted that – especially for smaller measures – the date of entry into force is only indicative. In principle, the reported numbers are mainly *ex ante* estimates. *Ex post* numbers are sometimes available for more recent measures (when they are reported also *ex post* in a stability programme).

2.1.2 Own estimates

Own estimates have been used mainly for three purposes: the abolishment of taxes (the latter sometimes due to court decisions), for assessing the impact of government non-action on tax

revenue and monetary social transfers, and for estimating the impact of deviations of pension indexation from inflation.

- Both the impact of abolished (inheritance tax, "Getränkesteuer" …) and newly introduced taxes have been estimated (in case no official numbers existed) based on cash / national accounts data of the last / first year where the tax has been collected.
- Currently, the legal benchmark for indexation of social security (and other public) pensions is the average CPI inflation from August (t–2) to July (t–1). For each year, the deviation of the adjustment of average pensions from this benchmark (multiplied by aggregate public pensions in t–1 according to ESSPROS) is defined as a measure.
- Among (other) monetary social transfers, long-term-care benefits ("Pflegegeld") and lump-sum family transfers ("Familienbeihilfe", "Kinderabsetzbetrag", "Kinderbetreuungsgeld") are nominally fixed and not automatically indexed to past inflation.
- Among other taxes on goods, most excise duties (except the tax on purchase of cars and around 40 per cent of the partly ad-valorem tobacco tax) are also nominally fixed and not automatically indexed to past inflation.
- Among other current taxes, the same is true for the (households' part of) the motor vehicle tax.
- The impact of non-adjustment of tax levels and transfers in t is assumed to be the expenditure/revenue[19] in t–1 multiplied by the average change of the CPI in t–1.
- Furthermore, income tax brackets are not indexed to past developments of inflation (or average wages). Therefore, bracket creep has been estimated by the revenue from wage income tax and general income tax in t–1 multiplied by the average change of the CPI in t–1 multiplied by 0.9; the latter being the current (as of 2013) estimated elasticity of the income tax on average wages minus 1.

The minimum and the maximum base for social contributions are indexed, so no adjustments have been made there. (Roughly) revenue-neutral shifts between subcategories of social contributions have not been listed as measures.

2.2 Other spending

The raw expenditure numbers which are used for Austria are all from the vintage of October 2013. Therefore, they still refer to ESA 1995 definitions.

2.2.1 Derivation of spending benchmarks

- *Nominal trend GDP*: Real GDP and GDP deflator from the annual data released in late summer 2013, extended by the autumn forecast of real GDP by the OeNB through 2015 and by assumptions on 2016 to 2019. Cycle and trend components derived using HP filter (λ=30). Reflation using GDP deflator.
- *GDP deflator*: annual data released in late summer 2013.
- *Inflation*: Consumer Price Index (CPI); this index is used for indexation matters within Austria (e.g., for pensions).

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[19] The expenditure categories mentioned in this enumeration are all taken from the publicly available break-down of spending on social protection (ESSPROS), while the mentioned taxes are all taken from the publicly available overview of tax revenue items in ESA terms.

2.2.2 Identification of omitted spending

The most important omitted spending pertains to the following:

- Interest spending (D.41), employers' social contributions (D.12), taxes paid (D.29, D.5), other capital transfers (D.99; thereby support measures to the financial sector are also excluded) and other (net) capital spending (P.52, P.53, K.2; thereby also excluding net sales of land, emission permits and UMTS frequencies) are all excluded.
- For intermediate consumption (P.2), wages and salaries (D.1), government investment (P.51) and social transfers in kind provided via market producers (D.631) the impact of reclassifications of public enterprises in 1997 and 2001 has been excluded. This has been done using the trend deviations of expenditure in the respective COFOG categories (04.5, 05.1, 05.2, 06.1, 06.3, 10.7 and most importantly 07.3).
- For intermediate consumption (P.2), purchases of interceptor planes have been excluded, too.
- Other current transfers (D.7) to the EU budget have been excluded.
- Within other current transfers (D.7) and investment grants (D.92) the impact of the consolidation adjustment has been excluded (based on COFOG data).
- Subsidies (D.3) and investment grants (D.92) in the (COFOG) areas health (07) and transport (04.5) have been excluded. Most of these transfers go to state-owned enterprises and fluctuations do not reflect the expenditure of these entities.

Note that some of the series will change significantly with ESA 2010 due to a broader definition of gross fixed capital formation (esp. R&D) and of the government sector (inclusion of – among others – state hospitals and the infrastructure unit of the federal railways).

3 Analysis

3.1 The main episodes of fiscal policy

Chart 1 shows how different measures of fiscal policy evolve from 1996 to 2012. The main episodes of fiscal policy may be summarised as follows:

- Fiscal policy was very tightening in 1996 and 1997 prior to Stage Three of EMU.
- In the following 2-3 years it was rather loose (in spite of the economy growing rather well).
- In 2001 and 2002 there were again sizeable consolidation measures.
- This was followed by rather neutral policies, the only exception being a (corporate and personal) income tax cut in 2004-05.
- Starting in mid-2008, fiscal policy was loosening with increases in social benefits and (in 2009-10) with sizeable tax cuts amidst high inflation in 2007-08 and the Great Recession of 2008-09.
- The combination of stimulus measures and low growth lead to a sizeable deterioration in headline and structural balances. Therefore, the government implemented tax hikes and cuts in social benefits which came into effect in 2011 and 2012, while at the same time letting other spending grow at comparatively low rates.

The characterisation of fiscal loosening and tightening episodes is fairly similar to that based on the change in the cyclically adjusted primary deficit as estimated by the European Commission

(with adjustments for some very large one-off transactions[20]). One important exception is 2001-02 when the change in the primary balance is heavily distorted by changes in the timing of collection in profit-related taxes. There are also some – albeit much smaller – discrepancies in the first years affected by the Great Recession, where the change in the structural deficit underestimates the amount of fiscal stimulus due to non-policy-driven developments in the tax ratio (see below).

3.2 Tax measures and changes in the tax-to-GDP ratio

Chart 6 reports the change in the tax-to-GDP ratio year-by-year broken down into the impact of tax measures and other factors. Except for the outlier in 2001, the graph shows that when adjusting for the impact of tax measures, the tax ratio moves rather countercyclically (especially so in 2008 to 2012). This is mainly driven by the relatively high taxation of labour income combined with the countercyclical pattern of the wage share.

The most important tax measures since 1996 have been taken in the area of direct taxes. The three major consolidation episodes (1996-97, 2001-02, 2011-12) all included base broadening measures in the area of both personal and corporate income taxes. Moreover, for personal income taxes, bracket creep is quite substantial, which created scope for three major cuts in tax rates or increases in tax brackets, in 2000, in 2004-05 and as part of the stimulus in 2009.

Measures affecting social contributions are relatively rare and typically very small; and the largest covered measure was neutral for the budget balance as the abolishment of the small sickness benefit fund in 2000 reduced social contributions and social benefits by similar magnitudes.

Changes in VAT legislation had relatively minor effects, too. Both the standard and the reduced rates have been fixed at 20 per cent and 10 per cent over the whole horizon, and the allocation of different goods and services to these rates has barely changed.

There have been more measures affecting other taxes on products as excise duty rates are not automatically indexed and as rate increases in mineral oil and tobacco tax (and the introduction of new excise duties like the energy tax in 1996) are typical ingredients of consolidation packages in Austria. Furthermore, one should note that the tax ratio has increased less than one would expect based on tax measures, which can be attributed mainly to the aforementioned decline in the wage share.

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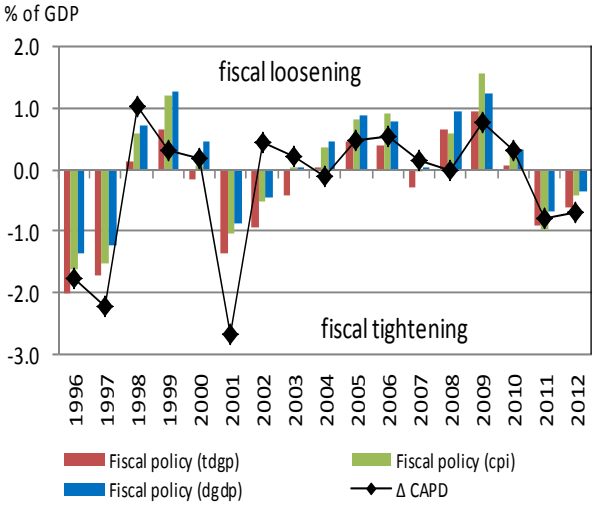
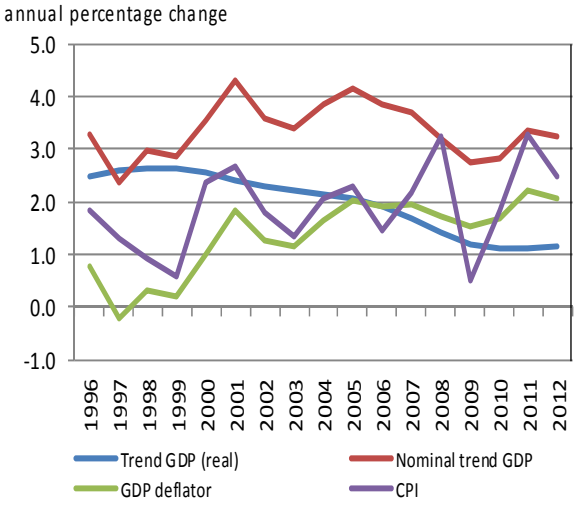
[20] These are transfers to financial institutions from 2009 to 2012, the effect of UMTS sales in 2000 and a large one-off capital transfer to the federal railways in 2004.

Austria

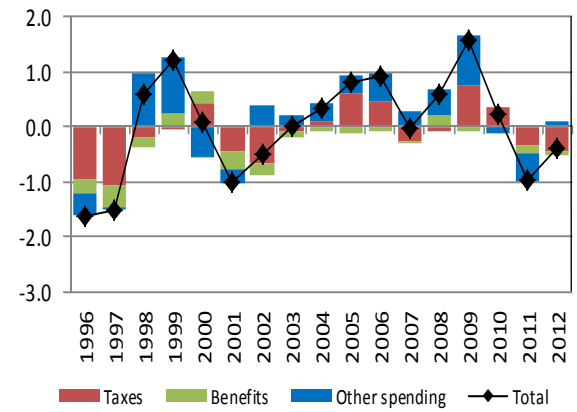
1. Measures of fiscal policy



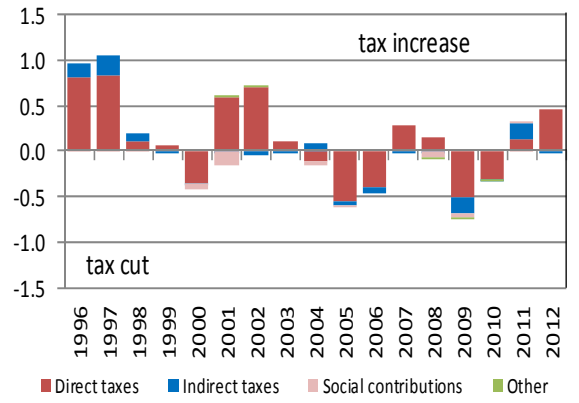
2. Spending benchamrks



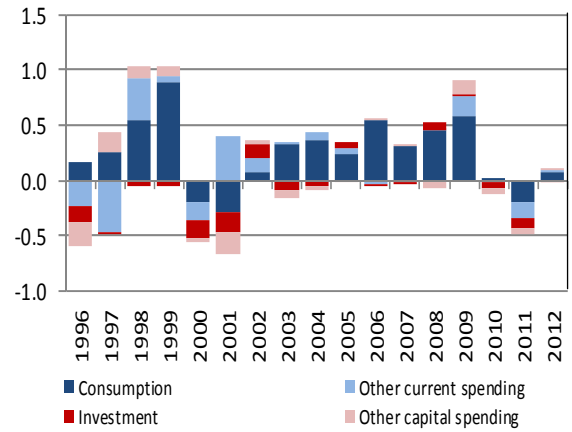
3. Composition of fiscal policy



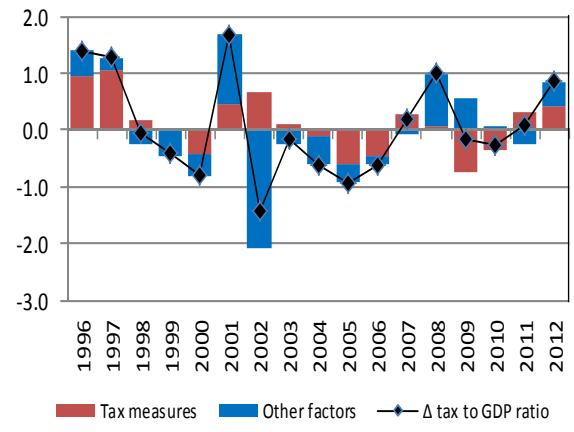
4. Composition of tax measures



5. Composition of "other spending" w.r.t. inflation



6. Tax measures and changes in tax-to-GDP ratio



Notes:

Δ CAPD = change in the cyclically adjusted primary deficit estimated by the European Commission, excluding capital transfers to financial institutions from 2009 to 2012, proceeds from UMTS sales in 2000 and a large one-off capital transfer to the federal railways in 2004

REFERENCES (AUSTRIA)

Statistik Austria (NSI)

- "Steuern und Sozialbeiträge in Österreich, Einnahmen des Staates und der EU (S.13+S.212)" (detailed time series on revenue from all taxes and social contributions)
- Data on GDP, CPI
- Eurostat / Statistik Austria (NSI)
- General government expenditure by function (COFOG)

BMASK (Ministry for Labour and Social Affairs)

- "Sozialschutzausgaben in Österreich" (detailed time series on public expenditure related to social protection/ESSPROS)
- "Gutachten der Kommission zur langfristigen Pensionssicherung (§ 108e ASVG) für das Jahr 2012" (includes data on indexation of pensions in previous years)

Österreichisches Parlament, Bundeskanzleramt

- Laws including commentaries on changes in taxes, social contributions and social transfers
- Hauptverband der Sozialversicherungsträger
- "Beitragsrechtliche Werte", editions 2003 to 2012 (detailed data on social contribution rates)

POLAND

1 Time period

The dataset for Poland covers the period from 2000 to 2012. The starting point of 2000 is imposed mainly by the low quality of ESA data for 1995-1999 and the lack of official government estimates of new fiscal measures in this period. Moreover, in the 1990s Poland was undertaking numerous, major reforms covering practically every aspect of fiscal policy. Often new regulations were introduced and later withdrawn or appeared to have results far from what had been expected. In view of these difficulties, building a descriptive fiscal policy data base for the period 1995-1999 remains a task for future work.

2 Sources and methods

2.1 Impact of tax and benefit changes

The estimates of the impact on net borrowing of changes to taxes and benefits are primarily own estimates based on detailed tax and benefits data, but also draw partly on official/external sources. The relatively greater reliance on own estimates stems from the fact that official sources were often unavailable or unreliable, as regulations frequently changed during the legislative process or results deviated significantly from *ex ante* assessments. As a rule, identified measures with an impact of more than 0.01 per cent of GDP have been included. Measures to tackle tax avoidance have generally not been included.

2.1.1 Estimates taken from official/external sources

Draft Budget Act, Annual Budget reports, Convergence Programmes and background documents accompanying legislation (the *Regulation Impact Assessment*, *OSR* in Polish) published with the law proposal.

Draft Budget Acts in Poland are typically published in September of each year. The document usually explains the planned performance of each revenue category in the upcoming year. But it does not usually present direct estimates of the legislation changes determining the forecast outturn. The same applies to Annual *Budget Reports* which are presented in May, after the budget year has ended.

In years 2011-2012 *Convergence Programme updates* included a table with estimates of planned fiscal measures as a percentage of GDP.

Regulation Impact Assessments are the best source of estimates concerning the discretionary changes. They usually include detailed estimates of the future impact of the new regulation, conditional on macroeconomic or demographic assumptions. Even so, in many cases, these estimates do not appear valid as: (i) the regulation was changed during the legislative process and updated estimates were not published; (ii) the introduction of the tax/benefit changes was postponed; and/or (iii) the actual macroeconomic and/or demographic situation deviated significantly from the assumptions. In these cases, appropriate adjustments to the original estimates have been made, based on own estimates.

2.1.2 Own estimates

Own estimates have been produced whenever official estimates of the impact of tax and benefit changes were not available. The main sources of information have been: data on tax/contribution receipts, rates, allowances and reliefs published by Ministry of Finance and Social Insurance Institution in various statistical publications and budget reports, information on pensions published by the Central Statistical Office and Social Insurance Institution as well as detailed data on social benefit payments published by the Ministry of Labour and Social Policy. When possible, own estimates have also been used to cross-check *ex post* the official *ex ante* estimate.

Additional estimates were produced to ensure a consistent approach across time with respect to the adjustment of duty rates, tax brackets and benefit entitlements to inflation. The approach to compiling these estimates can be summarised as follows:

- *Excise duties:* It is difficult to find a standard practice for changes to excise duty rates in Poland. Rates of excise duty on fuel, tobacco products and alcohol often changed several times per year in the early 2000s and in more recent years have either been increased due to EU requirements, in line with inflation or remained unchanged. In this dataset, the impact of changes in excise duty rates has been estimated by calculating increases in duty rates in real terms (deflated by CPI in the current year) and applying this increase to the relevant receipts outturn. In case excise duty rates were changed more than once in a year, a weighted average of the duty rates in force has been calculated. To do this, data on the various duty rates, tax receipts of the various types of fuel, tobacco and alcohol has been taken from *Budget reports*, *Statistical Bulletins of the Customs Service* and *European Commission Excise Duty Tables*.
- *Income tax brackets:* It is similarly difficult to identify a standard practice in relation to income tax brackets. In some years allowances and thresholds have been frozen, in others they have increased in line with inflation or by more than inflation. The approach taken here has been to compare the increase in allowances and thresholds with inflation. Estimating the impact on receipts is, however, difficult and subject to uncertainty because of the large number of factors which interact to determine the relevant tax liabilities. In Poland, the Ministry of Finance does not publish detailed information on the income distribution of personal income and tax liabilities. Therefore, calculations have been based on the Ministry of Finance note on the fiscal impact of lack of indexation of thresholds in the years 2002-2006 and were crossed-checked with the available estimates from the background documents accompanying the law proposals for raising or freezing the thresholds.
- *Pensions:* The rules regulating the indexation of pensions have varied significantly through the examined period. There were changes concerning the first month of indexation, the indexation frequency (there was no indexation in 2005 and 2007), and, most importantly, the calculation of the indexation rate. Therefore, the approach taken here has been to take CPI in the current year as the 'neutral policy' benchmark for the indexation of pensions. The impact of deviations of the legislated pension increase from this benchmark has been calculated on the basis of monthly data on pensions from The Central Statistical Office *Monthly Statistical Bulletins*.
- *Family benefits:* After the introduction of the new family benefits scheme in 2004, the income thresholds, which in previous years (with exception of 2003) were indexed on a yearly basis, remained frozen till 2012. This has gradually, but significantly reduced the number of beneficiaries. The estimate of the impact of frozen income thresholds was based on the assumption that if the income criteria were changing in line with wage growth (neutral fiscal policy), the number of beneficiaries would be determined by the number of children aged 0-24 (family benefits in Poland are targeted at this age group).

2.2 Other spending

- The spending data is that released by the Central Statistical Office in conjunction with the October 2013 EDP Notification.

2.2.1 Derivation of spending benchmarks

- *Trend GDP*: calculated using the HP filter
- *GDP deflator*: Central Statistical Office – October 2013
- *Inflation*: Consumer Price Index (CPI) – Central Statistical Office

2.2.2 Identification of omitted spending

The omitted spending pertains to the following:

- Sales of spectrum in 2000 (scored as negative gross capital formation).
- The impact of the difference between the delivery and payments of military equipment on intermediate consumption (according to ESA95 rules, the expenditures on the military equipment are recognized on the delivery date, even though payment date would appear to be more appropriate from the perspective of analysing fiscal policy).
- Expenditure financed with EU funds

3 Analysis

3.1 The main episodes of fiscal policy

The main episodes of fiscal policy may be summarised as follows:

- The fiscal loosening in 2000 driven by a significant cut in the corporate income tax rate and pension scheme reform. The resulting loss in revenue and economic slowdown led to a large increase in central government net borrowing in 2001, which prompted the budget act amendment in 2001 and tightening of fiscal policy in 2002.
- In the following years fiscal policy remained slightly expansionary (mainly due to growing real spending). The largest fiscal expansion happened in 2008 as a result of significant tax cuts and increases in government consumption and investment.
- Finally, with net borrowing having risen to 7.9 per cent of GDP in 2009, the years 2011-2012 saw a considerable fiscal contraction, with large tax increases, and unprecedented, large real terms cuts in spending.

3.2 Tax measures and changes in the tax-to-GDP ratio

Over the whole 2000-2012 period, the cumulated impact of tax measures amounted to around –1 per cent of GDP, while the ratio of taxes and social contributions to GDP declined by 2½ per cent. Factors steadily weighing on the tax-to-GDP ratio have been the tendency for consumption of products subject to excise duty to decline over time; and a declining wage share, as labour productivity in Poland has been growing faster than wages.[21]

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[21] Growiec, J. (2012), "Determinants of the Labour Share", *Eastern European Economics*, Vol. 50, No. 5, pp. 23-65.

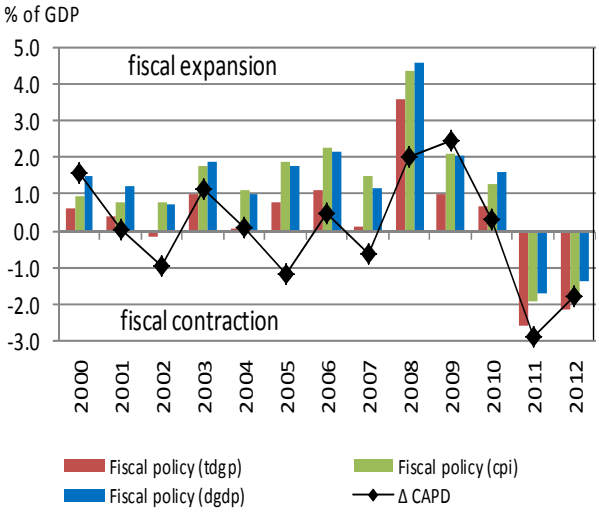
In terms of tax measures, the tendency has been to reduce personal and corporate income taxes and to raise VAT and other indirect taxes. The main corporate income tax rate was cut in stages from 34 per cent in 1999 to 19 per cent in 2004. In the case of personal income tax, predominantly revenue reducing measures have included the introduction, in 2004, of a single 19 per cent tax rate for the self-employed, the introduction of child tax allowance and, in 2009, a reform of the personal income tax scale (reducing the number of rates from 3 to 2). In 2011, the main and reduced rates of VAT were increased from 22 to 23 per cent and from 7 to 8 per cent respectively. Excise duty rates have increased in real terms, with the exception of duty on alcohol.

As far as social contributions are concerned, there have been measures working in both directions, although the net effective of these have been negative (about ½ per cent of GDP). The most important measures include: (i) the 1999 pension scheme reform (which significantly reduced revenue, by creating a funded pillar, classified outside the general government sector in ESA terms); (ii) the gradual increase of health care contribution rate in the years 2001-2007; (iii) the reduction of disability contribution rate in the years 2007-2008; (iv) reduction of the social contribution rate transferred to the Open Pension Funds in 2011; and (v) increase of disability contribution rate in 2012.

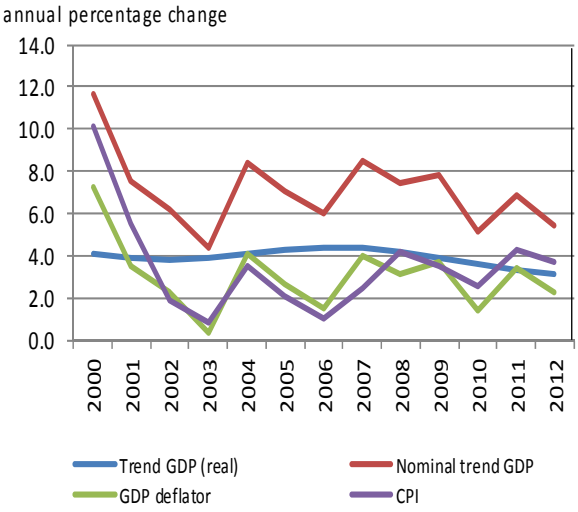
As far as changes in the tax-to-GDP ratio not explained by measures are concerned, these were significantly negative in 2000 and in 2009-12, but significantly positive 2005-08. Apart from the effects of a declining wage share and declining consumption of goods subject to excise duties, it is worth highlighting (i) the fact that the share of direct taxes payable by corporations in GDP has only edged down slightly in spite of the significant cuts in the main corporate income tax rate and (ii) significant shortfalls in VAT receipts during periods of economic slowdown (2000-01, 2008-09 and 2011-12).

Poland

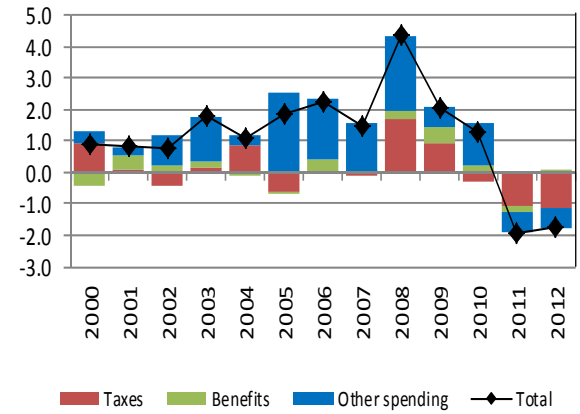
1. Measures of fiscal policy



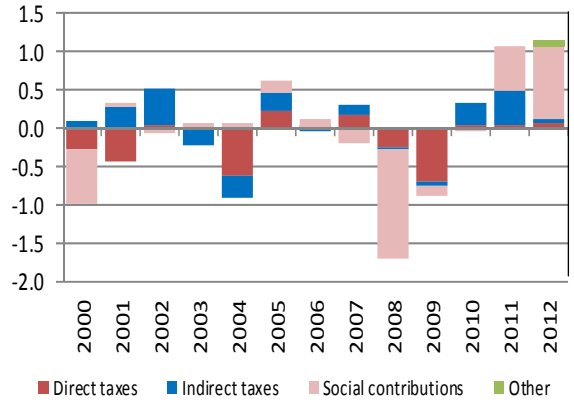
2. Spending benchmarks



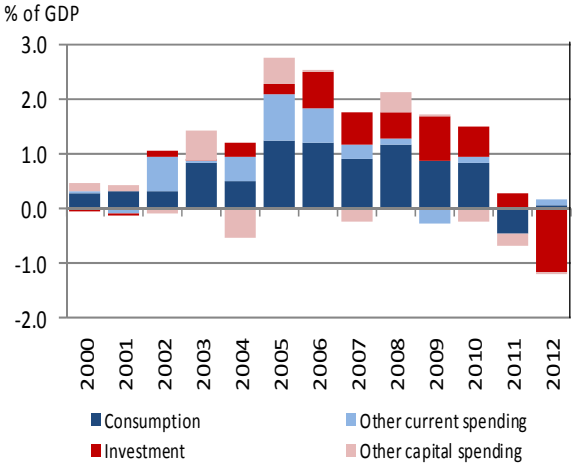
3. Composition of fiscal policy



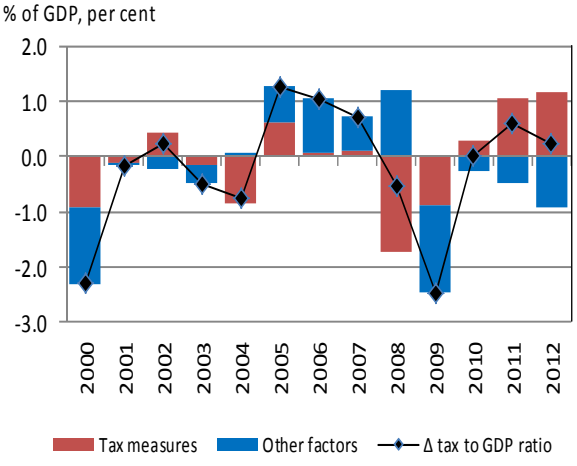
4. Composition of tax measures



5. Composition of "other spending" w.r.t. inflation



6. Tax measures and changes in tax-to-GDP ratio



Notes:

ΔCAPD = Change in the cyclically adjusted primary deficit as estimated by the European Commission , excluding proceeds from the sale of UMTS licences in 2000.

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Ministry of Finance

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- Monthly Budget Reports
- Budget Drafts for years 1999-2012
- Convergence Programmes - 2011 and 2012 Updates
- Information on Corporate Income Tax Settlements for years 2003-2012
- Information on Private Income Tax Settlements for years 2003-2012

Central Statistical Office

- Statistical Yearbooks for years 1999-2012
- Monthly Statistical Bulletins 1999-2012
- Fiscal EDP Notifications and Questionnaires relating to EDP Notification Tables (2004-2013)
- Tables on annual Consumer Price Index for years 1999-2012

The archive for the legislative work of the Lower House of the Polish Parliament

http://www.sejm.gov.pl/Sejm7.nsf/page/archiwum

Ministry of Labour and Social Policy

- Statistical information on Family Benefits – Bulletins for years 2004-2012 (http://www.mpips.gov.pl/wsparcie-dla-rodzin-z-dziecmi/swiadczenia-rodzinne/informacje-statystyczne/)

European Commission Excise Duty Tables

http://ec.europa.eu/taxation_customs/taxation/excise_duties/index_en.htm

Supreme Audit Office (NIK)

- The evaluation of state budget execution and monetary policy assumptions in years 2000-12

Bank Gospodarstwa Krajowego

- Annual Reports – the data on National Road Fund's and Rail Fund's revenue

PORTUGAL

1 Time period

The data for Portugal covers the period from 1996 to 2012. Detailed information on the impact of fiscal measures is very scarce before 1996. Even for the period since then, information has had to be gathered from several sources.

2 Sources and methods

2.1 Impact of tax and benefit changes[22]

In Portugal, fiscal policy measures are most commonly included in the State budget, which is usually presented in October of each year and enters into force in January.[23] However, the provision of detailed estimates of the impact on the budget of changes to taxes and benefits has only recently (after the outbreak of the sovereign debt crisis) become an integral feature of budget documentation. Additional and alternative sources of information have therefore been the annual reports published by Banco de Portugal and the information collected – or estimates made at the time - as input to fiscal projections to the disaggregated framework for the analysis of fiscal policy within the European System of Central Banks (Kremer *et al*., 2006). For particularly sizeable measures, calibrating the impact and timing has benefited from discussion among public finance experts. In case of conflicting estimates as to the magnitude of a particular measure, the selection of the most reliable estimate was based on consistency with the legislation and evidence from available fiscal outturn data.

The dataset contains both permanent and temporary measures. A measure is classified as temporary if it gives rise to temporary fluctuations in revenue even if the measure is permanent itself. For instance, in 2002 there was an especially strong increase of the personal income tax withholding tables. Although the change to the withholding tables was permanent, the measure had no permanent impact on revenues; rather it increased tax receipts in the first year in which the new withholding tables applied, with a corresponding reduction in settlements the following year.

An important part of the construction of the dataset was the correct assignment across time of the estimated full-year impact of measures. This has been done on the basis of the tax collection calendar. A particularly difficult case in Portugal (like in many other countries) is that of the Corporate Income Tax, in which payments are mostly related to the previous year's tax legislation (and income)[24]. Taking this into account requires recording Corporate Income Tax rate changes decided in year t with a long-term impact of X as having one temporary effect in t equal to 20 per cent of X (related to the initial impact in prepayments); another temporary effect in t+1 amounting to 80 per cent of X (related to the one-off impact in the final tax liability in the following year); two permanent effects, one recorded in t+1 amounting to 80 per cent of X (related to the increase in prepayments) and another amounting to 20 per cent of that impact in t+2 (related to the increase in the final tax liability payments).

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22 The tax changes considered September-October for Portugal are the same as the list of measures presented in Pereira and Wemans (2013). Further explanations of the data can be found in Section 2 of that paper.

23 Exceptions to this rule include supplementary budgets and some wider reforms approved in separate legislation.

24 The corporate income tax legislation in Portugal establishes that companies have to make prepayments of the tax equal to around 80 per cent of the previous year tax liability. The final tax liability is set in May of the following year and prepayments made are deducted from the tax liability.

In some cases, measures have been excluded on the grounds that, even though they may have impacted government revenue and spending, they should not have affected economic activity. This led, for instance, to the exclusion of the securitisation of tax revenues in 2003, as that was a strictly financial operation. The long term effects on social transfers from the transfer of pension funds to the public administration were excluded for a similar reason.

In the case of changes to social benefits, due to the limited information available, only major measures have been included, such as those related to the introduction of new social transfers or key changes in benefit schemes. In 2007 there was a very comprehensive reform of the pension system, mainly targeting sustainability. Given that, its effects on spending were expected to be gradual and no policy measure is recorded in the sample. However, this reform introduced a link between pensions and previous year's inflation and the non-compliance with this rule from 2010 onwards gave rise to a positive spending measure in that year followed by negative spending measures in 2011 and 2012.

More generally, the updating of benefits, income tax brackets and excise duty rates for (expected) inflation can hardly be considered as an implicit rule of fiscal policy during the period studied. As a result, no policy measures were considered in years where there were no (or only minor) updates.

2.2 Other spending

2.2.1 Derivation of spending benchmarks

- Trend GDP: trend nominal GDP (HP filter lambda 30)
- GDP deflator: national accounts data published by Statistics Portugal (INE)
- Inflation: Harmonized Index of Consumer Prices (HICP)

2.2.2 Identification of omitted spending

Adjustments have been made to account for the following:

- Capital transfers to financial institutions in 2010, 2011 and 2012.
- A different accounting, before and after 2005, of transfers from the state to civil servants' social security, impacting social contributions.
- The reclassification of some hospitals outside of general government, which significantly affected the composition of government consumption (*intermediate consumption*, *sales* and *wages and salaries* versus *social transfers in kind via market producers*).

3 Analysis

3.1 The main episodes of fiscal policy

For most of the sample period, fiscal policy was tending to loosen, with modest tax cuts and spending growing in real terms (and by more than trend GDP) (see Chart 1). There were, however, intermittent fiscal consolidation episodes (2002 and 2006-07) as Portugal sought to comply with the Stability and Growth Pact. Fiscal consolidation was often achieved by resorting to temporary measures implying little or no structural improvement of the public finances.[25] The fiscal tightening

[25] For a detailed analysis of the main trends in fiscal policy in Portugal, see Cunha and Braz (2009).

implemented in the context of Portugal's Economic and Financial Assistance Programme initiated in 2011 dwarfs anything occurring before it.

3.2 Tax measures and changes in the tax-to-GDP ratio

Between 1996 and 2001 there were tax cuts, mainly related to the introduction of an intermediate VAT rate in 1996 and to changes to Corporate Income Tax. In 2000 there was also a Personal Income Tax reform which reduced tax rates. The special scheme for the payment of taxes in 2002 inverted this trend and clearly stands out as a very significant tax increase. After that, in 2004 the main Corporate Income Tax rate was reduced from 30 to 25 per cent, most of the impact being in 2005. This was followed by significant tax increases, including an increase in the main VAT rate from 19 to 21 per cent in 2006. The years 2008 and 2009 were marked by some tax relief while 2011 corresponds to the beginning of a very significant sequence of tax increases in the wake of the Economic and Financial Assistance Programme. Some of the most relevant tax increases in 2011 and 2012 were increases in indirect taxation and the introduction of a temporary personal income tax surcharge.

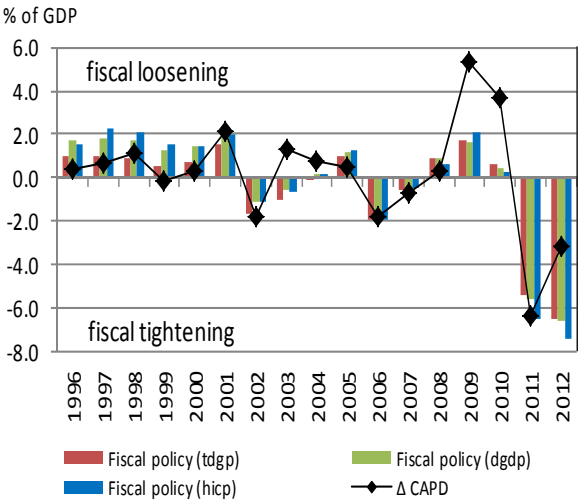
The estimated impact of tax measures differs considerably from changes in the tax to GDP ratio (see Chart 6). This can be mainly related to the following factors:

- Cyclical influences on the tax-to-GDP ratio: years in which "other factors" in Chart 6 are positive tend to be those in which the economy was growing relatively strongly (e.g. 1996-98) and vice-versa (e.g. 2009 and 2011)
- The existence of tax measures that affected tax revenues but are omitted from our data. The effect of the securitisation operation in 2003 can clearly be seen in the "other factors". In 2004 an opposite effect occurs as the tax-to-GDP ratio falls due to the base effect of this operation.
- Possible errors in the quantification of the impact of policy measures. In 2012 the disaggregated framework pointed to a potential overestimation of the impact of tax measures, as discussed in Banco de Portugal, Annual Report 2012.
- Changes in the efficiency of tax collection. In 2005, despite net discretionary tax cuts (as the estimated effect of cuts in direct taxes more than offset the estimate effect of increases in indirect taxes), there was a significant increase in tax collection as a whole that seems to have been at least partly related to an improvement in the efficiency of tax collection.[26]

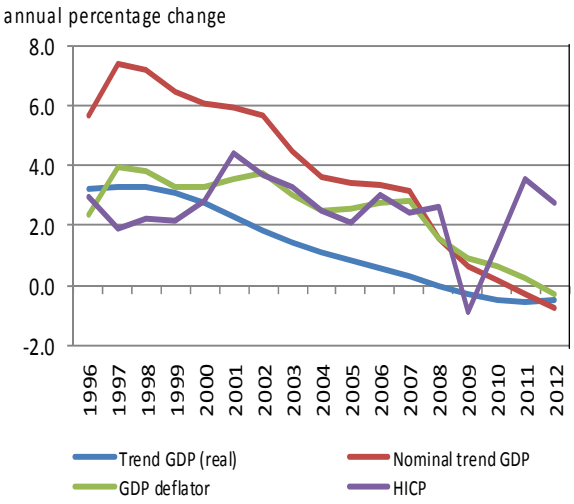
[26] See Banco de Portugal (2005), Annual Report.

Portugal

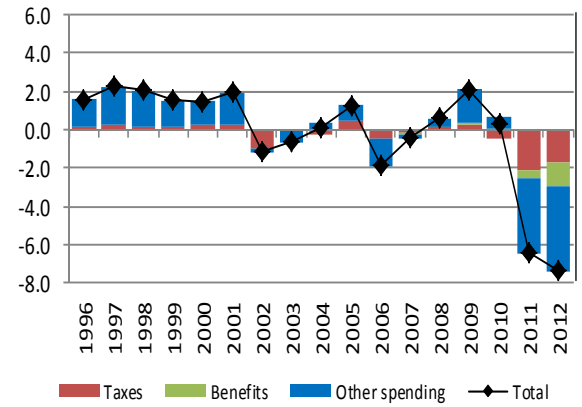
1. Measures of fiscal policy



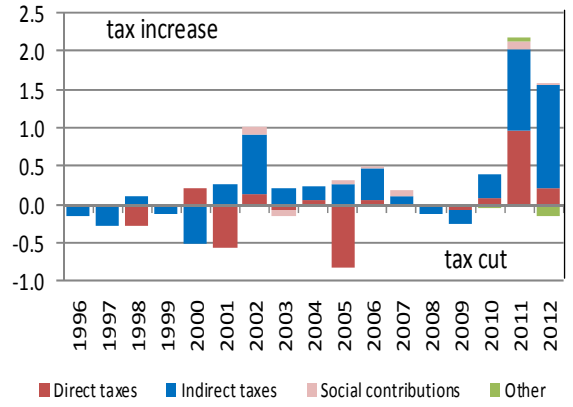
2. Spending benchmarks



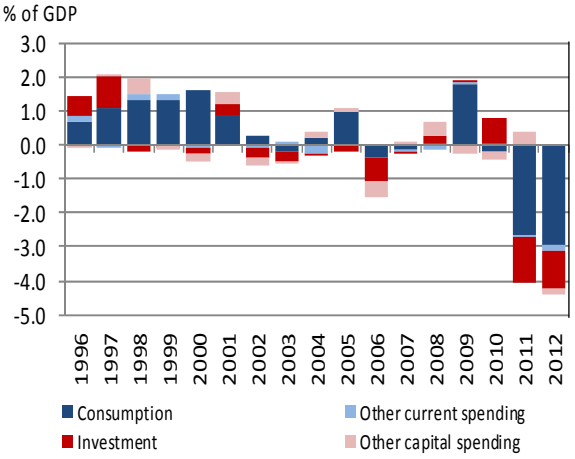
3. Composition of fiscal policy



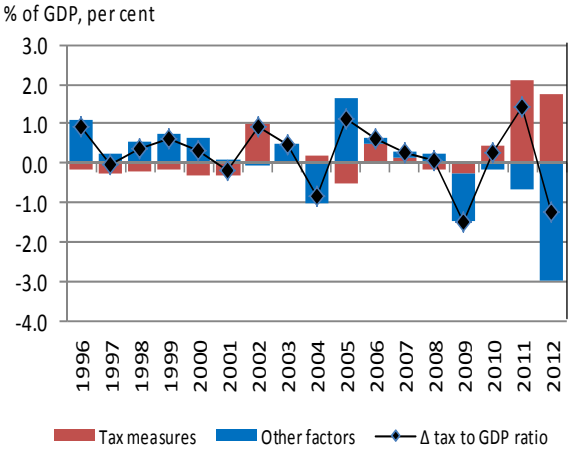
4. Composition of tax measures



5. Composition of "other spending" w.r.t. inflation



6. Tax measures and changes in tax-to-GDP ratio



Notes:

ΔCAPD = changes in the cyclically adjusted primary deficit as estimated by the European Commission, adjusted for pension funds tranfers, capital tranfers to the financial system, the securitisation of tax revenues and proceeds from UMTS and 4G.

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UNITED KINGDOM

1 Time period

The dataset for the United Kingdom is on a financial year (FY) (April-March) basis and covers the period from 1988-89 to 2012-13. The starting point of 1988-89 is imposed by the fact that quarterly government finance statistics (needed to compile the non-benefits spending part of the dataset) are only available back to 1987q1. 1987 is also the first year for which the ONS Blue Book dataset[27] reports detailed data on national accounts tax receipts.

2 Sources and methods

2.1 Impact of tax and benefit changes

The estimates of the impact on net borrowing of changes to taxes and benefits are based partly on official/external sources and partly on own estimates based on detailed tax and benefits data. As a rule, identified measures with an impact of more than 0.01 per cent of GDP have been included. Measures to tackle tax avoidance have generally not been included. The impact of the introduction of – and changes to – tax credits are considered throughout as changes to benefits spending rather than taxation (consistent with the forthcoming treatment in ESA 2010).

2.1.1 Estimates taken from official/external sources

*Budgets, Pre-Budget Reports and Autumn Statements (1998-99/2012-13)***:** In the UK, the budget is typically presented in March of each year. During the Labour government (1997-2010) there were also Pre-Budget Reports (PBR) in the autumn. Under the present coalition government, these have since been replaced by Autumn Statements (AS). All of the relevant documentation is available on the internet and budget documents throughout this period contain detailed tables with estimates of the impact of budget measures.

A notable feature of UK fiscal policy is that changes to the tax and benefit system are often announced one or two years before they come into effect. Each budget/PBR/AS contains tables with costings, not only of the measures announced in the relevant budget/PBR/AS, but also measures announced earlier and still to come into effect. These documents have been the primary, initial source for compiling the dataset over the period from 1998-99 to 2012-13, especially for those changes to the tax and benefit system for which it is not feasible to construct reasonable, own estimates based on published information. The estimate included is generally the last one published before the measure enters into force. For example, in the case of a measure announced in Budget 2005 but only coming into effect in FY 2007-08, the estimate would, as a rule, be the one contained in the March 2007 Budget (on the eve of the start of the financial year in question). It is thus the "final *ex ante*" estimate available.

*Office for Budget Responsibility Budget Tax Measures database***:** In June 2012, the OBR published a database of budget tax measures going back to 1970. This database contains, in principle, the initial budget costings of all tax measures with an impact of GBP 50 million or more (which corresponds to around 0.01 per cent of GDP in 1988-89). It has been the main, initial source for compiling information on tax measures during the period 1988-89 to 1997-98 and for

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[27] The Blue Book is the main UK annual national accounts publication.

cross-checking the period from 1998-99 to 2012-13. The estimates taken from this dataset are the initial budget costings even if these may have been revised in subsequent budget documents.

Apart from adjusting the budget/PBR/AS estimates to agreed reporting conventions, adjustments have been made if necessary so that estimates refer to tax/benefit changes that actually happened and do not include estimates of the impact of postponing or abandoning previously announced tax changes that never took place.

2.1.2 Own estimates

Own estimates have been produced in order to fill gaps left by the above-mentioned sources, to ensure a consistent approach across time with respect to the adjustment of duty rates, tax brackets and benefit entitlements to inflation and, more generally, whenever relevant micro public finance data is available which makes it possible to verify *ex post* the official *ex ante* estimate.

The main sources of information have been data on tax receipts, liabilities, rates, allowances and reliefs published by HM Revenue and Customs (HMRC) in various statistical publications; historical information on tax rates and allowances compiled by the Institute for Fiscal Studies (IFS), and detailed data on benefits payments and caseloads published by the Department for Work and Pensions (DWP). These sources have also served as a cross-check that measures announced/costed in budget documents actually took place.

The approach to compiling these estimates can be summarised as follows:

- *Excise duties:* In the UK, it is standard practice for excise duty rates to be adjusted each year for inflation. In this dataset, the impact of changes in excise duty rates has been estimated by calculating the real terms increase in duty rates (compared to RPIX until 2010-11, CPI thereafter) and applying this increase to the relevant receipts outturn of the FY in question. In case excise duty rates were changed during the FY, a weighted average of the duty rates in force during the FY has been calculated. To do this, data on the various duty rates, consumption of the various types of fuel, tobacco and alcohol and the related tax liabilities and receipts has been taken from HMRC's Hydrocarbon Oil, Tobacco and Alcohol Bulletins. In the case of duty on cigarettes, the calculation of the effective duty rate (both specific and ad valorem) is based on historical data calculated by the IFS.
- *Income tax and social contribution brackets:* In the UK, it is standard practice for income tax and social contribution brackets to be raised each year in line with inflation. As in the case of excise duties, the intention has been to follow a consistent approach across time, by comparing the increase in allowances/bands/limits with the evolution of inflation (RPIX up to FY 2010-11, CPI thereafter). Estimating the impact on receipts is, however, subject to much uncertainty because of the great number of factors which interact to determine the relevant tax liabilities. At this stage, provisional/rudimentary estimates have been made as follows.
  - First, in the case of income tax, the real terms increase in the personal allowance and basic rate limit in each year has been calculated. In the case of social contributions, the increase in the lower earnings limit (later the primary threshold (employees) and secondary threshold (employers)) and upper earnings limit in each year has been calculated.
  - Second, data from the ONS household expenditure/income survey (with average incomes, taxes and benefits for a sample of households broken down into decile groups) has been used to make an estimate of the proportion of income liable to be affected by the aforementioned bracket changes. The relevant tax rates have then been applied to these proportions of income.
  - Third, the estimates derived in this way have been cross checked for the years 2006-07 to 2012-13 against the "direct effects of illustrative tax changes" (or "ready reckoners")

published by HMRC corresponding to the FY in question. For earlier years, they have been cross-checked against any actual estimates of above or below inflation adjustments of brackets contained in budget documents.

- Vehicle Excise Duty: Historical rates were obtained from the "standard note" in the House of Commons Library. Real terms increases/decreases were then applied to FY receipts and split between households (other current taxes, D59) and firms (other taxes on production, D29) based on ONS Blue Book detailed tax data.
- *Business rates*: this is a tax which accrues to local government and which is levied on firms on the basis of property values. Property values are re-evaluated usually every five years and each year a "multiplier" is applied to these values to determine the tax liability. The multiplier is increased, as a rule, in line with the Retail Price Index (RPI) of the previous September. Historical data on rates as published by the Department for Communities and Local Government confirm that the multiplier was always increased in line with inflation. The relatively modest impact of the introduction of – or changes to – various reliefs is still being reviewed.
- *Other targeted taxes.* Over the past two decades, a number of new (mostly indirect) taxes have been introduced, which are targeted at specific economic activities. Examples are Air Passenger Duty, Insurance Premium Tax, Landfill Tax, Aggregates Levy, and Climate Change Levy. In general, estimates of the impact of the introduction of these taxes and subsequent changes to tax rates have been derived on the basis of detailed (usually monthly) data on receipts and liabilities published in the respective HMRC statistical bulletins.
- *One-off taxes*: Examples include the Windfall Tax imposed on privatised utilities in FY 1997-98 and the Bank Payroll Tax imposed in FY 2010-11. The impact of these measures is simply the respective (one-off) receipts outturn.
- *State pensions and child benefit:* The IFS has published historical data on state retirement pension rates and rates of child benefit. Estimates of the impact of changes have been made by applying the real terms increase to the outturn for state pension spending and child benefit spending respectively for the FY in question.
- *(Other) Social benefits*: the DWP publishes detailed data on FY spending on all benefits for which it (and its predecessor departments) are (were) responsible, as well as data on caseloads (*i.e.*, numbers of recipients for each benefit). This data has been analysed, in particular by computing real terms growth in spending for each benefit, adjusted for caseload. This analysis does not point to major effects from changes to the benefits system having been overlooked. Notably, the only significant fluctuations in real terms spending on benefits appear to be those for income-related benefits during and after recessions and around the time of the introduction of tax credits (for which the estimates included in budget/PBR documents have been incorporated).
- Finally, in the case of tax receipts, an analysis of year-on-year changes in the tax-to-GDP ratio has been undertaken (tax-by-tax) with a view to identifying possible, major errors and omissions. Specifically, the causes of significant fluctuations in the ratio of any tax to GDP should have a plausible explanation. In general this is the case. But occasionally, this has led to the identification of a potentially large impact of a tax measure. For example, in 1989-90, the ratio of social contributions to GDP fell sharply in spite of no measure being referred to in the OBR database. According to IFS records, in this year, the rate paid by employees below the lower earnings limits was reduced from 5 to 2 per cent, while between the lower and upper earnings limit, the lower 5 and 7 per cent rates were replaced by the (then) standard 9 per cent rate. Probably these changes were intended to be fiscally neutral. However, in the quarter in which these changes came into effect, there is a clear drop in employees' social contributions relative to employers' social contributions (which were not affected by these or any other

changes). On this basis, a negative impact of these changes in social contribution rates was imputed.

2.2 Other spending

- The spending data is that contained in the 2013q3 release of quarterly government finance statistics published by the ONS.

2.2.1 Derivation of spending benchmarks

- *Trend GDP*: Real GDP from the 2013q3 release of UK Economic Accounts (UKEA) from 1955-56 to 2012-13, extended by the real GDP growth forecasts of the OBR through 2018-19 (December 2013 Economic and Financial Outlook).
- *GDP deflator*: from UKEA 2013q3 release.
- *Inflation*: Retail Price Index excluding mortgage interest payments (RPIX) from 1988-89 to 2010-11, Consumer Price Index (CPI) for 2011-12 and 2012-13. The shift in index is motivated by the government's decision to change the annual uprating of the state pension from RPI to CPI as of 2011-12.

2.2.2 Identification of omitted spending

For current transfers, the UK's GNI-based contributions to the EU Budget. For other spending items, identification of outliers based on quarterly general government finance statistics and UKEA. The most important omitted spending pertains to the following:

- Transfer of nuclear sites from British Nuclear Fuel (public non-financial corporation) to the Nuclear Decommissioning Authority (central government entity) in 2005-06
- Capital transfers related to support to the financial system in 2008-09 and 2009-10

The sales of 3G and 4G mobile licenses in 2000-01 and 2012-13 are automatically excluded from the analysis along with all net acquisitions of non-financial, non-produced assets.

3 Analysis

3.1 The main episodes of fiscal policy

The main episodes of fiscal policy may be summarised as follows:

- Fiscal policy was expansionary at the end of the 1980s (the "Lawson boom") and in 1992-93 (in response to the recession of 1991-92).
- With net borrowing rising to almost 8 per cent of GDP in 1993-94, there follows a period of fiscal consolidation (1993-94 to 1998-99). During this period, broadly speaking, there were net tax increases, no major change to benefits, and other spending was kept broadly constant in real terms (with cuts in capital spending tending to offset modest increases in current spending).
- With a balanced budget achieved by 1998-99, fiscal policy was generally loosening during 1999-2000 to 2005-06. While tax policy was broadly neutral, there were increases in benefits (related in particular to above inflation increases in pensions, winter fuel payments and the introduction/expansion of tax credits) and, most importantly, other spending grew strongly in real terms. This was a period during which the government committed to significant real terms

increases in spending on health and education, as well raising the share of government investment in GDP.

- Real spending growth moderated in 2006-7 and 2007-08 (in part because inflation picked up) and fiscal policy was more neutral in these years.
- There was a fiscal expansion in 2008-09 and 2009-10 in response to the "great recession". This consisted of temporary tax cuts (e.g. cut in main VAT rate from 17.5 to 15 per cent), partly temporary spending increases (e.g., bringing some investment projects forward) and of sticking to significant nominal spending increases agreed in the autumn 2007 spending review.
- Finally, with net borrowing having risen to more than 11 per cent of GDP in 2009-10, during 2010-11 to 2012-13, there is a considerable fiscal contraction. This fiscal contraction dwarfs the one of the mid- to late-1990s, with larger tax increases, and unprecedented, large real terms cuts in spending.

Our measure of fiscal policy differs quite substantially from the change in the cyclically adjusted primary deficit, especially during and after the recession of the early 1990s, as well as in the run-up to and during the financial crisis and recession of 2008-09. Much of this owes to fluctuations in the tax-to-GDP ratio not related to tax changes, described in more detail below.

3.2 Tax measures and changes in the tax-to-GDP ratio

Over the whole 1988-98/2012-13 period, the cumulated impact of tax measures amounts to 3.5 per cent of GDP, while the ratio of taxes and social contributions to GDP actual declined slightly. The main reason for this is the fact that taxes on products other than VAT have held fairly steady over GDP in spite of significant increases in excise duty rates. The effect of higher duty rates on receipts has been offset by the tendency of consumption of fuel and tobacco to decline relative to GDP (and overall consumption). It should be recalled that in our dataset we only record the initial impact of a tax measure. If, in subsequent years, the tax base tends to shrink (expand) in relation to GDP, then the effect of this tax measure in relation to GDP correspondingly declines (increases), but this is not something that is captured in the database.

In terms of tax measures, there has been a tendency for indirect taxes to be increased. Apart from excise duties on fuel, tobacco and alcohol, there have been significant increases in the main rate of VAT (from 15 to 17.5 per cent) in April 1991 and then again in April 2011 (from 17.5 to 20 per cent) following a temporary cut (to 15 per cent) between 1 December 2008 and 31 December 2009. Rates of stamp duty were increased significantly (albeit from very low levels) in the late 1990s and early 2000s. Moreover, during the 1990s and early 2000s – as already mentioned above – a number of new indirect taxes were introduced. Corporation tax measures have been fairly neutral over the period as a whole, while in the case of personal income tax there has been a tendency to reduce rates and to increase tax brackets by more than inflation (although, at least until recently, by less than average wages). Changes to social contributions have been relatively limited, although both employee and employer rates were raised in 2003-04.

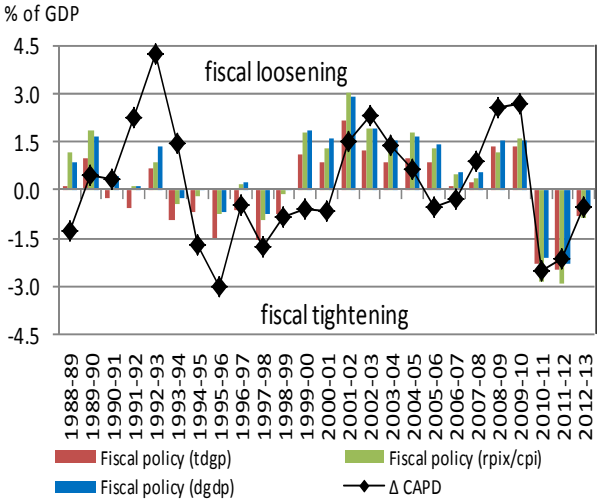
In general, and looking at the broad tax aggregates, tax policy has tended to "lean in one direction" in any given year, rather than tax changes offsetting each other. The most notable exception is 1991-92 when the main rate of VAT was increased to finance a reduction in the Community Charge ("Poll Tax").

As far as changes in the tax-to-GDP ratio not explained by measures are concerned, there are periods when the tax-to-GDP ratio net of tax measures has tended to rise strongly: 1988-98/1989-90, 1997-98/2001-01 and 2004-05/2007-08. These are periods which generally coincide with the latter end of a cyclical expansion. By contrast, during 1990-91/1993-94,

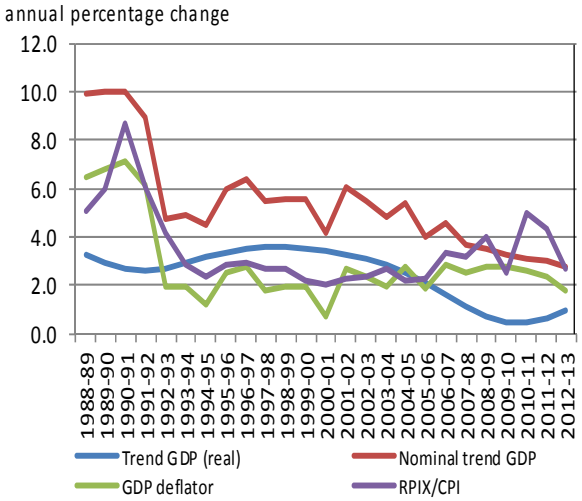
2001-02/2002-03 and 2007-08/2012-13, the tax-to-GDP ratio net of measures fell sharply. These are generally periods coinciding with or immediately following recessions and/or sharp falls in asset prices/transaction volumes. This is a clear pattern driven mainly by the evolution of income tax and corporation tax receipts.

United Kingdom

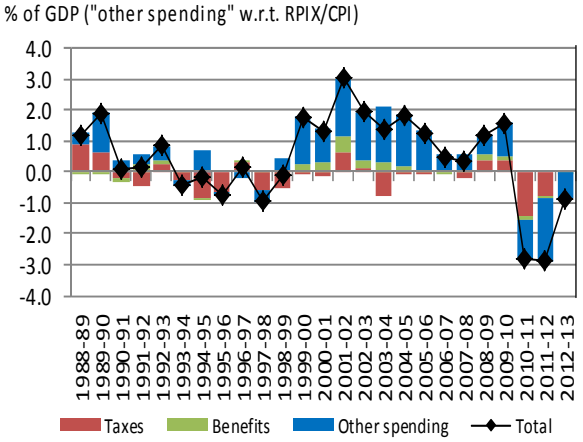
1. Measures of fiscal policy



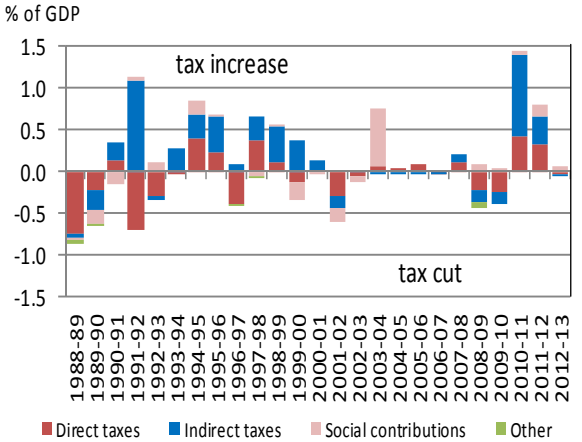
2. Spending benchamrks



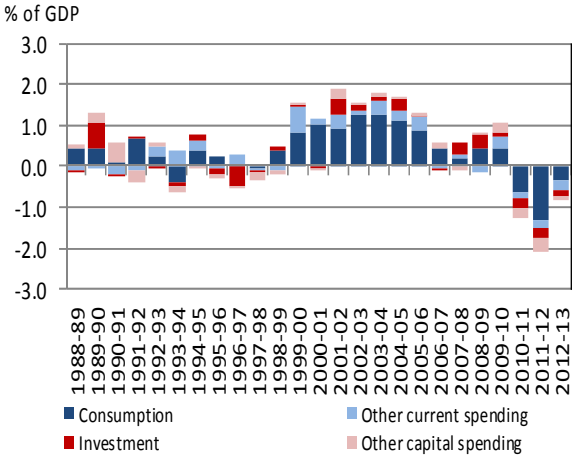
3. Composition of fiscal policy



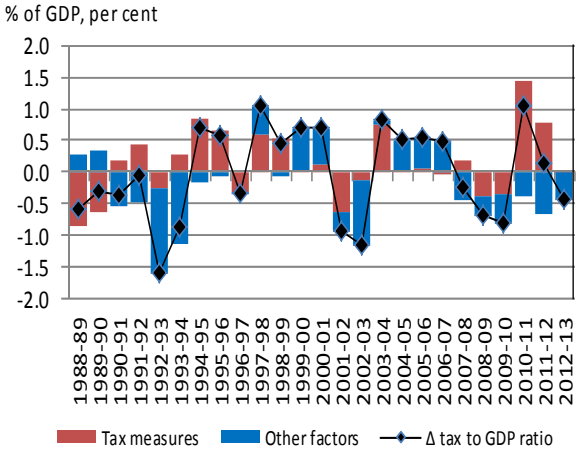
4. Composition of tax measures



5. Composition of "other spending" w.r.t. inflation



6. Tax measures and changes in tax-to-GDP ratio



Notes:

ΔCAPD = Change in the cyclically adjusted primary deficit as estimated by the Office for Budget Responsibility, excluding proceeds from sales of UMTS licences in 2000 and 2012 and the Royal Mail Pension Transfers in 2012.

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Institute for Fiscal Studies

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HM Revenue and Customs

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- Income Tax Liabilities Statistics
- Hydrocarbon Oils Bulletin
- Tobacco Bulletin
- Alcohol Bulletin
- Insurance Premium Tax Bulleting
- Air Passenger Duty Bulletin
- Landfill Tax Bulletin
- Aggregates Levy Bulletin
- Climate Change Levy Bulletin
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- Inheritance Tax Statistics

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COMMENT TO "TOWARDS A (SEMI-)NARRATIVE ANALYSIS OF FISCAL POLICY IN EU MEMBER STATES" BY RICHARD MORRIS, PIETRO RIZZA, VLADIMIR BORGY, KIRSTINE BRANDT, MANUEL COUTINHO PEREIRA, ANNA JABLECKA, JAVIER J. PÉREZ, LUKAS REISS, MORTEN RASMUSSEN, KARIM TRIKI AND LARA WEMENS

David Heald[*]

I won't talk about fiscal multipliers at all: we've had quite enough of them today! What I want to do is to praise the initiative of Richard Morris (European Central Bank) and his colleagues from other central banks – the eight countries now involved, three in process and hopefully this will be expanded later. This project is really an initiative, rather than a piece of specific research. What the participants aim to produce is a well-documented dataset. From reading the paper (Morris *et al.*, 2014) and listening to Richard's presentation, delegates at the workshop will gain a sense of the huge care that's been taken. There are questions about cost: clearly the resource costs of doing this kind of work are considerable. There's a question of expertise in terms of understanding the countries' government accounting as well as the national accounts under ESA. And there's also the question of access. This is the kind of work that academics cannot do but from which academics are potentially major beneficiaries. I was also impressed by the emphasis placed on having what has been done by experts on particular countries peer reviewed by people from other countries. Essentially this is about creating a research infrastructure as a platform for work both by the people who are doing the hard slog and by others.

The whole question about what goes into the public domain is important for legitimacy. We have seen a conflict between technocracy and democracy: it's not just the legitimacy of democracy that is under threat, it's also the legitimacy of technocracy. One of the things that worries me is that, when one hears numbers for fiscal multipliers, one does tend to expect certain kinds of numbers coming from particular institutions. The fact that the project is to open things up cannot be anything but beneficial.

Turning now to how the dataset will add value, there's a lot of care in thinking about disaggregation and about classification. Both the paper and the presentation contrast the approach in this work with that of Romer and Romer (2010) and of Devries *et al.* (2011). An important issue in the context of disaggregation is the measuring of what is "discretionary". Indeed, what constitutes a "measure"? What is it that you're trying to put a value on? There's the question of what kinds of spending should not be included as discretionary. Richard specifically mentioned debt interest and the transfer of assets between the government sector and the non-government sector. There's also been a lot of thought about benchmarks against which changes should be measured.

There are several things we can say about government documents. They come with a lot of political spin now that there is just as much concern about the political effects that announcements have as about what actually happens. And that raises a question in such datasets, about the use of numbers that are provided at the time. Obviously these numbers might not be reliable for reasons of political spin or they might not be reliable because there's very little basis on which to make an estimate. UK examples are: the incremental yield from increasing the top rate of income tax from 40 to 50 per cent; the cost of social care where the United Kingdom has had big problems with estimates; and of policy changes to student financing (where large projected savings now look illusory). One of the key differences between this paper and that of Devries *et al.* (2011) is not

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taking at face value the numbers provided at the time. I very much hope that the comments that are attached in the dataset to particular items will make clear the distinction between the numbers at the time and the subsequent numbers and set out the justifications for questioning the original numbers.

This brings me to a more general concern. Charles Goodhart (1983) became very famous for Goodhart's Law about monetary aggregates: if you take something as a target, it starts changing its behaviour. And as one focuses on fiscal aggregates there comes a very considerable danger that this happens in this context. I would mention the use of Public-Private Partnerships (PPPs) as opposed to publicly-financed capital expenditure; government guarantees for new power stations in England; and arbitrage between the general government sector and the public sector broadly defined. I used to have a fairly clear idea of what was fiscal policy and what was monetary policy but quantitative easing has taken on a quasi-fiscal role. There are questions to think about with regard to interpreting the numbers that are published.

I spent a long time as an adviser to the Treasury Committee of the UK Parliament and have a long record of criticising the UK Treasury. So it's quite nice to be able to note here that the UK Treasury comes out quite well in terms of the nature of the budget documents and what is actually provided. Specifically, the fact that the UK budgets on a national accounts basis is good because it creates more visibility in relation to the national accounts. However, one motivation for that is to make sure that PPPs do not score in the budgeted numbers (though they do in departmental accounts and the Whole of Government Account) (Heald and Georgiou, 2011a, 2011b). Once this dataset is available, it should be helpful for countries that don't have that kind of alignment between government budgetary documents and the national accounts, to see what is possible. That might start having an influence on international practice.

My final comment is that Eurostat (2013) is, at this moment, "trespassing" into the area of government financial reporting by publishing a proposal for harmonisation of public sector accounts. That raises all sorts of issues, because differences between budgetary accounting (the way the budget is presented), government financial reporting (the way in which the outturns are reported in government financial statements) and the national accounts, create significant problems of comparability. There is also the major issue of whether the European Union will follow International Public Sector Accounting Standards (IPSAS) or whether, and if so how, the proposed European Public Sector Accounting Standards (EPSAS) will be different from IPSAS. There are two possibilities. The first would be to eliminate some of the choices within IPSAS, to secure more comparability within the European Union. The second is the danger of carve-outs to IFRS-derived IPSAS standards that governments do not like because of the results that they show.

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Session 3

NEW RULES FOR EMU

THE GOOD, THE BAD AND THE UGLY: STRENGHTS AND WEAKNESSES OF THE NEW EUROPEAN FISCAL FRAMEWORK

Ľudovít Ódor[*]

Under substantial market pressure, policymakers have proposed a diverse set of far-reaching changes to the basic European fiscal architecture. The adoption of the so called "Six-pack", "Two-pack" and the agreement on the Fiscal Compact made the fiscal framework more complex, but the proponents highlighted their main benefits in higher transparency at national level, more local ownership and stricter enforcement mechanisms. This paper´s objective is to critically assess the new framework, its initial implementation and to identify potential shortcomings. The well-known Kopits-Symansky criteria represent the basis for the review. We also formulate fifteen recommendations, which aim at a simpler, more internally consistent system where flexible interpretation is not necessary to eliminate tensions between various elements of the framework.

1 Introduction

"A camel is a horse designed by a committee"

Alec Issigonis

If one looks at the current fiscal framework in Europe, path dependency is visible at first sight. Many incremental changes over the last almost two decades have resulted in a very complex web of rules, procedures and surveillance mechanisms, which can be meaningfully described only on more than one hundred pages.[1] In comparison, the fiscal framework in the United States (and many other existing federations) is much simpler. We argue that this complexity is a price paid for the low credibility of the no-bail-out clause in the European Treaty. In addition to that, changes adopted very quickly under the pressure of financial markets made the system even harder to understand for the general public.

This paper looks at the current European fiscal architecture not primarily from the point of view of its historical evolution, but rather through the lens of a well-established set of criteria for fiscal rules. The Kopits-Symansky[2] criteria are useful in identifying the main strengths and weaknesses of the framework. As a second test, we have decided to draw tentative conclusions based on available empirical evidence. In our view, despite the fact, that many of the major changes have been legislated only recently, it is useful to evaluate the new architecture not only from theoretical but also from practical point of view.

There have been several changes to the system which clearly go in the right direction ("the good"). The main advantages of the new framework are in the recognition that synergies between fiscal rules and independent fiscal institutions (IFIs) can be more effective in eliminating the deficit

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Useful comments and suggestions from Biswajit Banerjee, Michal Horváth, George Kopits, Philip Lane, Geert Langenus, Sandro Momigliano, Lucio Pench, Gábor P. Kiss, Simon Wren-Lewis, Charles Wyplosz and participants of the Banca d´Italia Workshop on Public Finance in Perugia, ZEW Public Finance 2014 Conference in Mannheim and seminars at the CBR and NBS are gratefully acknowledged. The author alone is responsible for all views expressed.

[1] European Commission (2013).

[2] Kopits and Symansky (1998).

bias. It is possible to have a more complex set of rules, if there is a trusted and independent entity to check the compliance with them. Among the good features one should mention also more weight put on stock variables (debt). Last but not least, more automatic enforcement mechanisms and higher transparency at the national level are further key improvements.

The "ugly" part of the current architecture is the overregulation in terms of fiscal rules. Six – sometimes inconsistent – rules are more than the usual case in well-functioning federations. One can also mention the numerical benchmark for changes in the structural balance (deviation from the medium-term objective – MTO), which is while theoretically sound, empirically extremely hard to evaluate in real-time. Two different evaluations of deviations from MTO (one by the Commission and one by the local independent fiscal institution)3 can create confusion and might complicate the communication of basic messages to policy makers and the general public.

The paper identifies also several shortcomings ("the bad"). Inconsistencies within the SGP and between the Pact and the Fiscal Compact are the most serious ones. There is also a motivation to adopt one-off and temporary measures in order to end the Excessive Deficit Procedure (EDP), since the underlying fiscal position plays no role in the decision of the Council. The definition of the structural balance is another problem both because of the narrow concept of the output gap (for example no role for absorption or financial cycles) and because of the lack of clear and consistent definition of one-offs and temporary measures. Introduction of the so called "investment clause" and the very benevolent implementation of the new rules in 2013 have been identified as another weakness.

Based on the critical assessment, the paper offers fifteen recommendations for further improvements. Among the main proposals one can mention a) the abolishment of the expenditure benchmark and the investment clause, b) the utilization of synergies between the SGP, Macroeconomic Imbalance Procedure (MIP) and crisis resolution mechanisms, c) the improvement of the definition of one-offs, d) the widening of the mandate of IFIs and e) the use of structural budget balance estimates when ending the EDP.

The paper is organized as follows. The second section describes the main features of the new fiscal architecture in Europe. The third section evaluates the system through the lens of the Kopits-Symansky criteria. Section 4 deals with implementation issues, while Section 5 offers an overall assessment and recommendations for further improvements. Section 6 concludes.

2 The new European fiscal framework

In this section we briefly describe the original set-up and the main changes recently legislated to the European fiscal framework. Important innovations were adopted in all three main parts of the system: numerical fiscal rules, transparency requirements and institutional set-up.[4]

When setting up a fiscal framework one should take into account many important aspects, however one trade-off stands out as the most critical one: flexibility versus credibility. Usually the practical implementation of enforcement mechanisms is a litmus test in this regard. If the rules are strong only "on paper", they would gradually lose their credibility. On the other hand, strong enforcement of a very rigid rule would lose public backing. The problem can be rephrased also in the general context of the "rules" versus "discretion" debate. Originally, policymakers in the EU

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[3] The EC will act based on the Stability and Growth Pact, while the local IFI will follow domestic rules (transposition of the Fiscal Compact). Since output gap is unobservable and model dependent, it is likely that the two estimates of structural budget balances will differ.

[4] Including procedures and surveillance mechanisms.

opted for a collegiate decision-making among peers rather than for a (quasi-)automatic implementation of the rules. As the events in 2003 clearly showed, when countries both judge and are being judged, it is almost impossible to fine big countries (given the distribution of voting rights). The result was that the rules were eroded and the implementation de facto gradually moved away from rules towards discretion. What we see now is a step back towards less discretion and more rules. However, as Wendorff (2014) argues, a very complex set of rules with many exemptions and exceptions might paradoxically mean *more* room for discretion. According to Wendorff, in that case "the rule becomes a bargaining process." This is dangerous in a monetary union, since negotiations behind closed doors to affect outcomes can easily undermine the credibility of the framework in the eyes of financial markets.

The original architecture of the European Monetary Union rested on three main pillars. First, the ECB was established as an independent monetary authority with clear focus on a union as a whole. Second, the Treaty included a no-bail-out clause to avoid free-riding behavior and possible negative spillovers. Third, this objective was strengthened by fiscal rules via the adoption of the Stability and Growth Pact (SGP) to avoid gross policy errors. Clearly, these safeguards failed to ensure sound public finances mainly in good times[5] and were not credible in the eyes of financial markets.[6] The set-up was not better outside the fiscal arena. As Quaden, Smets and Langenus (2013) show there was only very soft coordination of macroeconomic policies and a coherent framework was lacking also as far as banking supervision is concerned. The ECB was not designed to be the real lender of last resort. The initial assumption was that endogenous convergence inside a monetary union together with market-discipline will do the job.

The European debt crisis quickly uncovered the major shortcomings of the initial set-up and put enormous pressure on policymakers to adopt changes to restore the credibility of the single currency. Since the no-bail-out clause was viewed by financial markets from the beginning as not credible (and the crisis proved them right)[7] and the ECB was reluctant to step in without safeguards, the only possibility was to adopt *more* fiscal rules and to *promise* stricter enforcement in the future. The final result is depicted on Figure 1.

Three important pieces of legislation were gradually implemented. The adopted "Six-pack"[8] and "Two-pack" added additional layers of complexity to the SGP. The stated objective was to make the European rules "smarter" and more credible. Moreover, an intergovernmental treaty (TSCG)[9] was signed among members of the European Union,[10] which was necessary for the ECB to launch its OMT program to finally calm down financial markets.[11] There is a fundamental difference between the TSCG and the changes in the SGP, since the former is not part of the EU setting. Even though there is some convergence in content, important differences exist between the two. A good example is the inclusion of the European Court of Justice, a new "guardian" of implementation, which may not necessarily have the best possible expertise to judge these matters.

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5 Calmfors (2005).

6 Altough, one can argue that low spreads in the boom phase could also reflect mispriced risk.

7 We clearly regard activities of the EFSF as de facto bailouts, even if some argue that there were no bailouts de jure (but only official loans).

8 All important legislation can be found through this link:
http://ec.europa.eu/economy_finance/economic_governance/sgp/legal_texts/index_en.htm

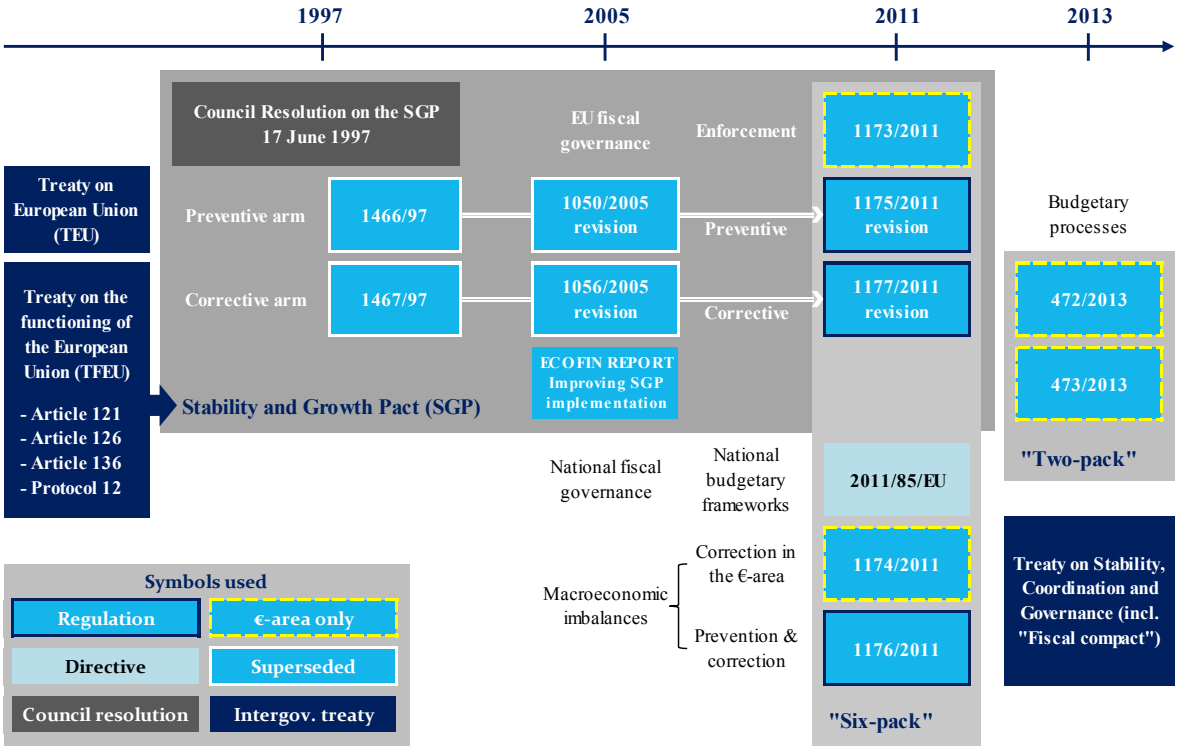
9 Treaty on Stability, Coordination and Governance (the part on stability is the so called Fiscal Compact).

10 With the exception of the UK and Czech Republic.

11 Draghi (2011).

Figure 1

The Evolution of the European Fiscal Architecture



Source: Adaptation from EC (2013).

Here we briefly describe several important features of the new Stability and Growth Pact.[12] First, not only fiscal developments but also macroeconomic imbalances are now monitored based on the new Six-pack. Second, the importance of national budgetary frameworks is recognized through the adoption of the Directive 2011/85 on requirements for budgetary frameworks of the Member States. Third, the Two-pack delegates more power to the center to control the budgets of individual Member States. Fourth, there is now a possibility to impose sanctions in the preventive arm of the Pact and finally, there was a shift in power from the Council to the European Commission via the reverse qualified majority voting.

2.1 Numerical fiscal rules

Compared to the usual case in existing federations (Allard *et al.*, 2013) the number of numerical fiscal rules in Europe is significantly higher. Federations employ two constraints on average, while the euro area has six. Of course Europe is not a conventional federal structure, but simplifications seem to be possible. The EMU has a following set of numerical fiscal rules:[13]

- excessive deficit – actual deficit over 3 per cent of GDP;
- excessive debt – actual debt over 60 per cent of GDP;

[12] Detailed description is available in EC (2013).

[13] In order to concentrate on the big picture, all rules are presented here in a simplified form without all the ifs and buts.

- benchmark structural adjustment – 0.5 per cent of GDP;
- debt reduction rule – reduction of the excess over 60 per cent of GDP by one-twentieth a year
- medium term objective – close to balance in structural terms (structural deficit up to 0.5/1 per cent of GDP);
- expenditure benchmark – constraint on the real growth of adjusted expenditures.[14]

Moreover, there is a numerical definition of "significant deviation" from the MTO or the path towards it based on the evolution of the structural balance and the expenditure benchmark. To allow for more flexibility, two general escape clauses were defined. The first is related to "unusual event outside the control of the Member State", while the second to "severe economic downturn". Some form of flexibility is provided also with the so called "investment clause",[15] which allows back-loading of structural adjustments if certain criteria are met.

Apart from fiscal rules at the European level, according to the newly adopted Six-pack, Member States should have their own fiscal rules on a multi-annual horizon. The legislation also specifies that these should be monitored by functionally independent local bodies.

2.2 Rules for transparency

Information requirements for Member States have also increased with the reform of the fiscal architecture. The Directive on requirements for budgetary frameworks of the Member States put more emphasis on reporting tax expenditures, contingent liabilities, public corporations, capital injections and other extra-budgetary operations. The new framework addresses also the macroeconomic forecasts on which the budget figures are based. According to the Two-pack, independent fiscal institutions should produce or endorse these assumptions.

2.2 Institutional set-up

Significant changes have been carried out also in the institutional set-up. The role of the European Commission and independent fiscal institutions has increased considerably. The former now has the power to recommend adjustments in draft budgets of the Member States and its role in the EDP procedures has also strengthened. The latter are expected to be involved in the macroeconomic forecasting procedure and should also check the compliance with fiscal rules at the national level.

The shift of power towards technocratic bodies is a step in the right direction; however it also moves the political battlefield. More political pressure and lobbying are expected to influence the decision of the EC and since the abolishment of independent watchdogs is not an easy option anymore, one should expect greater political pressure in the selection of members of fiscal councils. In others words, more checks and balances might be necessary in the implementation phase. Possible options are: some form of involvement of IFIs in the SGP procedures or for example stricter professional requirements for candidates as far as the nomination of members of fiscal councils is concerned. We will elaborate more on the possible options for institutional set-up in Section 5.

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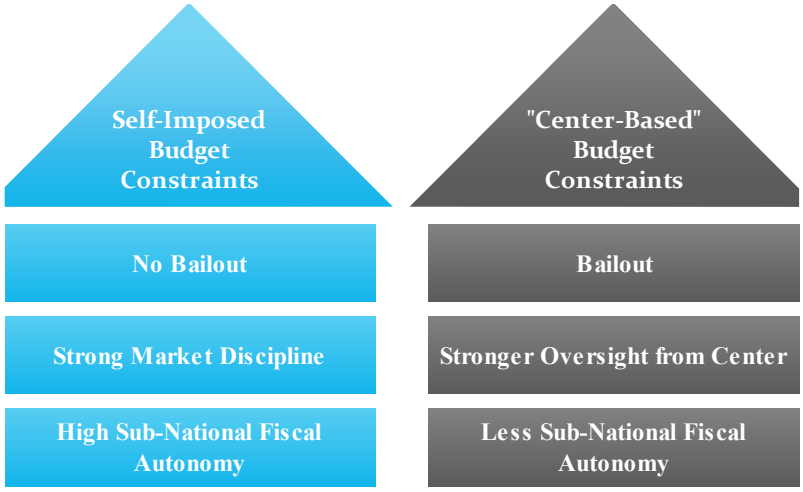
[14] The adjustment includes discretionary measures on the revenue side.

[15] The investment clause is not part of the new legislation, but rather the way the European Commission interprets minimum structural adjustments in the preventive arm of the Pact. In order to prioritise spending in investment - which support sustainable growth - the EC would "explore further ways within the preventive arm to accommodate investment programmes". Government investment in projects co-financed with the EU was decided to be eligible expenditure under this flexible interpretation.

Figure 2

Two Possible Arrangements of Fiscal Discipline



Source: Adapted from Allard *et al.* (2013).

3 Evaluation of the new fiscal framework

In this section we evaluate the European fiscal framework from two different angles. The first is a more general question of the relationship between the center and individual regions or states.[16] As we are going to argue, it is crucial to take into account these relationships when deciding about the fiscal architecture. The second aspect is the core of this paper – the evaluation of the framework compared to a benchmark represented by the Kopits-Symansky criteria.

3.1 Division of power

The usual theoretical argument to have strong fiscal frameworks is the well-known deficit bias. There could be several reasons for this bias (see Calmfors and Wren-Lewis, 2011 or Wren-Lewis, 2013), but the set-up of a monetary union is more complicated, since common-pool problems can arise not only for local reasons but also at the level of the whole union.

There are several ways, federations are dealing with this "common-pool squared" problem (Allard *et al.*, 2013, Wyplosz, 2013). One extreme is to rely on pure market discipline. In this case, there is no formal coordination mechanism, but a strict and credible no-bail-out principle at the central level. The deficit bias at the local level is then usually dealt with self-imposed fiscal rules or procedures. The US model is very close to this type of arrangement.

The second extreme is direct control by the center. The German set-up[17] can be reasonably well approximated by this model. In this case bail-out is not prohibited, but the free-riding is

[16] Here the center means federal level or in case of the European Union a supranational entity (*i.e.*, the European Commission).

[17] Or one can mention the new Spanish framework.

contained by heavy involvement of the center in local budgetary decisions through *ex ante* rules and procedures.

Despite current improvements, the problem of the European framework is that on the one hand pure market discipline is not credible and on the other hand substantial involvement of the center in national budget decisions are at odds with the national sovereignty principle guaranteed by the Treaty.[18] Therefore in the short run (when changes in the Treaty are not realistic) the only possibility was an overregulation with fiscal rules and stricter enforcement mechanisms (a move from a more market controlled regime toward more oversight from the center). In other words this is the price Europe had to pay for the non-credibility of the no-bail-out principle and the failure of the former SGP. If substantial changes to the Treaty are not possible in the longer-run, the pendulum will have to swing back toward more market discipline. In that case at least partial resuscitation of the no-bail-out clause (via private sector involvement, CACs, bail-ins or other mechanisms)[19] seems to be necessary for survival.

Now we turn to the evaluation of the European framework based on a set of well-established criteria.

3.2 The European framework an the Kopits-Symansky criteria

Kopits and Symansky (1998) defined a set of eight criteria to assess fiscal rules. Ideally, a fiscal rule should be well defined, transparent, adequate, consistent, simple, flexible, enforceable and efficient. Of course, since there are important trade-offs among these criteria, it is impossible to score high on all these aspects. The important point is to balance the fiscal rule along these characteristics to achieve the desired outcome. Kopits and Symansky do not attach weights to individual criteria; however one can argue that in case of a monetary union the flexibility vs. enforceability trade-off is the most important.

Table 1 represents the evaluation of the current European fiscal framework[20] based on these criteria.[21] The new framework is strong as far as transparency and flexibility is concerned, while it scored not very well on simplicity, enforceability and consistency. Weak links were identified also in the definition of some rules. The assessment was more neutral in case of adequacy and efficiency.

3.2.1 Transparency

One of the strengths of the European framework is transparency at the national level. New requirements to provide more detailed information in key budgetary documents and the establishment of independent fiscal institutions have helped to better assess the underlying fiscal position of individual Member States. Improved understanding of possible risks (public enterprises, contingent liabilities, etc.) and day-to-day analysis of budgetary developments at local level also have the potential to limit creative accounting practices in the future. Voters might also benefit from higher transparency, since it will be easier to distinguish bad luck from bad policy.

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[18] According to Quaden, Smets and Langenus (2013), some weakening of the national sovereignty principle is already visible in the Two-pack: *ex ante* assessment of euro area countries´s annual budgets by the EC or for example the generalisation of the conditionality in the current troika programmes.

[19] Some of these mechanisms were used in the case of Greece and Cyprus, however they are not part of the framework yet.

[20] It is important to note that here we evaluate the whole fiscal framework and not just fiscal rules.

[21] Rather positive evaluation of the original SGP *vis-à-vis* the Kopits-Symansky criteria can be found in Buti and Giudice (2002).

Table 1

The European Fiscal Framework through the Lens of the Kopits-Symansky Criteria

Positive	Neutral	Negative
Transparency +	Adequacy	Simplicity – –
Flexibility +	Efficiency	Consistency –
		Definition –
		Enforceability –

Source: Author.

Important innovation is that the new SGP grants greater powers to Eurostat to audit statistics and the possibility of fines for statistical misreporting. After the experience with Greece, these measures are necessary not only from a transparency but also from a credibility point of view.

There are three countries (Ireland, UK and Slovakia), where detailed analysis of the inter-temporal public sector net worth by independent fiscal institutions contribute to an even more transparent presentation of fiscal accounts. Not only flows but also stocks are under better scrutiny. As Horváth and Ódor (2009) show regular balance sheet analysis not only improves transparency but can also mitigate bad incentives in fiscal policymaking.

On the other hand there are still some areas, where transparency can be improved (mainly at the EU level). If we focus on fiscal rules, the identification of one-offs is one of the most opaque procedures. Another area for greater transparency is the definition and calculation of discretionary revenue measures (DRM). In *ex ante* evaluations, the figures from the stability programs are taken into account, in *ex post* exercises it is not clear who should provide the relevant data. It is hard to imagine that the European Commission has the capacity, data and models to check all the discretionary revenue measures in all member states. Finally, the definitions of "good" and "bad" economic times are also very vague.

3.2.2 Flexibility

Fiscal rules should be flexible enough to accommodate significant shocks beyond the control of policy makers. There are several provisions in the new European fiscal framework, which serve this requirement relatively well.

More focus on structural budget balances via the SGP and the Fiscal Compact might give the authorities the needed flexibility in periods of normal business cycle fluctuations. On a top of that, there are two escape clauses to deal with "unusual events" and "severe economic downturns". Another innovation in the Fiscal Compact is that independent fiscal institutions should play an important role in triggering these escape clauses.

There is also a possibility in the preventive-arm of the SGP to take into account investment needs of the Member States. When assessing the compliance with minimum structural adjustment, countries can adjust their figures to co-financing of investments in projects financed by EU funds. However, there are at least two problems with this "investment clause". The first is that it creates inconsistency with the Fiscal Compact (there is no such provision there) and second, the calculation of the deduction in the first year makes no economic sense. From the *change* in the

structural balance the *level* of co-financing is deducted. In other words, even countries with a year-on-year *reduction* of investments can benefit from this clause.

Greater flexibility can be found also as far as the evaluation of effective action is concerned. The EDP procedure is not stepped-up if the country delivered the required adjustment but the economy moved in the other direction. Three factors are taken into account: a) the impact of revisions to potential output (α), b) the impact of revisions to output composition and revenue windfalls/shortfalls (β) and c) impact of other unexpected events on the general government situation (γ).

It is worth noting that the risk of being too flexible should not be underestimated. Escape clauses and other provisions granting exceptions and exemptions should be applied in a consistent manner and only in well-defined circumstances. Otherwise too much flexibility can undermine the enforceability of the whole system. As Calmfors (2005) put it "rules that are not clearly defined or which are open to interpretation from time to time can never command legitimacy". Wendorff (2014) goes even further by describing European rules as: "there is an impression that they are designed with a search for exemptions in mind." We come back to a benevolent application of rules in the fourth section.

The degree of flexibility is also directly linked to simplicity via the "rules versus discretion" debate. If one wants high flexibility, but no discretion,[22] it is not possible to have simple rules. The fundamental problem lies in the difficulty to design rules to many possible states of the world. Unfortunately the current European framework is an attempt to achieve this very ambitious goal. In our view, at the end, either the high degree of flexibility or the national sovereignty principle has to be given up to have a fully functional and internally consistent system.

3.2.3 Enforceability

Enforceability of the SGP has been a weak point since its inception. The 2005 reform of the Pact was explicitly provoked by the lack of ability to enforce the rules when two big countries breached them. The recent amendments made significant changes with respect to enforceability. More automatic sanctions can help to increase compliance with fiscal rules. It is however important to note, that it is too early to assess the enforceability of the new SGP, since it was adopted only recently. Unfortunately, the first phase of implementation described in the next section raises some question marks regards enforceability.

We have identified two areas for future improvement. The first is that reverse qualified majority (RQMV) is still not the benchmark in many important decisions of the Council. For example qualified majority voting (QMV) is used when deciding about the existence of excessive deficits or in case of evaluation of non-effective action.[23] The second possibility for improvement is to impose more harsh sanctions in the preventive arm. The major failure of the SGP in the past was lax budgetary policy in good times. Moreover it is also less counter-productive and more credible if one imposes fines in good times rather than in recessions.

Kopits (2014) stresses that in order to have sufficiently enforceable rules; the authorities should have an operational target under their control. From this point of view the European framework is relatively weak. Although the Six-pack recommends some form of medium-run fiscal framework at local level, the requirement is rather general.

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[22] The national sovereignty principle is in conflict with discretionary decision at the EC level.

[23] However, it should be evaluated positively, that the signatories of the Fiscal Compact have agreed to follow RQMV also in these important cases.

3.2.4 Adequacy

According to Kopits and Symansky, fiscal rules should be also adequate with respect to the specified goal. In the European case, rules are in place for the headline deficit, structural deficit, debt and real expenditure growth. To assess this criterion, one needs to define the basic objective first. The documents laying down the origins of the SGP explicitly mention "potential negative spillovers" but also sound public finances in general.

Despite the fact that the 3 per cent headline deficit limit has been the most well-known rule among policymakers,[24] it is clearly not adequate to ensure sound fiscal performance in the long-run, since it has no information on the underlying fiscal position.[25] Structural budget balances and debt levels are much more informative in this respect. Therefore one should evaluate positively that the new framework put much more emphasis on debt figures. In principle from the remaining three indicators (structural deficit, debt level or expenditure benchmarks) each one of them alone can be part of an adequate fiscal rule (depending on the exact definition). Three different rules for the same purpose clearly point towards over-regulation and unnecessary confusion. In the next paragraphs we highlight the main strengths and weaknesses of these three indicators. We are going to argue that *at least* one of them (the expenditure benchmark) can be abolished without too much negative effects.

From a theoretical point of view, structural budget balances represent a nice option to limit non-responsible fiscal behavior. However, several criteria have to be met in order to successfully operationalize this concept in a fiscal rule:

- reliable real-time estimate of the output gap has to be available on a policy-relevant horizon;
- one-off and temporary measures should be excluded;
- the level of the structural balance target has to reflect long-term sustainability issues.

We are going to show that further improvements are necessary to fulfil all these requirements.

First and foremost, the definition of the output gap is very narrow, focusing only on the link established via the Phillips curve. As several papers show (Borio *et al.*, 2013 and 2014, Bornhorst *et al.*, 2011, Lendvai *et al.*, 2011 or Benetrix and Lane, 2011) absorption cycles, financial cycles or commodity price cycles can have substantial effect on potential (or sustainable) output beyond normal business cycle fluctuations. Interestingly the new Six-pack offers a unique possibility to link[26] the output gap estimates and other cyclical factors to the analysis conducted in the Macroeconomic Imbalance Procedure.

Second, the empirical performance of output gap estimates and structural budget balances is generally poor as is illustrated on next figures (more on this topic in Annex 1). The uncertainty is so large that *yearly* evaluation of significant deviation from the MTO or the path toward it is more an art than a science.[27]

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[24] Kopits (2014) states that while governments in the EU as well as European Commission officials tend to communicate mostly in terms of headline figures; the finance minister in Chile communicates almost solely in terms of the structural budget balance.

[25] The usual argument for the 3 per cent deficit limit is that it is consistent with the 60 per cent debt target at 5 per cent potential nominal growth. In our view, 2 per cent for potential growth and 1.75 per cent for inflation is a more realistic assumption, which yields to not 3 per cent but 2.8 per cent deficit limit. Moreover, this calculation does not take into account stock-flow adjustments, costs of aging or the fact that 60 per cent debt may be too high for small and open economies. Woo (2014) is even more pessimistic about future growth prospects of the euro area and calculates that with 3 per cent nominal GDP growth, the SGP deficit limit is consistent with nominal debt at 100 per cent of GDP.

[26] The link between potential ouput estimates and analysis of macroeconomic imbalances is not expected to be formal. We proposing only to use the same information sets.

[27] Both the level of the structural balance and its yearly change is relevant for the identification of significant deviations. While the level is important for the deviation from the MTO, the change is relevant for the minimum structural adjustment.

To illustrate this point quantitatively we looked at different vintages of output gap estimates by the European Commission. In our simple evaluation exercise we selected four measures to evaluate these estimates:

a) AS[28] – absolute difference between the estimate for year t in autumn t+1 compared to spring t+1; in other words the difference between the first two estimates available after the completion of year t when deviation from the MTO can trigger correction mechanisms;
b) SS – absolute difference between the estimate for year t in spring t+2 compared to spring t+1;
c) LS – absolute difference between the estimate for year t in the last vintage compared to spring t+1; in other words difference between the last available and very first vintage after the completion of year t;
d) LA – absolute difference between the estimate for year t in the last vintage compared to autumn t+1.

Comparison of estimates during one-year (from spring t+1 to spring t+2) is important because of *credibility*, while differences between first estimates and the last vintage are more about *robustness*: changes in views over time, when more data points are available.

The upper panel of Figure 3 illustrates that the average revision (since the 2004 Autumn forecast; the first available vintage) to estimates of the *change*[29] in output gap for the new Member States is 0.45 percentage points in the first six months, while the average difference between the last and first estimate is 0.74 percentage points. The same statistics for the old Member States (since the 2003 Spring forecast) are 0.30 and 0.55 percentage points respectively.

Another illustration of the same point is on Figure 4, where we have tracked the evolution of the output gap and cyclical components through different vintages of European Commission forecasts (starting with the Spring 2003 forecast) for the same year. We selected years 2000, 2001 and 2002 for this exercise since we wanted to discard periods mostly affected by the financial crisis. From all the vintages for these years we calculated the difference between the highest and the lowest estimate to indicate the degree of uncertainty.

The average difference in this sample (25*3=75 observations) was 2.2 percentage points; in some cases more than 4 percentage points. In other words, the "historic output gap"[30] has changed as much as 2 per cent of potential GDP. We repeated the calculation for the *change* in the output gap which is also relevant indicator from policy perspective. The result was, that for the old MS, the average difference between the most optimistic and most pessimistic estimate was 0.52 per cent of GDP with changes in signs in 13.3 per cent of cases. As far as new MS are concerned, the average difference was slightly higher (0.52 per cent of GDP), but the sign has changed through different vintages in 40 per cent of cases. In other words, in many instances it was not even clear whether there was an increase or a decrease in the cyclical component.

The uncertainty around the change in the cyclical component (CC) is not the only problem with the estimation of minimum structural adjustment (ΔSB). One should also look at the definition and application of rules for identification of one-offs (OO) and revisions in headline deficit figures (B).

$$\Delta SB = \Delta B - \Delta CC - \Delta OO \quad (1)$$

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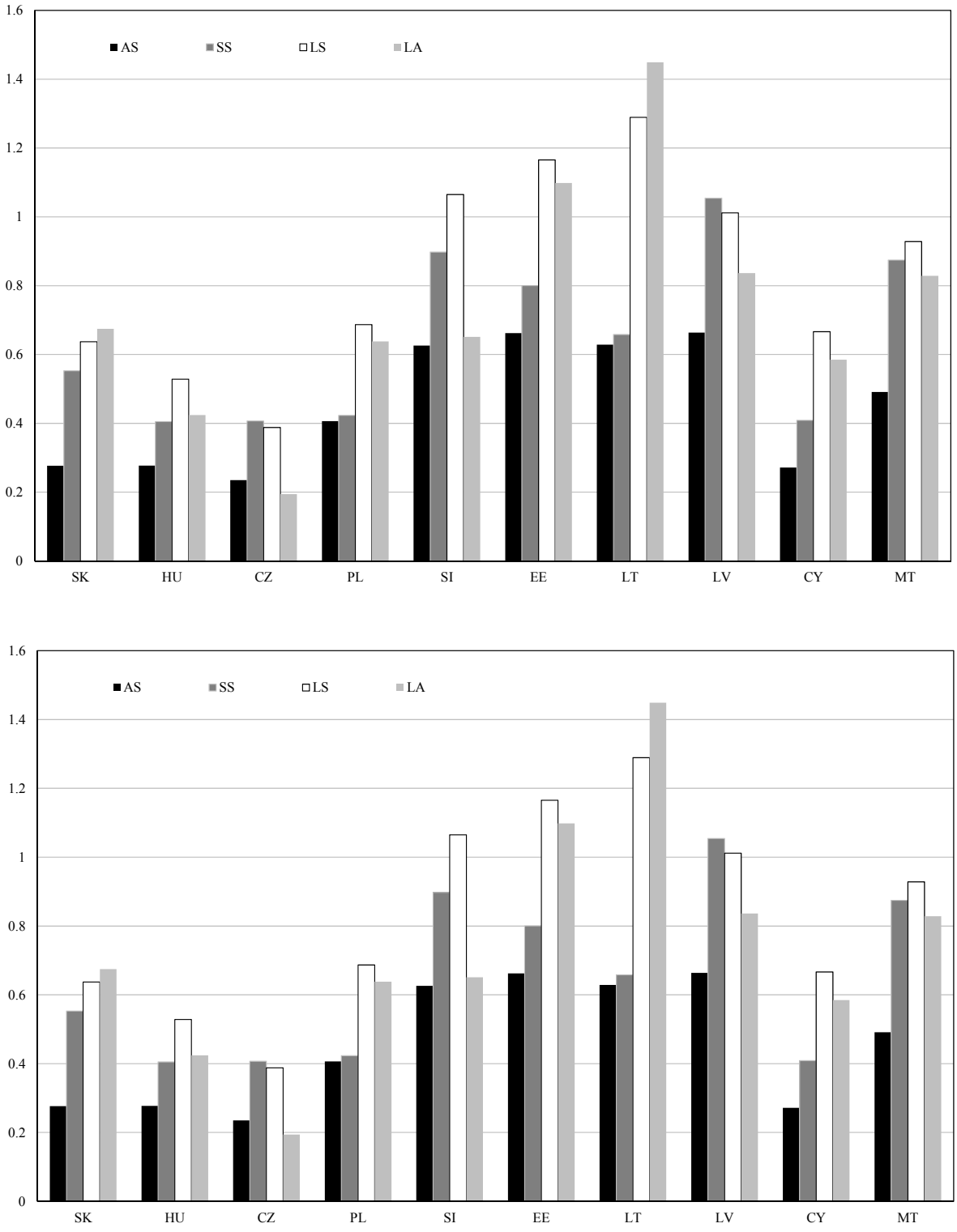
[28] A=autumn, S=spring, L=last.

[29] Average changes to the *level* of the output gap can be found in the Annex 1. They are substantially more volatile than changes to differences in the OG.

[30] These are all *ex post* estimates for 2000, 2001 and 2002.

Figure 3

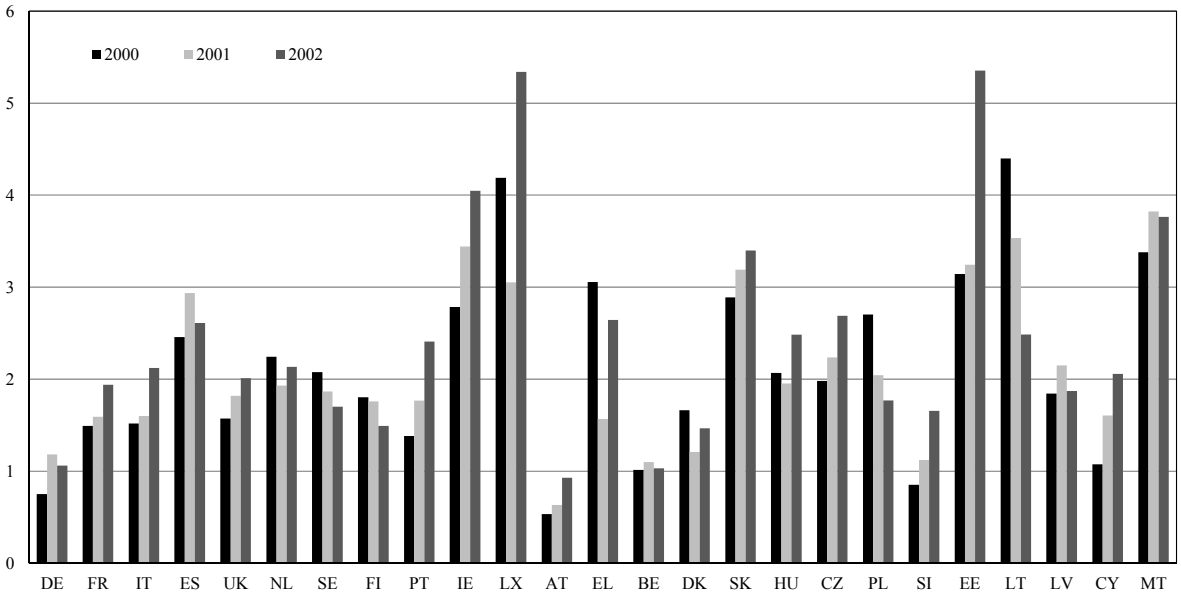
Real-time Estimates of Changes in the Output Gap (ΔOG)
(percent of GDP)



Source: EC, CBR.

Figure 4

Difference Between the Lowest and Highest Output Gap Estimates of the European Commission Since Spring 2003
(percent of GDP)



Source: EC, CBR.

Figure 5 illustrates the relative distribution of revisions to government data notifications on a six-month horizon (between the October and April notifications). Seven years of data for 27 countries were available for this exercise (only revisions to figures for the last available year were considered). It should be noted that these revisions can arise not only from changes to nominal government balance data, but also because of revisions to GDP figures. While the average revision is relatively small (-0.05 per cent of GDP), the standard deviation is significant (0.45).

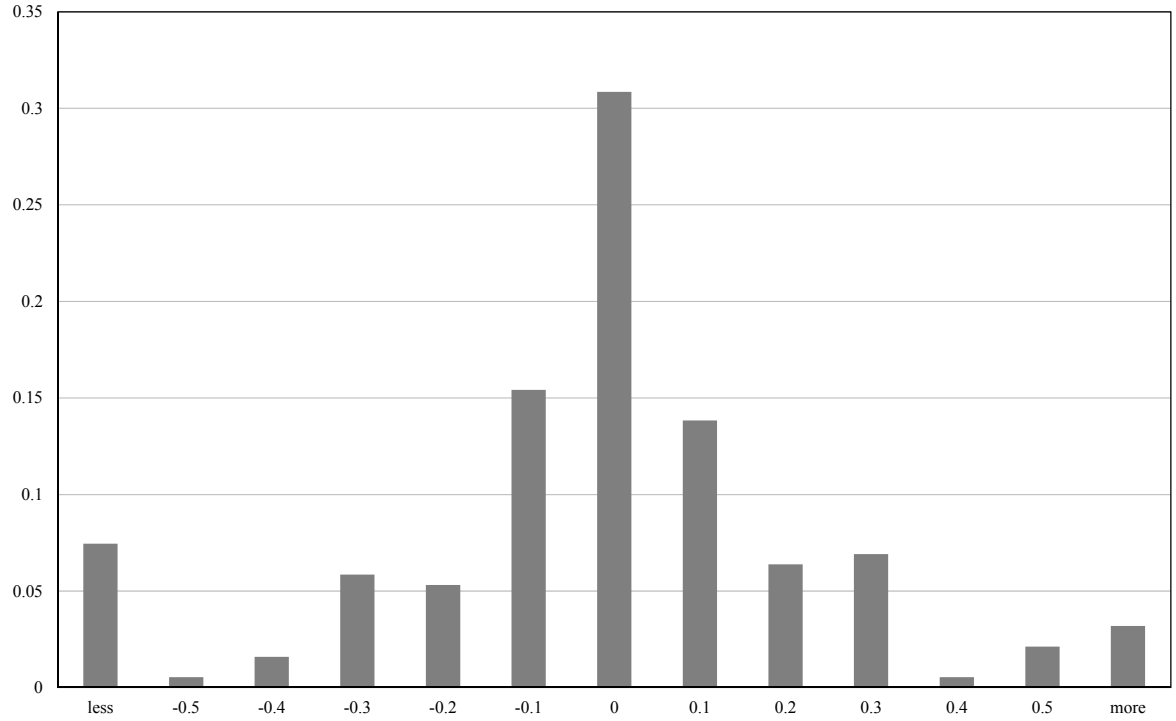
Table 2 highlights the uncertainty in estimating the change in the structural balance in case of Slovakia.[31] On a six-month horizon between the first and second estimate for year t, the median change was 0.2 percentage points, while over time the estimates changed more than 0.5 per cent of GDP.

Here we should mention that the corrective part of the SGP is *not* based on the most up-to-date estimates of the output gap, but rather takes into account numbers available at the time of issuing recommendations. On the one hand it might reduce uncertainty and provide more flexibility; on the other hand it can weaken the credibility of the framework if actual estimates are very different from those made few years ago (which is often the case). Moreover, as far as the Fiscal Compact is concerned every ministry of finance and local IFI is free to use its own methodology; there is no requirement to use old estimates in the evaluation exercise. For these reasons we argue, that bottom-up evaluation of effective action should be more important than top-down approaches.

[31] We did not have the data for one-offs in case of other countries, and therefore it was not possible to compare different vintages of SB estimates for all the members of the EU.

Figure 5

Relative Frequency of Revisions in Notified Government Data (October vs April for year t–1)
(percent of GDP)



Source: Eurostat, CBR.

Table 2

Average Absolute Revisions to SB Changes in Slovakia
(EC methodology, percent of GDP)

Changes	2006	2007	2008	2009	2010	2011	MIN	MAX
AS	–0.2	–0.2	–0.3	–1.4	0.2	–0.2	–1.4	0.2
SS	0.0	–0.6	–0.1	–1.4	0.2	–0.3	–1.4	0.2
LA	0.9	–0.4	0.8	0.2	–0.3	–0.1	–0.4	0.9
LS	0.7	–0.6	0.5	–1.2	–0.1	–0.3	–1.2	0.7
Absolute							**AVG**	**MED**
AS	0.2	0.2	0.3	1.4	0.2	0.2	0.42	0.20
SS	0.0	0.6	0.1	1.4	0.2	0.3	0.43	0.25
LA	0.9	0.4	0.8	0.2	0.3	0.1	0.45	0.37
LS	0.7	0.6	0.5	1.2	0.1	0.3	0.58	0.55

Source: CBR.

The third problem with the structural budget balance is that there is no detailed and consistent definition of one-off and temporary measures. The break-down of one-off measures identified by the EC is not even publicly available! At first sight the identification of one-offs seems almost trivial; however in our view this procedure is more tricky than it seems at first sight. The definition in the Code of Conduct (EC, 2012) is very general: "one-off and temporary measures are measures having a transitory budgetary effect that does not lead to a sustained change in the inter-temporal budgetary position". In the footnote there are some examples: sales of nonfinancial assets; receipts of auctions of publicly owned licenses; short-term emergency costs emerging from natural disasters; tax amnesties; revenues resulting from the transfers of pension obligations and assets.

The definition is further clarified in the Public Finances in EMU (EC, 2006) and in Larch and Turrini (2009). It mentions several common features of one-offs: a) temporary influence on the deficit (one or a very limited number of years); b) non-recurrence of measures; c) only measures with significant impact should be considered (above 0.1 per cent of GDP) and d) no deficit-increasing measures should be excluded (with some exceptions). There is also an indicative and open list of one-offs in the public finance report.

The application of this definition in practice is however not without problems. There are important borderline cases and because of capacity constraints it is not always easy for the EC to spot all one-offs in real time.[32] The following examples illustrate this point:

- repaying or assuming old debt is not always a one-off according to the EC; in autumn 2011 the estimate of the Commission for one-offs in case of Slovakia was –0.8 per cent of GDP, while one-year later for the same period +0.5 per cent of GDP (the huge difference is mainly due to repayment of old liabilities);
- by decreasing the contributions to a fully funded pension pillar not much happens with the inter-temporal budgetary position (more revenue for the government now but also more future liabilities); despite the above mentioned definition it is not identified as one-off;
- sales of oil reserves or dividends from asset revaluations were not regarded as one-off by the EC in some vintages of estimates for Slovakia.

In our view, independent fiscal institutions can play an important role to identify all the measures without impact on the inter-temporal budgetary position in real-time. To increase the transparency of the whole process, fiscal councils and the EC should publish detailed principles for identifying one-offs with clear examples. It is interesting to note, that the EC warned to implement series of large one-offs already in 2006 by pointing to the case of Portugal between 2002 and 2004 (EC, 2006).

Fourth, the medium-term objective only partially reflects the estimated costs of aging. The current coefficient is 33 per cent. While pension debt is not necessarily equals to public debt, it is in our view important to internalize the costs of ageing (in the no-policy-change scenario on a long-term horizon) as much as possible to increase the awareness of policymakers and the general public.

All in all, the uncertainty involved in real-time estimates of the cyclical component together with frequent changes in the headline deficit figures and the problems of the identification of one-offs make the use of structural budget balances for a numerical policy evaluation purposes on a yearly basis highly problematic. In many cases the uncertainty around the estimates of the change

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[32] In many cases the EC has to rely on information provided by the Member States, which might represent a problem if the national authorities are not transparent enough.

in structural balance is higher than 0.5 per cent of GDP, which is the benchmark against to which it should be evaluated according to the Fiscal Compact.[33]

From the above discussion is clear that several improvements are needed to fully operationalize the structural balance rule on a yearly horizon. In our view the SB is more suited for rules over longer horizons (to ensure that bygones are not bygones) or as *ex ante* guiding point for nominal expenditure limits at national level.

Another candidate for an adequate fiscal rule is a numerical criterion for the debt of a country. Despite the fact that optimal debt level is not well-defined in the academic literature (Wren-Lewis, 2013) the empirical lesson from the last crisis is clear: "…this suggests the need for both a more comprehensive approach to measures of public debt and lower values for what constitutes "prudent" official debt-to-GDP ratios" (Blanchard *et al.*, 2013). The problem with debt limits is mainly in the definition. Should we use gross or net debt figures? How should we incorporate contingent and implicit liabilities into the analysis? What is a sufficient room for maneuver in case of severe economic downturns? What to do with the differences between small and big countries and their tax raising and growth potential? How to react to short-term economic fluctuations affecting the denominator?[34] It also raises the question of differentiation, which is not easy to reconcile with the requirement for equal treatment inside the EU.

More focus on debt figures in the SGP is a step in the right direction; however the debt reduction rule is effectively targeting 60 per cent of GDP which might be too high for small and open economies. More focus on the stock-flow adjustments is also welcomed, because it eliminates at least the differences coming from the holding of the most liquid assets.

In our view there is a rationale to treat the 60 per cent rule in a similar vein than the 3 per cent deficit rule – as a maximum possible in case of adverse effects and not as a target. Incorporation of a minimum absolute reduction of debt (above a certain prudent limit below the 60 per cent threshold) might help to overcome this problem. For example one can use the wording from the Fiscal Compact: "where the ratio of the general government debt to GDP at market prices is significantly below 60 per cent of GDP and where risks in terms of long-term sustainability of public finances are low". The Commission via the aging report should assess whether these conditions are met to exempt the country from further reductions of debt. It is also important to recognize the links between debt levels and sustainability. If a country implements reforms with gradual long-term impacts (*i.e.*, indexation of pension age to life expectancy) there is less need for "pre-funding" of ageing costs via lowering actual debt figures.

The third rule is the so called expenditure benchmark. Basically it is a similar concept as a change in the structural deficit, since it is expressed in real terms and is also adjusted to discretionary revenue measures. At the end the growth rate of the adjusted expenditures should be such that the minimum structural adjustment toward the MTO is ensured.

Let us look first at a very simple case, where the potential growth of the economy is stable; there are no EU funds, public investment as a share of GDP is also stable and there are no one-off measures.

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[33] The situation is even worse when the precision vis-á-vis the threshold for average two-year deviation (0.25 per cent of GDP) is considered.

[34] The debt-to-GDP ratio is very sensitive to factors outside the control of the government.

Table 3

Simple Revenue and Expenditure Structure

Revenues	Expenditures
R^C – cyclical revenues	E^C – cyclical expenditures
R^S – structural revenues	E^{INT} – interest expenditures
	E^{RES} – residual expenditures

Minimum structural adjustment (MSA):

$$\frac{R_t^S - E_t^{INT} - E_t^{RES}}{NGDP_t} - \frac{R_{t-1}^S - E_{t-1}^{INT} - E_{t-1}^{RES}}{NGDP_{t-1}} \geq 0.005 \tag{2}$$

$$\frac{E_{t-1}^{RES}}{NGDP_{t-1}} - \frac{E_t^{RES}}{NGDP_t} + \left[\left(\frac{R_t^S}{NGDP_t} - \frac{R_{t-1}^S}{NGDP_{t-1}}\right) + \left(\frac{E_{t-1}^{INT}}{NGDP_{t-1}} - \frac{E_t^{INT}}{NGDP_t}\right)\right] \geq 0.005 \tag{3}$$

If structural revenues grow in line with nominal GDP and interest expenditures compared to GDP are stable or small, the term in square bracket is close to zero.

Expenditure benchmark (EB):[35]

$$\frac{E_t^{RES} - E_{t-1}^{RES}}{E_{t-1}^{RES}} - DEF_t \leq POTG - \frac{0.005}{PG} \tag{4}$$

$$PG = \frac{E_{t-1}^{RES} + E_{t-1}^{C}}{NGDP_{t-1}} \tag{5}$$

If we assume that the cyclical component on the expenditure side is small (only unemployment benefits are considered) we can write:

$$\frac{E_{t-1}^{RES} - E_t^{RES}}{E_{t-1}^{RES}} * \frac{E_{t-1}^{RES}}{NGDP_{t-1}} + (DEF_t + POTG) * PG \geq 0.005 \tag{6}$$

$$\frac{E_{t-1}^{RES}}{NGDP_{t-1}} - \left[\frac{E_t^{RES} * (1 + DEF_t + REALG_t)}{NGDP_t} - (DEF_t + POTG) * \frac{E_{t-1}^{RES}}{NGDP_{t-1}}\right] \geq 0.005 \tag{7}$$

$$\frac{E_{t-1}^{RES}}{NGDP_{t-1}} - \frac{E_t^{RES}}{NGDP_t} * \left[1 + (NOMG_t)(1 - \frac{E_{t-1}^{RES}}{E_t^{RES}} * \frac{NGDP_t}{NGDP_{t-1}})\right] \geq 0.005 \tag{8}$$

[35] DEF is a GDP deflator, PG means primary balance to GDP ratio and POTG refers to potential GDP growth.

The square bracket is close to one, so the expenditure benchmark in this simple case is conceptually the same as the minimum structural adjustment.

A numerical example might shed more light. Let us assume structural revenues at 50 per cent of GDP (55 in year t and 50 in year t–1), 8 per cent potential growth and 2 per cent deflator and no interest expenditures and unemployment benefits. The country is making an adjustment on the expenditure side, which yields a change in the nominal value of expenditures from 55 units in year t–1 to 59.4 in year t. GDP in year t–1 is 100.

The criterion for the minimum structural adjustment is the following (MSA):

$$\left(\frac{55-59.4}{110}\right)-\left(\frac{50-55}{100}\right)=\frac{55}{100}-\frac{59.4}{110}=0.01\geq 0.005 \tag{9}$$

The expenditure benchmark (EB):

$$\frac{-59.4+55}{55}*\frac{55}{100}+0.1*\frac{55}{100}=\frac{55}{100}-\frac{59.4}{110}*\left(1+0.1-0.1*\frac{55*110}{59.4*100}\right)>\frac{55}{100}-\frac{59.4}{110} \tag{10}$$

So in this case the minimum structural adjustment automatically ensures the fulfillment of the expenditure benchmark.

In more realistic cases there is a growing confusion between the two indicators, because of the following *major* differences:

- One-offs are reflected in the MSA but not in the calculation of the EB.
- Discretionary measures[36] on the revenue side are important for EB, while the overall change in structural revenues are reflected in MSA.
- Interest expenditures are excluded from the EB but not from the MSA calculation.
- EB is based partially on trend potential growth while the MSA on actual potential growth.
- Using semi-elasticities,[37] the cyclical component of expenditures is significant in MSA but very small in EB.
- Fluctuations in investment expenditures in small countries are reflected in EB but not in MSA.

What are the benefits of the expenditure benchmark? According to its proponents, the objective was to use another rule based on *trend* potential growth since the actual estimates are surrounded by substantial uncertainty. Besides that, the EB might help to save revenue windfalls. We argue that these points - while valid - cannot justify the introduction of the EB, since both could have been addressed inside the old framework. It would have been much easier to use historical averages and trends in the output gap calculations. As far as the windfalls are concerned, they are actually considered when evaluating effective action in the corrective arm of the SGP (β). The price in terms of confusion and inconsistencies seems to be too high for the limited benefit. Therefore we argue for abolishing the expenditure benchmark.

This discussion raises also the general question of calculating the consolidation effort (when effective action is judged). The top-down approach focuses on the change in structural balance ignoring the no-policy change (NPC) scenario. While the bottom-approach starts with the NPC and specifies the measures to reach the target, without considering cyclical components or one-off measures. A combination of the two approaches can be found in CBR (2013) and Novysedlak and Bugyi (2014), where the NPC is adjusted to cyclical movements and one-offs. In our view this

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[36] It is also not entirely clear who should calculate the impact of these measures *ex post*.

[37] Mourre *et al.* (2013).

modified bottom-up approach is useful in assessing effective action and independent fiscal institutions might play a role in calculating these scenarios together with the likely impact of the proposed measures.

3.2.5 Efficiency

Ideal fiscal rules should be supported by efficient policy action. Kopits and Symansky explicitly mention problems with potential one-off measures and according to them "a fiscal rule may be viewed as a catalyst for fiscal reforms that would be necessary anyway to ensure sustainability".

We identified two important points when assessing efficiency of the new fiscal architecture. The first is related to the excessive deficit procedure. Since the abrogation of EDP is not based on the estimate of structural balance, there is a motivation to adopt one-off and temporary measures in the medium-run, which does not supports long-term sustainability. For example introduction of an extraordinary tax in year t and sale of assets in year t+1 together with a promise of more structural reforms in t+2 can lead to the abrogation of EDP in spring t+1 even if the structural deficit is well worse than 3 per cent of GDP.

The second important point is the encouragement of structural reforms. As it was mentioned earlier, the calculation of the MTO partially reflects estimated costs of ageing. Apart from that structural reforms with "verifiable positive impact on the long-term sustainability of public finances" are taken into account in the preventive arm of the Pact. In our view this topic is important especially if there are significant trade-offs between growth and austerity in the short run. In that case, gradual, but very important reform of the pay-as-you-go (PAYG) pillar should be preferred compared to immediate adjustment (with the same impact on long-term sustainability). It might beneficial to incorporate this principle into the evaluation of effective action taken especially in bad economic times.

3.2.6 Simplicity

One of the most important weaknesses of the new European framework is lack of simplicity. There are so many rules and procedures, that it takes a considerable effort to read and understand all the relevant legal texts and technical notes. On the other hand it is important to stress that this criterion is not as important as it was in the past, when independent institutions were not present to "translate" the messages into ordinary language.

One of the main recent trends in international fiscal frameworks has been the utilization of possible synergies between rules and independent fiscal institutions. Simple rules without "guardians" can be easily circumvented, while fiscal councils without rules are less effective to reduce the deficit bias (although they can raise the transparency of fiscal accounts).

Here the question of a European fiscal watchdog pops up. According to Wendorff (2014), "it would be a productive idea to shift the task of assessing fiscal developments, plans and compliance with fiscal rules to an independent institution, that has a clear and only focus on that task, which does not have several other policy goals and which is outside the regular European bargaining process." In our view, with much more simple rules and without an objective to fine-tune national budgetary developments, it is not necessary to create and independent European body. The EC can serve this purpose relatively well.

3.2.7 Consistency

Fiscal rules should be internally consistent. This is unfortunately not always the case as far as the European fiscal framework is concerned. We have identified 4 groups of potential inconsistencies.

First, there are potential tensions between the SGP and the Fiscal Compact. The basic idea behind the Compact was to transpose the preventive arm of the Pact into national legislation "preferably" of constitutional nature. We have mentioned earlier the problems with estimating potential output and structural budget balances. Now there will be two sets of numbers: one calculated by the European Commission based on the commonly agreed methodology and one estimated by a local independent fiscal institution. While at the European level the "one-size-fits-all" methodology is essential, for a local IFI it is better to use a tailor-made methodology to the country in question. Moreover IFIs are better equipped to identify one-offs and discretionary revenue measures in the budget. The danger is that there can be two different policy messages derived from the same rule. In that case the public will be confused and the credibility of the whole framework suffers.

Another potential problem is the use of the so called "investment clause" in the SGP. There is no such thing in the Fiscal Compact, what again can lead to blurred policy messages.

A minor difference is that the FC sets a more ambitious MTO than the SGP for euro area members.

The last potential source of inconsistency between the SGP and the FC is related to deadlines. In the FC the timetable to reach structurally balanced budgets is fixed, while SGP procedures allow some postponements.

Second, as it was shown above, there are significant differences in the definition of the expenditure benchmark compared to the minimum structural adjustment despite the fact, that they are conceptually almost the same. Different treatment of one-offs, interest expenditures or for example cyclical components on the expenditure side can create confusion.

Third, there is a theoretical inconsistency between the excessive debt limit (interpreted as a maximum) and the debt reduction rule (target). In times of decreasing potential growth,[38] this inconsistency will only increase. One should note that in order to "prefund" the costs of ageing, debt ratios should rapidly decline below the 60 per cent of GDP limit (Balassone *et al.*, 2011).

Fourth, there can be potential inconsistencies between the minimum structural adjustment and the debt reduction rule (through one-offs or stock-flow adjustments) – for example via privatization revenues.

3.2.8 Definition

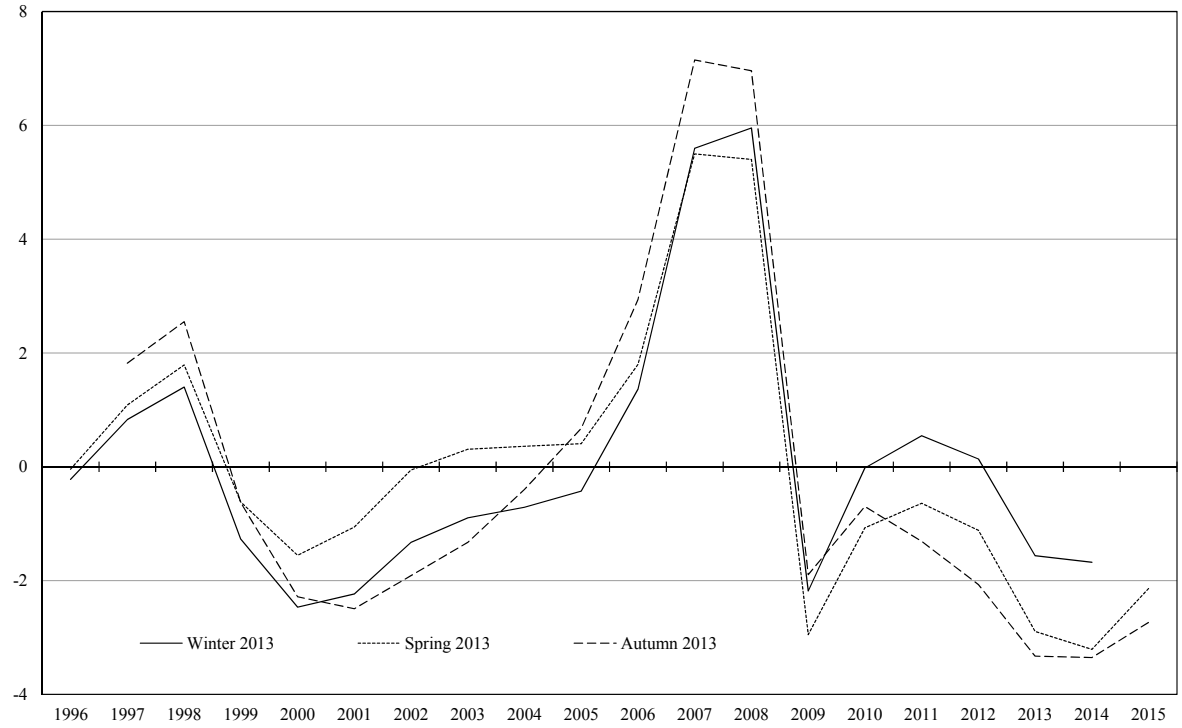
The final criterion to assess fiscal rules is that they should be well-defined to avoid ambiguities and ineffective enforcement. Since the whole framework is very complex and partially is based on unobservable variables it is almost impossible to fill all potential gaps for judgments.

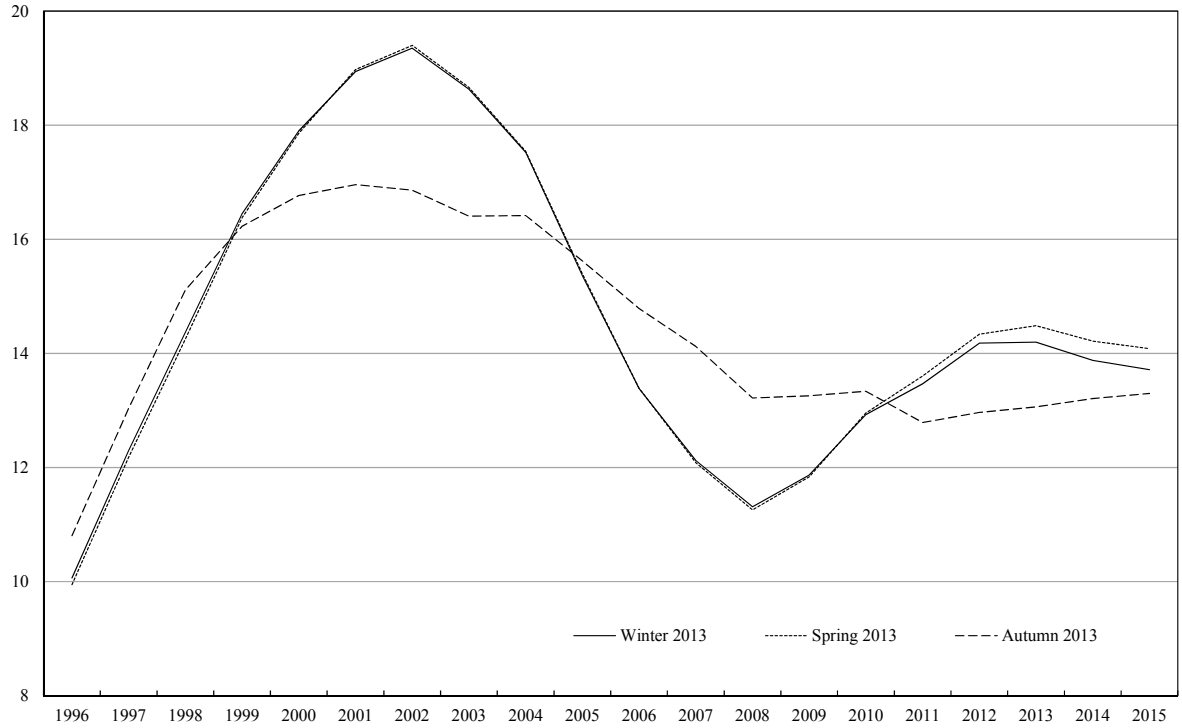
Next figures illustrate the last three vintages of output gap forecast for Slovakia. Basically, all of them are based on the same – commonly agreed - production function methodology. For 2011 the three output gap estimates are +0.5, –0.6 and -1.3 respectively. For 2012 we get similar picture with estimates ranging from +0.1 to –2.1. One can spot substantial differences also in the

[38] For example because of aging or long economic slump.

Figure 6

Output Gap and NAWRU Estimates for Slovakia
(European Commission)





Source: EC.

NAWRU[39] estimates. It is important to note that in these cases the main differences in outcomes are *due to technical factors*, which are hard to explain to policymakers and the general public:

- between the winter and spring vintages: TFP trend filtering changed from HP filter to Kalman filter;
- between the spring and autumn vintages: changes in upper bands for trend and cycle innovation variances in NAWRU estimation.

Another possibility for improvement is the definition of one-off and temporary measures. While "foolproof" definition is not possible, at least there should be clear detailed principles and examples available to reduce substantially the room for subjective judgments. The EC should make the list of one-offs public.

There is also a case for better definition of good and bad economic times or discretionary revenue measures (DRM). Since the MSA is differentiated via the phase of the economic cycle, it should be spelled out more clearly what we mean by "good" and "bad" times.

As far as the headline deficit rule is concerned, its definition is clear, although better coverage of public enterprises and other special purpose vehicles inside the public sector would be definitely a step in the right direction. The new ESA2010 might enlarge the borders of the general government sector.

The definition of the debt criterion is very simplistic, since it ignores liquid assets, implicit liabilities, accrual interest, trade credits or for example debt related to PPP projects. On the other hand it is clearly unrealistic to expect far reaching changes, since it is one of the most well-known rules among citizens.

4 The first phase of implementation

The price for a non-credible no-bail-out clause was that the European fiscal framework had to be significantly changed in three waves (Six-pack, Fiscal Compact and Two-pack). It is too early to draw far reaching conclusions based on more or less one year of experience; however some preliminary lessons can be identified.

There were interesting changes in moods depending on the intensity of pressures invoked by financial markets. At the beginning of the crisis, more and more rules and austerity plans were announced to regain the credibility of the basic fiscal architecture. After the decision of the ECB to introduce the OMT, markets calmed down and the European debate switched to "growth versus austerity" mode. It clearly illustrates the difficulty to design a credible and strict system, which on the one hand guarantees sustainability, but on the other hand allows for enough flexibility in bad times. Generally speaking it is hard to achieve two goals (consolidation and growth) with one instrument (the SGP), especially if that instrument was defined in a strict way to calm the markets. Maybe there is a room independent fiscal institutions can play in designing the speed of consolidation in the future.

The change in the mood is clearly visible in the Council decisions in Spring 2013. One can draw three tentative conclusions based on these decisions:

- relatively easy abrogation of the EDP procedures;
- benevolent extension of deadlines;

[39] The difference between the NAIRU and NAWRU is that the latter uses wage inflation instead of price inflation to calculate the natural level of unemployment.

- appearance of different treatment of member states.

All three can hurt the credibility of the framework.

On the first point it is a bit surprising to see that the structural deficit is not relevant when deciding about the abrogation of EDP. It is sufficient to have the deficit close to the reference value in year t-1 and to have forecasts of headline deficit below 3 per cent of GDP in year t and t+1 (no sufficient margins for unexpected events are required). The EDP for Italy was abrogated with a deficit of 3 per cent of GDP in 2012 and a forecast for 2013 at 2.9 per cent of GDP. In case of Lithuania the deficit in 2012 was 3.2 per cent of GDP, but the margin over the reference value could be explained by the costs of implementing a fully-funded pillar of the pension system. The case of Hungary was also interesting. It left the EDP with a growing trajectory of deficit forecasts for 2013 and 2014 (2.7 per cent and 2.9 per cent of GDP respectively). The most telling case was however the launch of EDP for Malta in spring 2013. The country left this procedure only few months earlier (December 2012) with an estimated structural deficit of 3.6 per cent of GDP! So it was not really surprising that the excessive deficit has popped-up again.

It was clear at the beginning of year 2013 that many countries were not able to cut their deficits below the reference value in the deadlines set by the Council. According to the new rules it is possible to extend the deadline, if countries delivered the effort, but the worsening of their economic situation has prevented them to fulfil their obligations. The wording of the law for the extension period is "one year as a rule". The cases of Spain, France, Poland and Slovenia show that there was no problem to extend the deadline by two years. There are no guarantees that next time it can be 3 or more years if one would like to avoid harsh sanctions.

As far as the evaluation of different member states is concerned, the initial experience with the new framework makes it difficult to reconcile the application of the rules with the principle of equal treatment. We argue in this paper that this is because the Commission has been pursuing a multitude of goals with only one instruments, with the weight on those goals varying across countries given their diverse circumstances. Some countries received one-year extension, others two years and some others had to stick to the original deadline. The case of Belgium is also interesting since it is the only country where the EDP was stepped-up. The deficit in 2012 was at 3.9 per cent of GDP but from which the cost of saving the banking sector was 0.8 per cent of GDP (clear temporary effect). The Commission´s budget deficit forecast for Belgium was 2.9 per cent of GDP in 2013. So the situation in economic terms was almost identical to those countries for which the EDP was abrogated.

The first phase of implementation of the two-pack was without significant media attention. Countries submitted their Draft Budgetary Plans (DBPs) and the Commission evaluated those. There are two points to highlight. First, the quality of DBPs was very diverse. For example Germany sent few pages of tables, while Slovakia a fully-fledged document describing budgetary trends in detail. Second, the overall assessment of the EC used the usual technocratic language of "broadly compliant" or "risk of non-compliance" what can hardly evoke policy responses from the individual Member States.

Some other features of the Two-pack and the Fiscal Compact are only waiting to be implemented. At this stage it is impossible to say, to what extent the "preferably" constitutional nature of the FC will be really binding at local level and how the potential inconsistencies between the FC and the SGP will be resolved.

From the perspective of an independent fiscal institution, it is not clear what is the path toward the MTO, against to which the deviation should be calculated. The general expectation was that the 2013 Stability Programs will define these trajectories. However, for example in case of Slovakia, 2018 was the year identified by the Ministry of Finance to reach the MTO. The Council

Conclusions disputed this and recommended 2017. Now it is unclear what should be the benchmark for the first year of implementation of the Fiscal Compact.

5 Recommendations for further improvements

When designing fiscal frameworks in a monetary union, systemic considerations should be preferred to incremental changes. As we have shown, broadly speaking, there are two general models: one relying on pure market discipline (USA) and one on more central control (Germany or Spain). In order to put the single currency on a more sustainable footing, it is in our view necessary to go back to this fundamental debate. In the last two decades we have witnessed mainly incremental changes and compromises, resulting to internal inconsistencies and extreme complexity. Now it is time to break this path-dependency and to go back to first principles. We argue that the euro area should be rebuilt on principles closer to the US model of decentralized fiscal discipline.

In both models of fiscal discipline cases it seems to be necessary to have a well-functioning banking union and the lender of last resort functions should also be clearly defined. Moreover, it is important to solve the legacy debt issue in some countries before implementing further far-reaching changes. Table 4 highlights the main differences between the two possible arrangements.

Table 4

Fiscal Discipline in the Euro Area

Decentralized Model	Centralized Model
Banking union	
Real lender of last resort	
Strong no bailout rule (restructuring, PSI, bail-in, etc.)	Bailouts possible
Domestic fiscal rules in the forefront	SGP or discretion
Strong local IFIs	
EC monitors to avoid “gross errors”	Federal ministry of finance
No borrowing at the center	Eurobonds against federal revenue

Source: Author.

The current European fiscal architecture is in between the two models and therefore it must almost inevitably rely on inconsistencies (central enforcement vis-à-vis national sovereignty). Since currently there is no substantial public support[40] for transferring more power to the center, it seems to be more important to build a functional decentralized system of fiscal discipline. Based on

[40] It is not even clear whether there is such thing as “European public”. Different countries have very different attitudes toward fiscal issues.

the above-mentioned recommendations, the decentralized system of fiscal discipline would have these features:

- strong no-bail-out rule;
- no complex web of rules at the central level, no attempts to fine-tune fiscal developments from the center;
- local rules and local IFIs would play the most important role, it is an error to impose one-size-fits-all *operational* (yearly) rules for every member state;[41]
- the EC would check only maximum limits on debt and deficit ("gross errors").

Even if there is no political will to go back to first principles, there are possibilities how to improve the *current* framework. The assessment based on the Kopits-Symansky criteria has identified several avenues for further improvements. Some of them would require changes to the Treaty. These are currently unrealistic; however it might be useful to keep them in mind if there is a window of opportunity to make substantial changes in the future. The second type of recommendations does not require changes in the legislation, but rather they point toward different interpretation of existing rules or procedures or make methodological proposals. These can be implemented in a medium-term horizon.

There are also recommendations which require changes to the institutional set-up. In some cases there are different technical solutions how to achieve the desired outcome. This question is especially relevant when potential greater involvement of independent fiscal institutions in European procedures is considered. IFIs are a heterogeneous group with widely different origin, mandate and resources. Currently the European fiscal framework assumes that each euro area member country should have an IFI. Moreover it prescribes three important tasks to carry out by these institutions: macroeconomic forecasts, a role in activation of correction mechanisms and escape clauses. To avoid question marks over the independence of local fiscal councils one has to carefully balance the costs and benefits when granting more power to IFIs in the future. In our view it can be done in four ways (initially the informal set-up is the most likely scenario):

- informal – the EC will use the analytical results of IFIs when available (for example when identifying one-off measures or evaluating effective action via the bottom-up methodology);
- semi-formal – the European legislation can require more tasks carried-out by IFIs without taking into account the capacity constraint of local councils (like in the case of macroeconomic forecasts); as in the "informal" case, the EC will not be obliged to use the output of IFIs;
- formal – the EU budget would finance additional tasks required to avoid capacity constraints; moreover there would be strict professional requirements laid down in EU legislation for the selection of council members;[42] in this set-up the EC would use the analysis of IFIs in SGP procedures;
- de-centralized – the first line of defence against the deficit-bias would be at the national level: local IFIs would monitor compliance with local rules (preferably constitutional). The role of the EC in this set-up would be to step-in only in case of "gross policy errors".

Based on the evaluation in Sections 3 and 4 our recommendations are the following (not necessarily in the order of importance):

1) Get rid of some of the fiscal rules. The first option to consider is the expenditure benchmark. In our view it is basically the same concept as the minimum structural adjustment, but it adds

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[41] Operational rules can depend on the political regime of the country: presidential vs. parliamentary arrangements, coalition vs one-party governments, etc.

[42] In extreme cases the EC would have the power to nominate one council member.

some degree of confusion to the framework because of different treatment of various budgetary items compared to the MSA. Moreover, expenditure limits are better to set-up locally. A more radical solution to the overregulation would be focusing on debt levels only via the target for structural budget balances (see recommendation 4). In that case the debt reduction rule could be also eliminated.

2) Improve the definition of one-offs and temporary measures. Set out clear principles with detailed examples to reduce the inconsistent treatment across years and Member States. The EC should make the list of one-offs publicly available. Since local IFIs have more detailed knowledge, they might play an important role in timely detection of ad-hoc and temporary measures.
3) Link the SGP and MIP via the output gap. Currently the output gap calculation is linked mainly to stable inflation. However, the recent experience shows that "beyond-inflation" concepts can be helpful in real-time evaluation of underlying trends in the economy. Incorporation of absorption or financial cycles in our view might substantially improve the precision of estimates. The Macroeconomic Imbalance Procedure can signal early on potential problems related to current account or domestic credit developments.
4) Differentiate more medium-term targets based on sustainability. We recommend increasing the weight of the aging costs in the determination of the MTO.
5) Restore the credibility of the no-bail-out clause as much as possible. Private sector involvement, partial restructuring or bail-ins seems to be essential to limit the risk of contagion between banks and the sovereign and also among sovereigns. Private investors should remain responsible for their investment decisions.
6) Encourage nominal expenditure ceilings at local level. As we have shown, the uncertainty around current estimates of structural budget balances is huge, so it is very hard to numerically evaluate deviations from goals on a yearly basis and to activate correction mechanisms. Better way would be to use structural estimates more loosely, *i.e.*, in setting nominal expenditure targets *ex ante*. Their evaluation *ex post* would be then straightforward. Moreover, nominal expenditure ceilings are better suited to become an operational target than other budgetary aggregates.
7) Abolish or redefine the investment clause. The current definition has no economic meaning and it is in potential conflict with the Fiscal Compact.
8) Use the estimate of the structural balance in ending EDP. It seems to be a mistake not taking into account the evolution of structural budget balances when abrogating the excessive deficit procedure. It motivates to adopt one-off and ad-hoc measures on a medium-term horizon.
9) More voting with reverse qualified majority. Despite the recent increase of automaticity of sanctions, there are still important decisions to be taken by qualified majority voting (existence of excessive deficits or evaluation of effective action).[43]
10) Involve IFIs in evaluating effective action. Fiscal councils might play a role in *ex ante* evaluation of the measures incorporated in the next year´s budget. This bottom-up approach can complement or replace the *ex post* evaluation of the structural budget balance. The main advantage is to focus directly in policy decisions and present an independent costing for them.
11) Set a minimum nominal effort (in GDP points) in the debt reduction rule above certain prudent level below the 60 per cent threshold. The definition of a country-specific prudent level can be borrowed from the wording of the Fiscal Compact. The European Commission can check the fulfillment of these conditions via its Ageing Report. This recommendation is an alternative to recommendation 4.

[43] Fortunately the Fiscal Compact is expected to partially fill this gap.

12) Increase the severity of sanctions in the preventive arm. It can be more credible and also sounder if one applies financial sanctions in good times and not during recessions.
13) Allow for effective action through gradual reforms in bad economic times. With the problem of aging it is maybe more preferable to improve sustainability through structural reforms than through immediate cuts in current or capital expenditures (this recommendation affects both the SGP and the FC).
14) Introduce professional requirements for IFI council members to avoid politically motivated nominations. Consider partial funding of local IFIs from the EU budget to ensure adequate capacities for the tasks defined in EU legislation.[44] However, full independence (functional and financial) outside EU matters should be retained.
15) Apply the rules less benevolently and more uniformly across countries in the future in order to gradually increase the credibility of the new framework.

Implementing the above-mentioned 15 recommendations might improve the score of the European fiscal architecture *vis-à-vis* the Kopits-Symansky criteria. Without losing too much on "flexibility" it seems to be possible to score higher on "simplicity", "consistency" and "enforceability". The greater involvement of local IFIs together with more weight on national rules should also improve "adequacy".

6 Conclusions

One can draw six broad conclusions from this paper.

First, when designing fiscal frameworks, systemic considerations should be preferred to incremental changes. It is important to notice that the effectiveness of the framework depends on many things outside purely fiscal issues. As we have shown, success can be achieved only if one takes into account the overall set up of a monetary union: the character and credibility of resolution mechanisms or for example the analysis of macroeconomic imbalances.

Second, do not set rules if you cannot measure them. Moreover do not attach correction mechanisms to something you cannot measure. The definition of the numerical benchmark for significant deviation is really a game changer. It is one thing to calculate ex ante structural deficits, since it is impossible to have meaningful budgetary plans without an idea about major trends in the economy, but ex post evaluation of deviations in real time with correction mechanisms attached is a completely different exercise. Now it is possible to ask questions like "who is responsible for the welfare consequences of the correction mechanisms if the independent institution´s estimate turns out to be wrong?" And as we have shown we are currently not in a position to estimate the change in the structural budget in real time with sufficient precision. It seems to be a mistake to rely on fine-tuning of budgets from a central level.

Third, simplify. Some features of the new system can be considered as "unnecessary ornaments". For example the expenditure benchmark, the investment clause or the debt reduction rule is a good candidate for future simplifications.

Fourth, IFIs might play an even more important role in the European fiscal architecture. We have identified possible involvement of fiscal councils in a) medium-term consolidation strategies (deficit targets), b) ex ante and/or ex post assessment of consolidation efforts, c) definition and application of rules for one-off and temporary measures and d) fiscal policy research. The first task clearly needs further investigation, but the remaining three are feasible in the medium-run. In a

[44] Depending on the institutional set-up; in the informal case it is not necessary.

fully decentralized model, local IFIs (together with preferably constitutional national rules) can replace the EC as guardians of fiscal sustainability in a monetary union.

Fifth, put even more emphasis on debt and sustainability. The debt limit at 60 per cent of GDP should be understood more as maximum limit and not as a target (at least for small and open economies). Fiscal sustainability issues should play a more important role in setting the medium term objective.

Finally, appearance of unequal treatment and too much flexibility can hurt the credibility of the framework. It is especially important in the first years of application of the new rules. Deploy SGP to deal with consolidation goals and address other objectives (growth) primarily through new instruments (e.g. through the EU budget) or via National Reform Programs.

ANNEX 1
EVALUATION OF ESTIMATES OF CYCLICAL COMPONENTS

The Fiscal Compact made the estimation of structural budget balances more important. It is not about average figures or over-the-cycle concepts anymore, but a yearly numerical evaluation of the deviation of the SB from the MTO or the path toward is required. If the deviation is higher than 0.5 percentage points in one year or 0.25 percentage points in two years (on average) correction mechanism should be triggered with possible welfare implications. This change implicitly assumes that it is possible to calculate structural budget balances in *real time* with sufficient precision. This annex shows that this crucial assumption might be too optimistic given current methodology.

The change in the structural balance can be decomposed into three components. i) change in the headline balance (B), ii) change in the cyclical component (CC) and iii) change in one-offs and temporary measures (OO).

$$SB = B - CC - OO$$

$$\Delta SB = \Delta B - \Delta CC - \Delta OO$$

Due to data availability, here we focus on the second component (the average revisions to notified data can be found in the main text – figure 5). The commonly agreed methodology uses an aggregated approach to calculate cyclical components. The estimate of the output gap is multiplied by a measure of elasticity (recently there was switch from overall budget sensitivity to semi-elasticities).

$$CC = \varepsilon * OG$$

$$\Delta CC = \varepsilon * \Delta OG$$

First we focus on the history of output gap estimates on a policy relevant horizon. For a given year t, the spring t+1, autumn t+1 and spring t+1 are the most relevant estimates from a credibility point of view. To assess reliability and robustness, we also compared these first estimates for year t with the latest vintage available, to see the change in the figures when more data points are available.

Next figures show these simple statistics calculated from autumn 2004 for the new MS and from spring 2003 for "old" MS. The most stable estimates over time were in case of Austria (less than 0.5 percentage points), while the least stable ones were for the Baltic States (more than 2.5 percentage points).

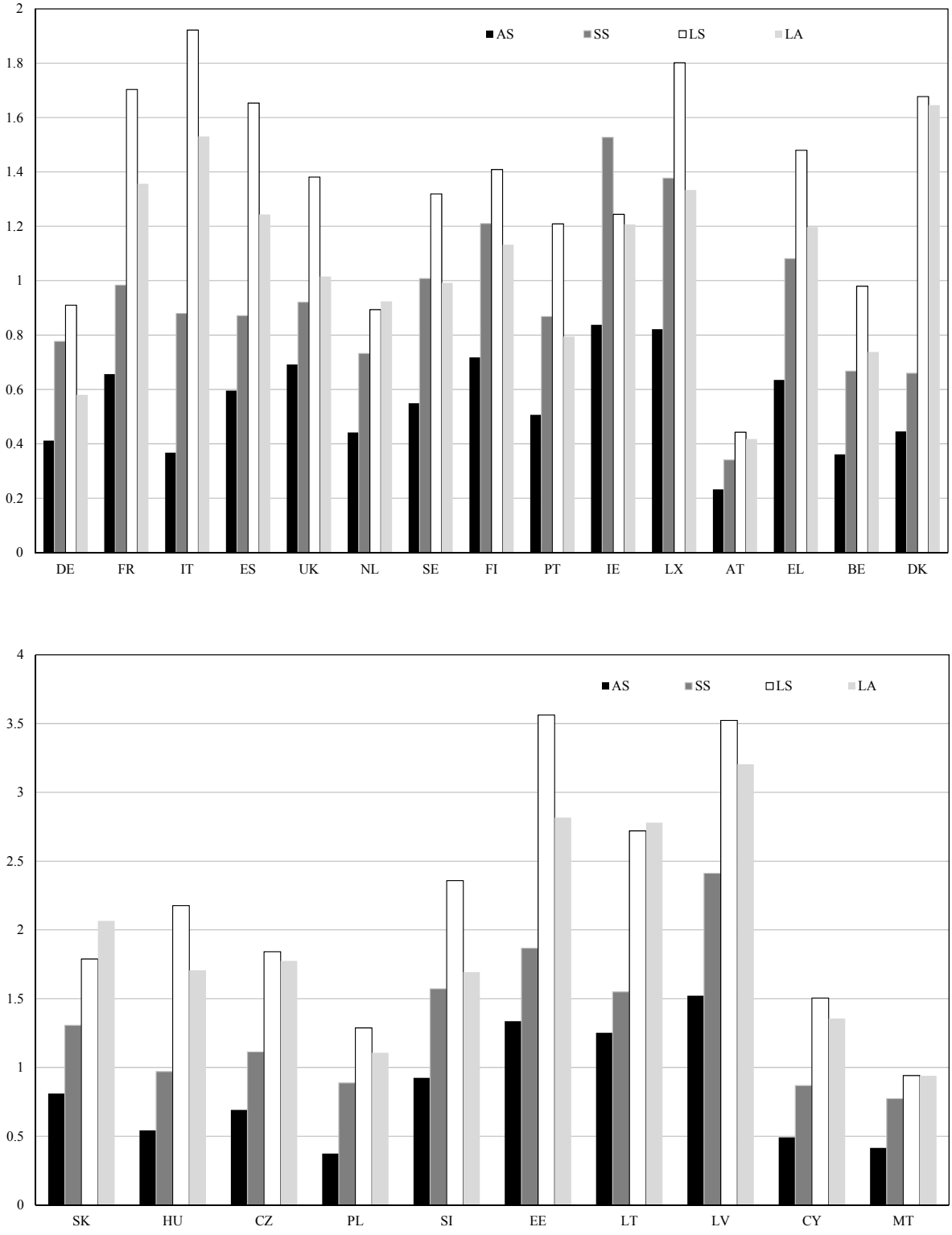
The level of output gap can be of course more volatile than the *change* in OG, which is relevant for the calculation of the structural adjustment. Figure 3 in the main text illustrate the revisions to changes in the output gap.

To get more data points for our analysis, we have decided to use all available vintages for three specific years (2000, 2001 and 2002). These years were not affected by the recent financial crisis and at the same time they represented a history even for the first vintage. Figure 4 in the main text show the substantial volatility of output gap estimates for 2000, 2001 and 2002 through the different vintages. The statistics we used is a difference between the highest and the lowest forecast for the given year. The average difference was 2.2 percentage points. The next figure shows the same statistics for the change in the output gap.

If we multiply these changes by the respective budgetary elasticity (Table 5), we get an average difference between the highest and lowest estimate of the cyclical component at 0.22 percentage points with a standard deviation of 0.16 percentage points.

Figure 7

Changes in Output Gap Estimates



Source: EC.

Table 5

Country-specific Budget Sensitivities

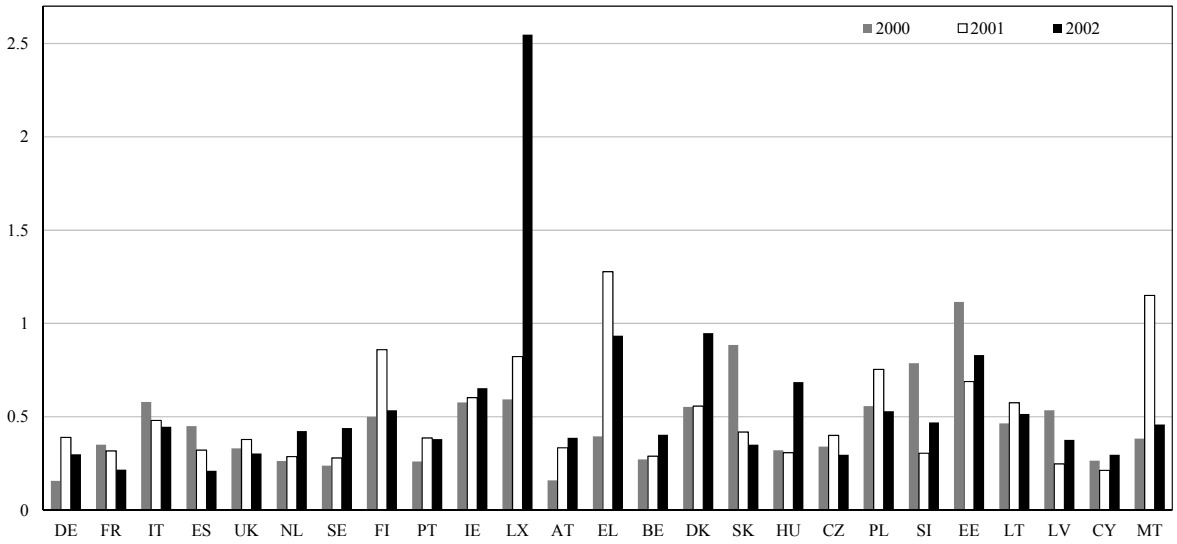
DE	FR	IT	ES	UK	NL	SE	FI	PT	IE	LX	AT	EL	BE	DK
0.51	0.49	0.5	0.43	0.42	0.55	0.58	0.5	0.45	0.4	0.49	0.47	0.43	0.54	0.65

SK	HU	CZ	PL	SI	EE	LT	LV	CY	MT
0.29	0.46	0.37	0.4	0.48	0.31	0.27	0.28	0.4	0.36

Source: EC.

Figure 8

Difference Between the Lowest and Highest Estimates of the European Commission for the Change in the Output Gap



Source: EC, CBR.

The last uncertainty is the – often ignored – estimation of elasticities. The commonly agreed methodology uses constant semi-elasticities. These are based on strong assumptions: no changes to the structure of revenues and expenditures, no legislative changes, no time-varying elasticities throughout the business cycle[45] and ignorance of some items on the expenditure side (for example pension or interest expenditures).

The bottom line from the analysis in this paper is that all four components of the structural balance (headline balance, elasticity, output gap and one-offs) are surrounded with high uncertainty and therefore the practical implementation of rules based on these estimates is very challenging in real-time with the current methodology.

[45] Relevant mainly for the corporate income tax and VAT.

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THE RESPONSE OF POLICYMAKERS TO NATIONAL AND EUROPEAN FISCAL RULES – THE CASE OF POLAND

Tomasz Jędrzejowicz[*] *and Marcin Kitala*[*]

The paper examines the impact of national and European fiscal rules on fiscal policy in Poland in 2004-2012 using a modified form of a fiscal reaction function (FRF). In order to distinguish the impact of these two sets of rules, we propose two innovations relative to existing literature. Firstly, our explanatory variables representing each of the rules are a numerical approximation of the incentives stemming from these rules. Secondly, using a database of legislative measures, we construct a bottom-up indicator of fiscal effort, which we use as the dependent variable, instead of the cyclically-adjusted primary balance. We find that national fiscal rules had a statistically significant disciplining effect on fiscal policies, whereas the European rules did not. We also confirm the pro-cyclical bias of fiscal policy in Poland, which is consistent with the pro-cyclical nature of public debt ceilings.

1 Introduction

The global economic crisis has led to severe weakening of fiscal positions or revealed pre-existing weaknesses in this area in the majority of European economies. They now face the challenge of consolidating their public finances and ensuring that sound fiscal policies are maintained in the medium term to facilitate reduction of public debt ratios from record levels.

In the past, the objective of ensuring sustainable fiscal policies was supposed to have been supported by the European fiscal rules framework. In reality, the targets of maintaining budget balances in EU countries close to balance or in surplus and keeping debt ratios below 60 per cent of GDP or ensuring their steady decline towards this level, had not been met in a number of countries. This is partly attributable to technical deficiencies of the rules and their statistical base, as well as large macroeconomic imbalances in some countries. However, another key reason was the weak enforcement of European fiscal rules.

These failings have since been addressed in two ways – firstly by strengthening of the Stability and Growth Pact through regulations contained in the so-called Six-pack and Two-pack. Secondly, it has been argued, that in order to increase ownership of fiscal rules, they should be enforced at the national, rather than the European level. Some countries, notably Germany, have begun to reinforce their national fiscal frameworks already before the onset of the economic crisis. But the milestone step towards widespread adoption of national fiscal rules in EU countries was the signing of the so-called Fiscal Compact by 25 out of the 27 EU countries in March 2012. The signatories of the compact made a commitment to transpose European fiscal rules to their national legislation, preferably at the constitutional level.

While there are several empirical studies on national fiscal rules and their impact on policy outcomes in EU countries (e.g., Debrun et *al*., 2008), the issue of interaction of national and European fiscal rules which are in force at the same time has not been investigated to our knowledge. This paper looks at the response of policymakers to EU and national rules in Poland. In order to distinguish between the impacts of the two rules, we look in detail at incentives arising

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The authors are grateful to Anna Jabłecka, who is largely responsible for compiling the database of legislative measures which the paper draws on. The views presented in this paper are those of the authors and should not be attributed to Narodowy Bank Polski.

from each of the rules. In addition, in order to best capture the policymakers' response, we use a "bottom-up" measure of fiscal effort.

The paper starts with a brief overview of the literature on the effectiveness of fiscal rules at national and EU level. In the next section we provide a description of the Polish public debt ceiling framework, which is in place since 1999 and which is anchored by the constitutional debt limit of 60 per cent of GDP. We then go on to describe our empirical strategy and the construction of the dataset used in our study. Next, we present a summary of fiscal developments in the analysed period in the context of the two sets of fiscal rules, before turning to a quantitative analysis. We close with conclusions.

2 National and European fiscal rules – a brief overview

The introduction of fiscal rules is associated with what is described as a "deficit bias" in fiscal policy, for which several explanations have been put forward in the literature. A number of them are linked to the common pool problem where different groups of interest decide on parts of public spending, often resulting in suboptimal overall spending levels. Other research points to the problem of time inconsistency of preferences, which may emerge both on the side of the voters and the government. The voters may be myopic and not understand the government's intertemporal budget constraint, resulting in demanding more government services than their taxes can finance. In addition, research has found evidence of strategic behaviour of outgoing governments, which create high deficits in order to "tie the hands" of their successors. On the other hand, the relationship between voters and elected officials may suffer from the principal-agent problem, in case politicians have other priorities than voters, such as seeking rents (von Hagen, 2002).

The problem of deficit bias may be addressed through the institutional setup of fiscal policy. This includes notably the introduction of fiscal rules, as well as improvements in transparency of government accounts and designing budget procedures in such a way that fiscal costs of policy measures are fully internalised (Ayuso-i-Casals *et al.*, 2007).

There is a considerable body of literature examining the relationship between fiscal rules and budgetary outcomes and usually finding that a favourable relationship exists. This includes notably studies in the U.S. context, (for example, Bohn and Inman, 1996; Poterba, 1996) where most state governments are bound by balanced budget rules since the 19th century. The widespread emergence of national fiscal rules is a more recent development, but these have also been the subject of empirical studies, particularly since the publication of the European Commission's database on budget rules in EU countries. One of the first applications was European Commission (2006), showing that the cyclically-adjusted primary balance on average improved in the years following the introduction of numerical fiscal rules. The data on fiscal rules were also tested econometrically on a panel of 25 EU countries, using a fiscal reaction function including a time-varying fiscal rule index variable. The latter was found to have positively affected the primary cyclically-adjusted budget balance, with its coefficient significant at the 10 per cent level.

While studies mentioned above have shown that introduction of fiscal rules is usually accompanied by better fiscal performance, they have not proven a causal relationship running from rules to outcomes. The question of existence of such a relationship has been briefly addressed by Poterba (1996), who suggested that both fiscal institutions and fiscal discipline may be driven by an omitted variable, namely voter preferences for fiscal restraint. Debrun and Kumar (2007a) looked at the issue of causality more in depth, arguing that countries in a better underlying fiscal position, or those, where the commitment to improve it is already present, are more likely to introduce or maintain fiscal rules, than those who would have a difficult time meeting the rules. They tested the hypothesis of reverse causality between fiscal rules and fiscal outcomes empirically on a sample of

EU countries, using the Commission's database on budgetary rules and found evidence of endogeneity bias in tests of rules as determinants of outcomes. In a related paper, the same authors (2007b) confirmed, that the belief in the role of fiscal rules as commitment devices is not entirely substantiated. Instead, they found that the rules may play the role of "signalling" devices, adopted by responsible governments to reveal the nature of their (unobservable) preferences and derive political gains from compliance with the rules.

The issue of deficit bias is of special significance in a monetary union, where negative consequences of fiscal indiscipline are partly exported to other members of the union, resulting in free-rider opportunities. In order to prevent this from happening, EU countries adopted a supranational fiscal rule in the form of the Stability and Growth Pact (SGP).

Recent years have shown, that the SGP has not succeeded in ensuring fiscal discipline. The reasons for this are well known (see, for example, Larch *et al.*, 2010). They include technical problems, associated with weaknesses in statistical surveillance and pro-cyclical nature of the corrective arm of the SGP. Another problem was the build-up of large macroeconomic imbalances in the period preceding the crisis, the reversal of which resulted in fiscal problems even in countries which previously complied with the Pact and were perceived to have conducted sound policies. The former group of problems and, to a certain extent the latter one, have since been addressed through changes in the SGP and other EU regulations introduced in 2011 with the so-called Six-pack.

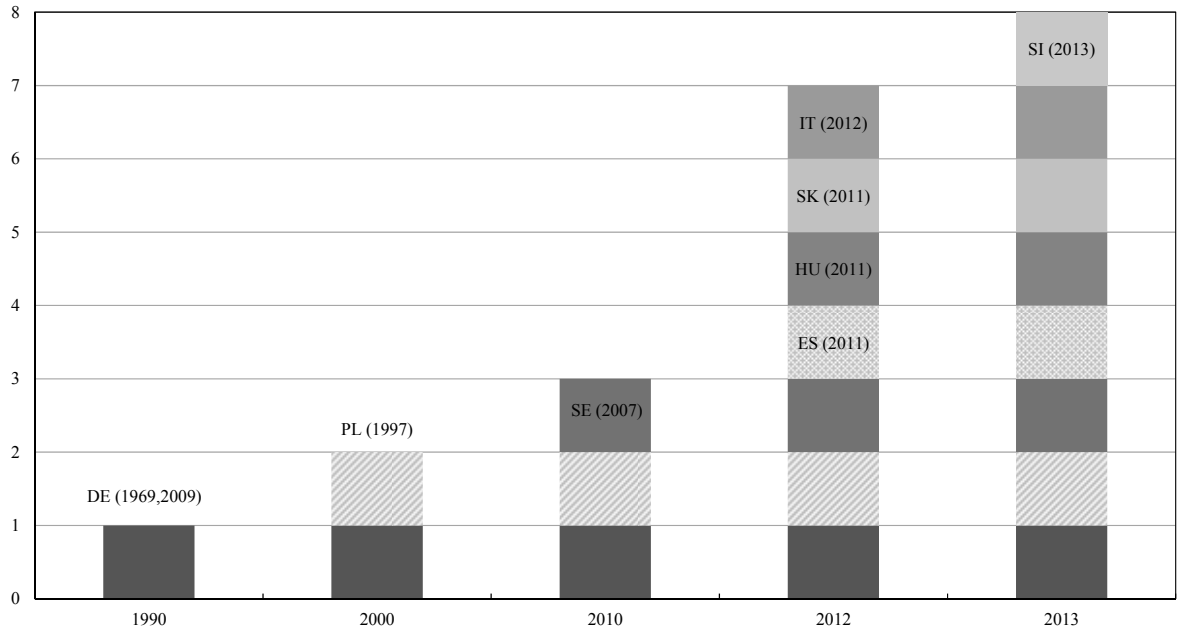
However, another important flaw of the SGP was the weak enforcement of its rules. This was a consequence of the contradiction between the supranational nature of the rules and the full fiscal sovereignty of Member States, whose ownership of the Pact was lacking. Buti *et al.* observed already in 2003, that the plausibility of imposing sanctions on sovereign countries is doubtful, yet noted that the existing level of political integration between EMU precludes a substantial improvement of the SGP in this regard. The problems of enforcement and ownership became acutely clear following the November 2003 Council decision to put the excessive deficit procedures against France and Germany in abeyance, against Commission recommendations. This sparked a debate among economists and policymakers, with many of the former (see, e.g., Annett *et al.*, 2005; Wyplosz, 2005) proposing measures to enhance domestic accountability, inter alia by establishing national budgetary institutions providing an independent assessment of fiscal policies. The Commission's broad proposals for SGP reform, outlined in Commission (2004) referred to independent national fiscal institutions and closer involvement of national parliaments in the application of EU fiscal rules. However, in the end, the SGP reform adopted in 2005 did not include any specific changes in this area.

Efforts to address the problem of enforcement and ownership of the SGP were only undertaken after the outbreak of the euro area debt crisis. The first step was the European Semester which aims at involving national authorities to a greater degree in the process of EU fiscal surveillance. Another change introduced after the crisis was the Six-pack clause calling on Member States to introduce national fiscal rules promoting the fulfilment of the SGP, but without any specific requirements as to the design of these rules, and encouraging them to introduce independent fiscal institutions, but with no binding obligation in this regard. These changes were criticised by Schuknecht *et al.* (2011) as too timid and not necessarily sufficient to ensure sound policies.

A more decisive shift of responsibility for fiscal discipline in the EU to the national level took place with the signing in 2012 by 25 out of the 27 EU countries of the Treaty on Stability, Coordination and Governance (TSCG). Its core (called the "fiscal compact") consists of

Figure 1

Number of Fiscal Rules Anchored in the Constitution in EU Countries



Note: Only fiscal rules covering central or general government are shown in the graph.
Source: National Fiscal Rules Database (2012), European Commission; European Commission (2013); Fiscal Rules Dataset (2013), IMF.

requirements, mandatory for euro area countries, concerning the transposition of European fiscal rules to national legislation, preferably of constitutional level, introduction of mechanisms ensuring automatic correction of past budgetary slippages and establishing of independent bodies monitoring the application of the rules.

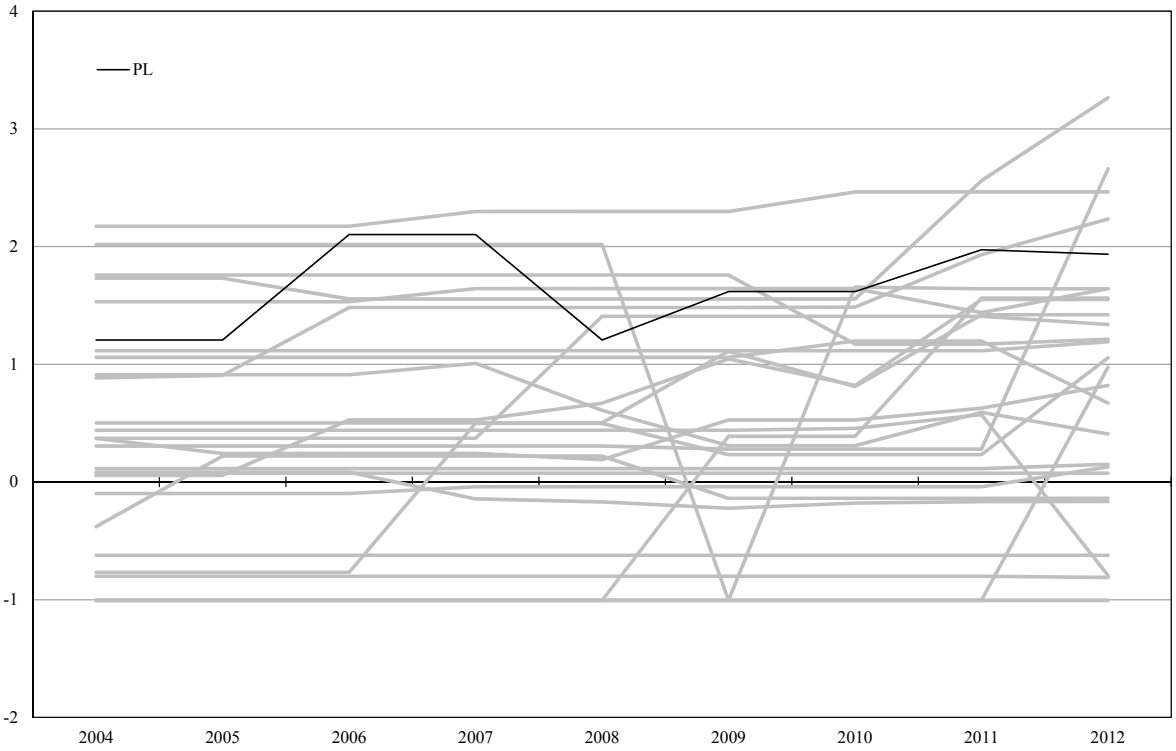
The fiscal compact has been welcomed by some observers as a step towards strengthening the commitment to sound fiscal policies by anchoring it at the national level (e.g., ECB, 2012; Wyplosz, 2013). Indeed, empirical literature on national rules does give some support to this idea, as they are found to be associated with improved budgetary outcomes. However, the lack of firm evidence on causality may suggest that this is a result of selection bias, *i.e.*, national fiscal rules being introduced only by countries where there is a pre-existing commitment to sound fiscal policies.

3 Fiscal rules in force in Poland

The cornerstone of Poland's fiscal rule framework is a rule anchored in the Constitution of 1997, which stipulates that the public debt to GDP ratio shall not exceed 60 per cent. Such a strong statutory base has until recently been unique among EU countries (see Figure 1), whereas nowadays this kind of institutional design is promoted by the Fiscal Compact "debt brake" provisions. Enforcement of the rule is strong, as the law provides for an automatic correction mechanism. According to the European Commission (National Fiscal Rules Database, 2012) overall strength of rules embedded in the Polish fiscal framework is one of the highest among the Member Countries (see Figure 2).

Figure 2

EC's Standardised Fiscal Rules Strength Index (FRSI)



Note: Single comprehensive score for each EU Member State.
Source: National Fiscal Rules Database (2012), European Commission.

The Public Finance Act (PFA), in force since 1999, complements the Constitution, as it defines the scope of the general government, public debt, escape clauses for exceptional situations[1] and prudential procedures, *i.e.*, automatic correction measures (see Appendix 1) triggered by the public debt-to-GDP ratio breaching prudential thresholds – 50, 55 and 60 per cent (constitutional ceiling).[2] It should be noted, that these measures are generally taken with two-year lag.

Corrective measure in case of public debt exceeding the 1st prudential threshold (50 per cent of GDP) is rather mild, as reduction of the state budget deficit-to-revenue ratio from year to year usually does not require a large fiscal adjustment. However, the magnitude of required consolidation measures could be very large, once public debt exceeds 55 per cent of GDP. The rule stipulates that in such a case the central budget has to be at least balanced or its outturn must ensure the decrease of State Treasury debt to GDP ratio. In times of economic downturn it may imply a requirement to plan a surplus in the budget. Furthermore, other measures triggered by the debt exceeding 2nd prudential threshold, such as public sector wage freeze or lower pension indexation, are politically sensitive. This contributes to a good track record of the Polish debt rule. Since 1999, the breach of the 2nd prudential threshold (55 per cent of GDP) has been avoided (see Figure 3).

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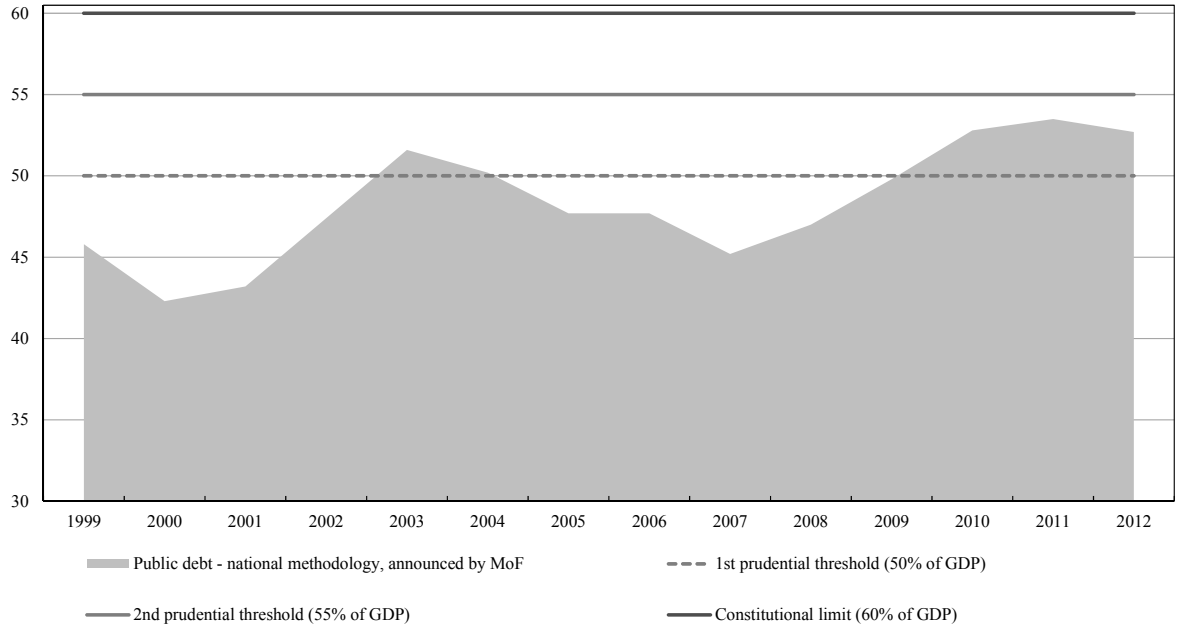
1 Imposition of martial law, state of emergency or natural disaster (nationwide).

2 The PFA also requires the Minister of Finance to submit, along with the draft budget act, annual public debt management strategy to the parliament. This document includes public debt forecast, which allows assessing the risk of public debt exceeding the following safety thresholds.

Figure 3

Public Debt in Relation to GDP
(percent)



Note: Ratio as announced by Ministry of Finance (MoF) for a given year (in May following year), without subsequent revisions.
Source: MoF.

The debt-to-GDP ceiling has a disadvantage of promoting pro-cyclical fiscal policy. Under severe economic conditions, an increase in the deficit accompanied by the denominator effect is likely to force pro-cyclical fiscal tightening. Meanwhile, in good times, the rule does not have a disciplining effect on policymakers.

Since 2004 Poland is also subject to the rules of the Stability and Growth Pact. The Pact consists of the preventive and corrective arms, which encompass several rules, regarding the size of the government deficit and debt, but also the cyclically-adjusted budget balance which is expected to be maintained at the level of the medium-term objective (MTO). However, the practical application of the Pact, at least prior to the economic crisis, has been such, that fiscal adjustment measures were only required in case the nominal general government deficit exceeded 3 per cent of GDP. Therefore, similarly to other papers (e.g., Golinelli and Momigliano, 2006), for the purposes of our study, we focus only on the 3 per cent reference value and disregard other disciplining elements of the SGP.

Moreover, it should be noted that the threat of sanctions did not apply (pre-2012) to a situation of breach of the 3 per cent reference value, but only to a situation, where a country did not comply with recommendations it received under the excessive deficit procedure (EDP), assuming that the EDP had been initiated beforehand. Therefore, in our view, an accurate reflection of incentives faced by policymakers is to take "European fiscal rules" to mean "recommendations under the excessive deficit procedure" and this is the approach we follow.

As a non-euro country, Poland did not face the threat of fines under the EDP. However, Poland was and is a recipient of substantial amounts of EU cohesion funds. In case of severe non-compliance with EDP recommendations, the EU Council may take a decision to suspend

commitment appropriations from the Cohesion Fund. Contrary to fines under the EDP, this form of penalizing fiscal irresponsibility has in fact been applied in the past, implying that it is a credible disciplining mechanism. Poland's compliance with EDP commitments and the associated threat of suspension of EU funds has widely featured in the domestic policy and media debate. For these reasons, we would have expected that European fiscal rules would be a binding constraint on Poland's fiscal policies in the analysed period.

4 Empirical strategy

Our objective in this paper is to test how policymakers in Poland have responded to the two sets of fiscal rules described above. A tool typically used in the literature for this type of exercise is a fiscal reaction function, where a measure of fiscal stance, usually the cyclically-adjusted primary balance (CAPB), is regressed against indicators of the economic cycle and various political and institutional variables. However, the use of CAPB as an indicator of fiscal stance is problematic. This has been raised in the context of studies on the impact of fiscal policy on the economy by the IMF (2010). Cyclically-adjusted budget balance indicators are not entirely free of the impact of macroeconomic developments on fiscal performance. In particular, they are likely to be distorted by the impact of asset price movements on tax revenue. In addition, tax elasticities used in cyclical adjustment are not directly observable and, contrary to the assumption made, may fluctuate over time.

Moreover, the CAPB may be affected by temporary measures, such as one-off capital transfers. In principle, fiscal experts may be able to correct the CAPB for their impact to obtain a "structural" balance. However, this requires a lot of time and detailed information, especially given that many existing studies on the impact of fiscal rules are panels covering dozens of countries. As a result, such adjustments are often omitted.

In our view, using the CAPB to test if policymakers are responding to fiscal rules has additional drawbacks. There is a lag between the announcement, or legislation of fiscal measures – *i.e.*, the moment when policymakers take action – and the time when the impact of these measures becomes visible in the CAPB. This lag may vary depending on the specific measure in question.

Therefore, we propose to use a "bottom-up" or "narrative" approach, where instead of the CAPB we will measure fiscal stance using the impact of announced legislative measures. We use the combined fiscal impact of legislative measures announced in a given period as the dependent variable in our fiscal reaction function. In our view, the date of announcement, rather than the date of passing by Parliament or the date of entry into force, is the right one to use when focusing on policymakers' motivations.

While fiscal policy is generally set using annual budgets, our database of legislative measures shows that they are announced and passed throughout the year. In view of this and in an effort to best use the information available, we have decided to use quarterly data. Because one of our main objectives was to compare the impact of national and European fiscal rules, the study had to be limited to the period when both sets of rules were in force, *i.e.*, after Poland's EU accession. The sample period is therefore quite short - 2004:Q3-2012:Q4.

It is clear that legislative measures passed by Parliament are not the only source of changes in fiscal policy, as it is also driven by discretionary policies of central and local governments. We capture the discretionary central government expenditure component (non-discretionary spending is already captured by other legislation) by including budget laws as separate pieces of legislation. For each budget law, we calculate the fiscal effort by deducting the planned growth rate of discretionary spending from nominal potential GDP growth. We disregard local governments in our study, as in the Polish institutional setup, the responsibility for compliance with domestic and

EU fiscal rules, as well as for using fiscal policy for cyclical stabilisation generally falls on the central government. Local governments have the freedom to independently set fiscal policies within the constraints of local government debt rules, most notably the ceiling of their debt-to-revenue ratio of 60 per cent - more stringent than the debt-to-GDP ratios faced by the central government.

Aside from a "bottom-up" measure of the fiscal stance, the other innovation we propose is in how the impact of fiscal rules is captured in our regression. In existing studies, fiscal rules were usually included in the form of dummies or indices proxying the strength of fiscal rules. This provides insights as regards the impact of fiscal rules compared to the situation when they are not in place and relative to other rules, which are assessed to be of different strength. However, we wanted to be able to assess the impact of two different fiscal rules which were in force in one country at the same time. In order to do this, we needed to look more directly at the incentives arising from both these the rules, *i.e.*, to what extent they "bite" at a given point in time. In case of European fiscal rules, we do this by using European Commission forecasts to determine the amount of additional fiscal adjustment required to comply with the EDP deadline. In case of the national debt rule framework, we use debt forecasts to determine the distance of the projected debt ratio from the critical debt ceiling of 55 per cent of GDP.

Summing up, we estimate the following fiscal reaction function:

$$FE_t = \alpha_0 + \alpha_1 PDR_t + \alpha_2 EDP_t + \alpha_3 GAP_t$$

where:

FE – our bottom-up measure of fiscal effort,

PDR – the public debt rule indicator,

EDP – additional fiscal effort required to comply with the EDP.

5 Compilation of the dataset

Our study uses the following variables:

1) **Fiscal effort**. As noted above, our independent variable is a bottom-up measure of fiscal effort, encompassing the fiscal impact of new legislation passed by Parliament (see Appendix 2). Our database of legislative measures includes those related to non-discretionary budget items, *i.e.*, revenue from taxes and social contributions and expenditure on social transfers. In order to capture the impact of central government decisions concerning discretionary spending items (public consumption and public investment) we have additionally included budget laws in the database as separate pieces of legislation. For each budget law, we have calculated its fiscal impact by deducting the growth rate of discretionary expenditure from the growth rate of nominal potential GDP and multiplying the difference by the ratio of discretionary expenditure to potential GDP.

   The database of legislative measures and their fiscal impact has been compiled at Narodowy Bank Polski as part of an ongoing project of a working team of the ESCB Working Group on Public Finance. Wherever possible, the estimate of the fiscal impact has been drawn from official sources, while for the remaining cases, NBP estimates have been used.

   For every legislative measure we have a date of announcement (this is usually the date of submission of the bill to Parliament) and the date of entry into force. The fiscal effort variable is based on the former date – we assume that policymakers react to incentives arising from fiscal rules (and other variables considered in our study) by announcing legislative drafts which are then processed in Parliament and enter into force with some delay. The date of entry of fiscal

measures into force is used for the purpose of interpolation of semi-annual into quarterly data (see below).

2) **Excessive deficit procedure indicator**. This variable represents incentives arising from EDP requirements and it is the average annual amount of consolidation required to bring down the deficit to 3 per cent of GDP. The required consolidation is calculated using real-time deficit projections of the European Commission. We calculate this variable as the difference between the deficit projected for the EDP deadline (or the final year of the Commission's projection) and the reference value, divided by the number of years left from the current quarter until the end of the year of the EDP deadline (see Appendix 3).

   For example, in the spring of 2005, the Commission projected a deficit of 6.3 per cent of GDP for 2005 and 5.7 per cent of GDP for 2006, while the EDP deadline was 2007. This means that the total fiscal adjustment effort required is 5.7-3 per cent = 2.7 per cent of GDP. We divided this figure by 2.5 years left until the end of 2007. Thus we obtained that in Q2 of 2005, the average additional annual effort required under the EDP amounted to 1.1 per cent of GDP.

   The Commission only publishes forecasts semi-annually (at least it has done so during the period covered by our study), while we need an updated forecast every quarter. Therefore, we have interpolated the deficit projections in the missing quarters, as the average of the projections published in the quarters before and after, adjusted for the impact of new fiscal measures announced in the meantime.

3) **Public debt rule indicator**. This variable represents incentives arising from the public debt rules. As noted in section 3, while the breaching of the first debt-to-GDP threshold (50 per cent) triggers only relatively minor corrective measures, the consequences of debt exceeding 55 per cent of GDP are punitive. We assume that policymakers want to avoid such a scenario and we expect that the closer the debt ratio is to the 55 per cent limit, the more likely they are to undertake consolidation measures. Therefore, we take the log of the difference between the 55 per cent limit and the debt ratio projected for the end of the current year[3] as the explanatory variable representing the national debt ceilings in our study.

   The debt projections in question are, again, real time projections of the European Commission, but with an additional correction. The Commission projects ESA95 debt, while the debt ceilings apply to the debt ratio according to the domestic definition. The main difference between the two is in the delimitation of the public sector. Therefore, for every period we made a correction based on the difference between the two definitions at the end of the previous year and the projected change in this difference in the current year, consisting of the average change in the two preceding quarters, the current quarter and one forthcoming quarter[4] (see Appendix 4).

   Again, we needed to interpolate Commission forecasts for the missing quarters. We followed a similar approach as for the deficit – average of the forecast from the quarters before and after, adjusted for the change in the deficit arising from new fiscal measures.

4) **Output gap and election cycle**. These variables may also be drivers of fiscal policy decisions, so we have included them in the fiscal reaction function. We used real time output gaps from the European Commission, again interpolating the missing quarters.

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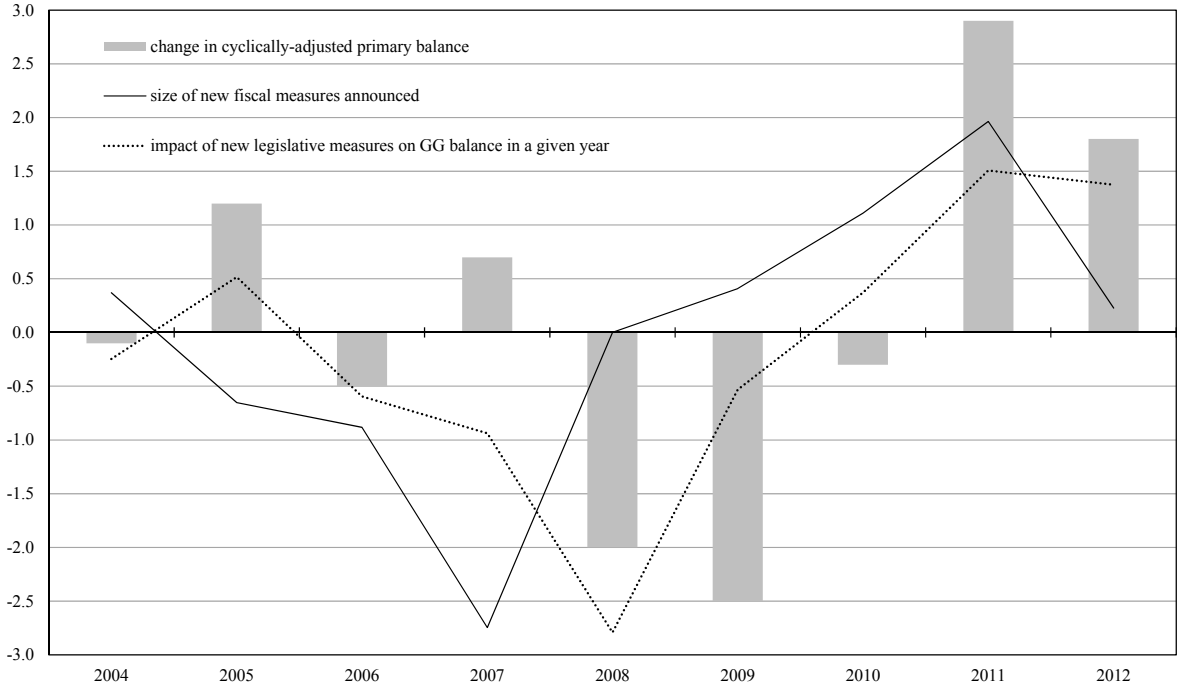
[3] We have also checked debt projections for the following year, but they did not perform well.

[4] We assume some foresight, because policymakers have partial control over the difference between debt levels according to the two definitions. Notably in 2009 the government shifted around 0.8 per cent of GDP of public investment spending from the central budget to the National Road Fund, which is not part of the government sector according to the domestic definition.

Figure 4

CAPB vs. Indicator of Discretionary Measures
(percent of GDP)



Source: own calculations using European Commission projections.

6 Overview of fiscal developments in 2004-2012

Figure 4 presents a summary of fiscal developments over the analysed period, showing the lag between the announcement and the impact of new fiscal measures, as well as the deviation of the CAPB from the said impact.

Prior to EU accession, fiscal deficits in Poland have usually exceeded 3 per cent of GDP, but as a result of a high economic growth rate, as well as substantial privatization receipts, this did not lead to an increase in the debt-to-GDP ratio. However, this changed when the economy entered a sharp slowdown in 2001, with public finances additionally burdened by higher than anticipated implementation costs of four major reforms (of pension scheme, health sector, local administration and education) introduced in 1999. The deficit increased and the debt ratio began rising towards 50 per cent, the first prudential threshold of the Public Finance Act, breaching it in 2003.

While the 2002 and 2003 budgets already included a number of smaller consolidation measures, they did not prevent further growth of the debt ratio. Faced with the risk of breaching of the 55 per cent debt-to-GDP threshold, the government began work on a comprehensive fiscal reform programme. In January 2004 the outline of the *Programme for Rationalization and Reduction of Public Expenditure* was approved by the government. The programme focused predominantly on the expenditure side and aimed at reduction in social transfers and public administration, but also included measures to broaden the tax base. However, the *Programme* was only partly implemented and in addition, it was offset by other measures, which had a negative effect on the budget balance. This was related to the breaking apart of the ruling coalition in

mid-2004 (it was replaced by a minority government) and the forthcoming elections in autumn 2005. Moreover, in 2004 the economy recorded very strong growth, especially in nominal terms, while in autumn 2005 a GDP revision took place, raising past GDP levels. As a result, the 2005 debt-to-GDP ratio amounted to 47.7 per cent and the threat of breaching debt thresholds (and with it the motivation for policymakers to implement consolidation measures) dissipated.

In the meantime, in May 2004 Poland entered the EU and in July was placed in an excessive deficit procedure (EDP), with a deadline to correct the fiscal imbalance in 2007. The deficit indeed was declining, but this was mainly due to favourable growth conditions, as no substantial consolidation measures were announced in the 2005-mid 2006 period. By late 2006 and 2007, strong growth prospects and perceived lack of fiscal risks prompted policymakers to implement a broad range of expansionary fiscal measures, although forecasts at the time indicated, that there are risks to compliance with the EDP deadline. The measures included inter alia a cut in social contributions by 7 percentage points of the salary, abolition of the top personal income tax bracket, new tax breaks and introduction of child tax allowance. The last of these measures was announced in the summer of 2007, when it was already apparent, that early elections would be called in the autumn. However, economic growth and tax revenues were so buoyant, that despite these expansionary measures, the general government deficit was brought below 3 per cent of GDP in 2007 and the EDP was abrogated in July 2008.

Once the global economic crisis started, the fiscal position rapidly deteriorated, reflecting cyclical factors, tax revenue shortfalls, the delayed impact of expansionary measures legislated during the preceding boom, as well as a substantial fiscal loosening at the local government level (local government deficit increased from 0.2 per cent of GDP in 2008 to 1.1 per cent of GDP in 2009). In 2009 Poland was yet again placed in an EDP with a deadline of 2012. Consolidation measures were not taken immediately – in 2010 the deficit continued to rise, reaching 7.8 per cent of GDP.

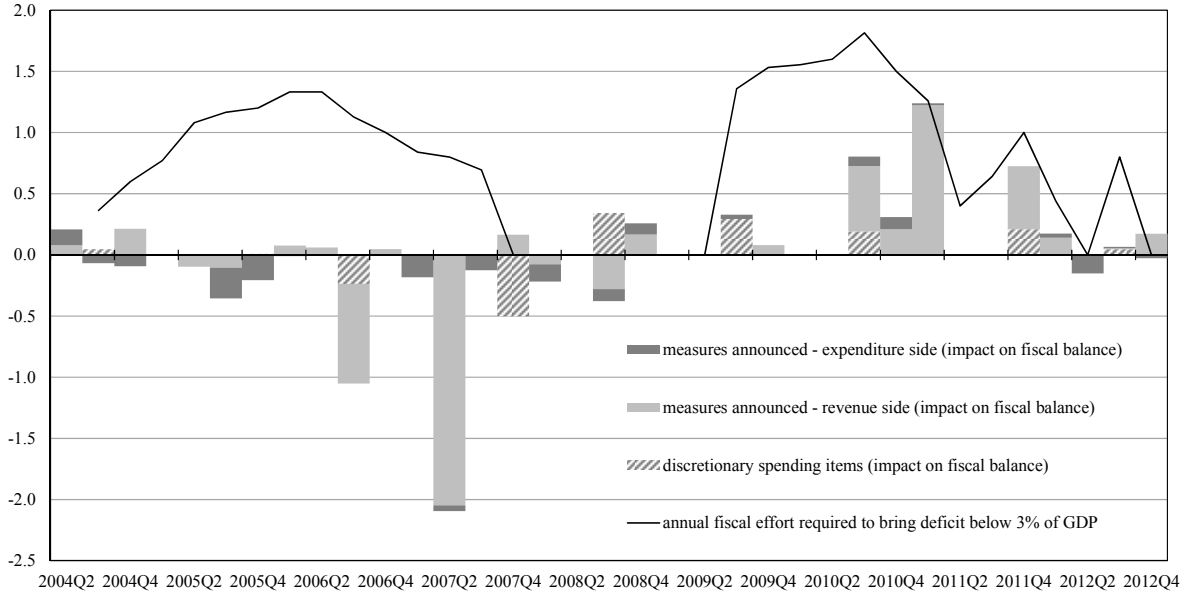
A major consolidation package was only announced in 2010-2011 and implemented in 2011-12, consisting, inter alia, of a VAT rate increase, changes to the pension scheme, a rise in social contributions and a wage freeze in the public sector. In early 2012 it appeared that these consolidation measures may be sufficient both to bring the deficit below 3 per cent of GDP and reverse the rise in the debt ratio. Therefore, no major additional consolidation measures have been announced since 2011. However, tax revenue slowed down considerably in mid-2012, as a result of which the EDP deadline was missed (the deficit reached 3.9 per cent of GDP).

In the basic specification, the fiscal effort is determined only by incentives arising from the two fiscal rules, which are the subject of the study. Contrary to the typical form of fiscal reaction functions, we do not include past deficit and debt levels in the regression, as they are highly correlated with our fiscal rule variables. Both fiscal rule variables have the expected sign – fiscal effort increases as the distance of the debt ratio to the 55 per cent of GDP threshold becomes closer and as the adjustment effort required to meet EDP targets increases. Only the debt variable is significant. As the table shows, the EDP variable is insignificant in all specifications we have looked at, while the debt rule variable performs consistently better and is at least weakly significant in most cases.

The next step is the inclusion of an output gap variable – specifically, the real-time output gap projection for the following year. The output gap enters with a negative sign, which is consistent across the different specifications of the model, pointing to pro-cyclical behaviour of policymakers. However, in some of the specifications, the output gap is not statistically significant.

Figure 5

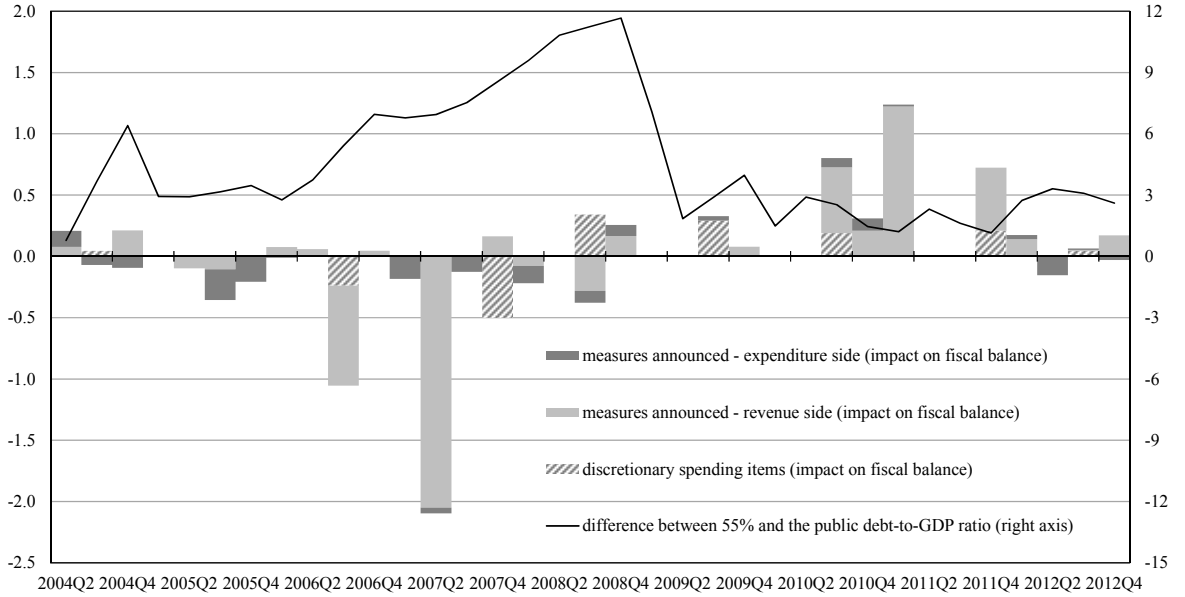
Magnitude of Fiscal Measures Taken and Annual Fiscal Effort Required to Comply with the EDP Deadline
(percent of GDP)



Source: Own calculations using European Commission projections.

Figure 6

Magnitude of Fiscal Measures Taken and the Distance of the Projected Debt Ratio from the 55 per cent of GDP Threshold
(percent of GDP)



Source: Own calculations using European Commission projections.

7 Empirical results

The table below presents an overview of the results of our quantitative analysis (estimation with OLS; dependent variable: fiscal effort indicator)

	Baseline				**Sensitivity Checks**					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Distance from 55% debt threshold	-0.14*	-0.15**	-0.13*	-0.15**	-0.12*				-0.31*	-0.13
	(-1.99)	*(-2.2)*	*(-1.89)*	*(-2.18)*	*(-1.93)*				*(-1.88)*	*(-1.59)*
Annual effort required under EDP	0.17	0.12	0.13	0.10		-0.01	0.15		-0.02	0.14
	(1.57)	*(1.05)*	*(1.21)*	*(0.92)*		*(-0.12)*	*(0.96)*		*(-0.1)*	*(1.1)*
Output gap (t+1)		-0.09	-0.08	-0.09	-0.11**	-0.08	-0.11*	-0.11*	-0.06	
		(-1.66)	*(-1.4)*	*(-1.64)*	*(-2.07)*	*(-1.37)*	*(-1.78)*	*(-1.77)*	*(-0.87)*	
Pre-election dummy			-0.26							
			(-0.92)							
Post-election dummy				0.31						
				(1.09)						
Debt level							0.00	0.00		
							(-1.36)	*(-0.98)*		
c									0.36	
									(1.04)	
Ex post output gap										-2.71
										(-0.44)
no. of observations	34	34	34	34	34	34	34	34	34	34
R-squared	0.12	0.19	0.19	0.20	0.16	0.06	0.11	0.09	0.22	0.12
Adjusted R-squared	0.09	0.14	0.11	0.12	0.13	0.03	0.06	0.06	0.14	0.06

Another potential determinant of fiscal policy decisions is the electoral budget cycle. We have tested it in two specifications –with a dummy for the quarter before parliamentary elections and with a dummy for the quarter immediately after. The results are not significant, which is hardly surprising given just three electoral periods in the sample. The coefficients are in line with expectations – before elections policymakers introduced measures to loosen fiscal policy, while immediately after they proposed measures to reduce the deficit. Interestingly, the latter coefficient is both higher in absolute terms and more significant, indicating that policymakers were more likely to tighten fiscal policy after elections than to loosen it beforehand.

We have then checked other specifications as robustness checks. We have looked at each of the rules separately, with the debt rule variable once again proving to be more significant. We also wanted to check whether the significant impact of the debt rule variable does not simply capture the

response of policymakers to increasing debt ratios typically seen in fiscal reactions functions regardless of the presence of public debt ceilings. In order to do this, we replaced the debt rule variable with a simple debt-to-GDP ratio in the preceding quarter (7 and 8). Quite surprisingly, it was not only insignificant, but also had the wrong sign. Finally, we tried using an *ex post* output gap instead of the real time one, but it was not significant.

8 Conclusions

This paper has examined the impact of national and European fiscal rules on fiscal policy in Poland in 2004-2012. The paper proposes two innovations relative to existing literature on the impact of fiscal rules on fiscal outcomes. Firstly, we employed a bottom-up approach to gauge fiscal effort, using a database of fiscal measures approved by the legislature, rather than primary cyclically-adjusted budget balances, which are likely to be distorted by factors other than actual policy decisions. Secondly, in order to distinguish between the effects of the two fiscal rules in question, we use explanatory variables which approximate the incentives arising from each of these rules. While the sample is short and results need to be interpreted with caution, the following conclusions may be drawn from our results:

- Policymakers in Poland have responded quite consistently to incentives stemming from the national debt ceiling framework by announcing new consolidation measures, as the risk of breaching the 55 per cent of GDP debt ceiling increased. This effect was statistically significant in most specifications;
- Meanwhile, the policymakers' response to European fiscal rules was generally not significant;
- Fiscal policy decisions have tended to be pro-cyclical, which is consistent with incentives arising from the debt ceiling framework, which tends to have a disciplining effect during economic slowdowns and not in "good times";
- The effect of parliamentary elections on policymakers' actions was not statistically significant, but it had the expected sign – in the quarters directly preceding elections there were announcements of expansionary measures, while immediately after elections the opposite was the case.

These results appear to confirm the notion that national fiscal rules which have a strong legislative base and are well-established in the national public debate, can have a stronger disciplining effect on policymakers than European fiscal rules which in the past faced the problem of insufficient ownership.

APPENDIX 1
THE POLISH DEBT RULE – AUTOMATIC PRUDENTIAL MEASURES (1999-2012)

Debt rule	• Anchored in The Constitution of the Republic of Poland (1997) • Bans contracting loans and granting guarantees when the public debt is exceeding 60% of GDP
Prudential procedures	• Regulated by the Public Finance Act (amendments: 2005, 2009, 2010, 2012) • Applied to prudential thresholds concerning public debt[5] (PD) to GDP ratio (50%, 55%, 60%): o If PD in year ***t*** > 50% and ≤ 55% of GDP (1st prudential threshold), then the state budget deficit-to-central budget revenue ratio in the draft budget act adopted by the Council of Ministers for the year ***t+2*** cannot be higher than in the year ***t+1***, o If PD in year ***t*** > 55% and ≤ 60% of GDP (2nd prudential threshold), then: ▪ the state budget for the year ***t+2*** has to be at least balanced **or** the difference between central budget revenues and expenditures in draft budget act for the year ***t+2*** must safeguard the decrease in central government debt-to-GDP ratio at the end of the year ***t+2*** in comparison to the year ***t***, ▪ obligation to draft measures aimed at increasing state budget revenues, ▪ amount of state budget subsidy to National Disabled Persons Rehabilitation Fund (PFRON) is reduced from 55% to 30% of fund's expenditure on refunds for disabled persons (year ***t+2***), ▪ expenditures[6] penciled in budget resolution of each local government unit adopted for the year ***t+2*** can be higher than revenues only by the amount connected with the realization of current tasks financed by the EU funds and non-returnable financial help from EFTA member countries, ▪ for the year ***t+2***: i) salaries of public sector employees are frozen at the level set for the year ***t+1***, ii) indexation of pensions in the year *t+2* does not include 20% real wage growth in the year ***t+1*** , iii) granting new loans and credits from the state budget is forbidden, iv) increase in state budget expenditures of certain units (preparing their budget chapters autonomously)[7] must not be higher than expenditures growth in the government administration, ▪ units of government administration can incur liabilities for investment only if EU funds for particular project have been appropriated at the highest allowable level (no lower than 50% of total costs), with the exception of: o construction or modernization of roads in order to improve traffic safety, o investments related to disposal of flood damages, o development of electronic toll collection system, o expropriation in case of road construction ▪ the Council of Ministers reviews: i) state budget expenditures financed with foreign credits, ii) long-term projects, ▪ the Council of Ministers presents a recovery programme. o If PD in year ***t*** > 60% of GDP (Constitutional limit) then actions listed for 2nd prudential apply and additionally: ▪ budgets of local government units for the year ***t+2*** must be at least balanced, ▪ granting new guarantees by public finance sector entities is forbidden, ▪ the Council of Ministers presents a recovery programme, including measures aimed at reducing PD to GDP ratio below 60%. Since 2012: measures triggered by the PD breaching the 1st or 2nd prudential threshold, would not be taken if the amount of public debt-to-GDP ratio converted into PLN using the average exchange rates in a given year and reduced by free funds of the MoF as of the end of the budgetary year (used to finance the borrowing needs in the subsequent budgetary year) does not exceed 50% or 55% of GDP, respectively.

Source: The Public Finance Act.

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5 Domestic methodology (differs from ESA95: includes matured payables, scope of units included in the public sector is defined in the Public Finance Act).

6 Less cumulated budgetary surplus from previous years and liquid funds.

7 Lower and upper house of Polish Parliament, Chancellery of the President of the Republic of Poland, Constitutional Tribunal, Supreme Audit Office, Supreme Court, Supreme Administrative Court, Voivodship Administrative Courts, Common courts, National Council of the Judiciary, Human Rights Defender, Spokesman of Child Rights, National Board of Radio and Television, General Inspector for the Personal Data Protection, The Institute of National Remembrance – Commission for the Prosecution of Crimes against the Polish Nation, National Electoral Office, National Labor Inspectorate.

APPENDIX 2
IMPACT OF MEASURES ON THE GENERAL GOVERNMENT BALANCE

Announced	Legislative Measures*						Discretionary Spending Items**
	Revenue				Expenditure		
	Indirect Taxes	Income Taxes	Social Contributions	Other	Social Benefits	Other	
2004	–0.0	–0.0			0.2	0.1	0.0
2005	–0.1		–0.1		–0.5		0.0
2006	0.1	–0.8		0.0		–0.0	–0.2
2007	0.2	–0.3	–1.8		–0.4	0.1	–0.5
2008	–0.1		–0.1	–0.0	–0.2	0.0	0.3
2009	0.1	0.0			0.0		0.3
2010	0.7	0.1			0.2		0.2
2011	0.2		1.6			0.0	0.2
2012	0.2	0.0	0.0	0.1	–0.1		0.0

* combined impact of measures on general government outturn in a given category in the first full year, in which they were effective.
** difference between the nominal potential GDP growth and the increase in discretionary spending planned in the budget act for a given year.

APPENDIX 3
EXCESSIVE DEFICIT PROCEDURE INDICATOR

$$EDP_{q,t} \begin{cases} \dfrac{DEF_{EC\ autumn\ t-1}^{t+1} + MEAS_{1,t} + OAdj_{1,t} - 3\%}{T_{EDP}}; q = 1 \\ \dfrac{DEF_{EC\ spring\ t}^{t+1} - 3\%}{T_{EDP}}; q = 2 \\ \dfrac{F_{EC\ spring\ t}^{t+1} + MEAS_{3,t} + OAdj_{3,t} - 3\%}{T_{EDP}}; q = 3 \\ \dfrac{DEF_{EC\ autumn\ t}^{t+2} - 3\%}{T_{EDP}}; q = 4 \end{cases}$$

$EDP_{q,t}$ – annual fiscal effort required in quarter q of the year t to bring down the fiscal imbalance to 3 per cent of GDP within the EDP deadline.

DEF – the European Commission's general government deficit forecast; subscript indicates source of data (spring or autumn forecast published in the year *t*), superscript – the year, for which deficit projection was taken.

$MEAS_{q,t}$ – combined impact of measures announced in quarter q of the year t on a general government balance in the first full year, in which they were effective.

$OAdj_{q,t}$ – interpolation of deficit projections in quarters, in which the European Commission did not issue its economic forecasts:

$$OAdj_{1,t} = \frac{\left(DEF_{EC\ spring\ t}^{t} - DEF_{EC\ autumn\ t-1}^{t}\right) - MEAS_{1,t} - MEAS_{2,t}}{2}$$

$$OAdj_{3,t} = \frac{\left(DEF_{EC\ autumn\ t}^{t} - DEF_{EC\ spring\ t}^{t}\right) - MEAS_{3,t} - MEAS_{4,t}}{2}$$

T_{EDP} – the number of years left from the quarter q of the year t until the end of the year of the EDP deadline:

$$T_{EDP} = \frac{EDP_{4,deadline} - t_{q,t}}{4}$$

APPENDIX 4
PUBLIC DEBT RULE INDICATOR

$$PDR_{q,t} \begin{cases} 55\% - \dfrac{DEBT^{t}_{EC\ autumn\ t-1} + DEBT^{t}_{EC\ spring\ t} + MEAS_{2,t} - MEAS_{1,t}}{2} - Adj_{1,t}; q = 1 \\ 55\% - DEBT^{t}_{EC\ spring\ t} - Adj_{2,t}; q = 2 \\ 55\% - \dfrac{DEBT^{t}_{EC\ spring\ t} + DEBT^{t}_{EC\ autumn\ t} + MEAS_{4,t} - MEAS_{3,t}}{2} - Adj_{3,t}; q = 3 \\ 55\% - DEBT^{t}_{EC\ autumn\ t} - Adj_{4,t}; q = 4 \end{cases}$$

$PDR_{q,t}$ – difference between the public debt-to-GDP ratio and the 2nd prudential threshold set in the Public Finance Act (55% of GDP) in quarter q of the year t.

$DEBT$ – the European Commission's general government debt forecast; subscript indicates source of data (spring or autumn forecast published in the year t), superscript – the year, for which debt projection was taken.

$MEAS_{q,t}$ – combined impact of fiscal measures announced in quarter q of the year t on a general government balance in the first full year, in which they were effective.

$Adj_{q,t}$ – adjustment of the ESA general government debt to the domestic methodology (DM, applied in the Public Finance Act) – actual data:

$$Adj_{q,t} \begin{cases} \Delta DEBT^{DM-ESA}_{4,t-1} + \dfrac{\Delta DEBT^{DM-ESA}_{3,t-1} + \Delta DEBT^{DM-ESA}_{4,t-1} + \Delta DEBT^{DM-ESA}_{1,t} + \Delta DEBT^{DM-ESA}_{2,t}}{4}; q = 1 \\ \Delta DEBT^{DM-ESA}_{4,t-1} + \dfrac{\Delta DEBT^{DM-ESA}_{4,t-1} + \Delta DEBT^{DM-ESA}_{1,t} + \Delta DEBT^{DM-ESA}_{2,t} + \Delta DEBT^{DM-ESA}_{3,t}}{4}; q = 2 \\ \Delta DEBT^{DM-ESA}_{4,t-1} + \dfrac{\Delta DEBT^{DM-ESA}_{1,t} + \Delta DEBT^{DM-ESA}_{2,t} + \Delta DEBT^{DM-ESA}_{3,t} + \Delta DEBT^{DM-ESA}_{4,t}}{4}; q = 3 \\ \Delta DEBT^{DM-ESA}_{4,t-1} + \dfrac{\Delta DEBT^{DM-ESA}_{2,t} + \Delta DEBT^{DM-ESA}_{3,t} + \Delta DEBT^{DM-ESA}_{4,t} + \Delta DEBT^{DM-ESA}_{1,t+1}}{4}; q = 4 \end{cases}$$

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COMMENT TO "THE RESPONSE OF POLICYMAKERS TO NATIONAL AND EUROPEAN FISCAL RULES – THE CASE OF POLAND" BY TOMASZ JĘDRZEJOWICZ AND MARCIN KITALA

Balint Tatar[*]

I would like to begin by expressing my thanks to Banca d'Italia for inviting me to participate at the 16th Workshop on Public Finance. It is a great pleasure to act as a discussant for the paper prepared by Tomasz Jedrzejowicz and Marcin Kitala. I would like to point out that in between I have left the European Commission, therefore the views expressed here and in the presentation are my own views and do not reflect the views of the European Commission in any way.

At first, I would like to provide a brief overview on the outline of this discussion. In the first part I will summarize the key questions addressed in this the paper. In the second part I will discuss the key challenges the authors faced in course of their research. Afterwards I will make some general remarks on the paper and in the last part I will discuss some specific caveats and provide the authors some ideas which could be pave the way for future improvements of their paper.

In this paper the authors addressed three key questions: 1) What is the impact of national and European fiscal rules in Poland? 2) Is there any econometric evidence on the pro-cyclical nature of fiscal policy decisions in Poland? 3) What is the effect of parliamentary elections on policymakers' actions in Poland?

The authors concluded that 1) "Policymakers in Poland have responded quite consistently to incentives stemming from the national debt ceiling framework." They also found that the "European fiscal rules are insignificant as a determinant of fiscal policy actions taken in Poland." 2) "Fiscal policy decisions have tended to be pro-cyclical." This is "consistent with incentives arising from the debt ceiling framework, which tends to have a disciplining effect during economic slowdowns and not in 'good times'" 3) "The imminence of parliamentary elections has contributed to a loosening of fiscal policy, but this result was not significant."

The key challenges the authors faced were the following: The existing literature uses mostly the Cyclically Adjusted Primary Balance (CAPB) as dependent variable to measure the fiscal reaction. Unfortunately, this measure might be distorted by the effect of asset price changes on tax revenue. Another well know weakness of this approach arises from the fact that tax elasticities are not directly observable. Moreover, the CAPB is affected by temporary measures as, e.g., by one-off capital transfers. A further issue concerning the CAPB approach is that there might be a significant lag between the announcement of a fiscal measure, the legislation and the reaction of the CAPB to the fiscal measure.

An additional very challenging task was to overcome the difficulties arising from the small sample size. Poland joined the European Union in 2004 and is therefore subject to the rules of the Stability and Growth Pact only since that year. The sample comprises the period 2004:Q3-2012:Q4, which consists of 34 observations. The data was available only on a semi-annual basis, therefore it had to be interpolated. Despite of the fact that this approach might be econometrically inaccurate, it is a necessary tradeoff, to which point I will come following some general remarks on the paper.

In general, answering the key questions addressed in this paper by using a regression framework is a very challenging task, due to the low amount of observations. The paper provides

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though a novel and significant contribution to the existing literature as it constructs an alternative, bottom-up measure of fiscal effort which is superior to the widely spread CAPB approach. This alternative measure captures both non-discretionary and discretionary fiscal measures. A further strength of the methodology applied is that the econometric approach used (OLS) in this paper is very clear.

Coming to the caveats and the weaknesses of this paper I would like to remark that the explanatory power of the model presented in this paper is rather low, the (adjusted) R^2 is lower than 0.20. This might be attributable to the small sample size, however it is possible that some important explanatory variables are missing and correlated with the regressors resulting in biased estimates due to the omitted variable problem. Therefore, I would recommend to control for further variables in the regression in order to enhance the inference.

Although the availability of data for Poland is strongly limited, a further weakness of the model arises from using interpolated data, which translates into half of the data being artificially generated and may in the end lead to incorrect t-values. An additional point worth mentioning concerns the estimate of the impact of the debt level. It fails to be significant, although it is only a linear transformation of the distance from the 55 per cent debt ratio. This might be unclear to the uninformed reader and should be elaborated on. A fundamental assumption made by OLS is that the relation between the independent and the dependent variables is linear. This assumption might be violated by non linearities, as the incentives could increase exponentially when approaching the 55 per cent debt-to-GDP threshold. A further point regarding the data used in the regression refers to the reliability of forecasts as the model uses forecasted data. Finally, taking the averages of fiscal measures required under EDP recommendations distorts the picture. To illustrate this, an adjustment of the deficit by 3 per cent within 3 years is treated in the same way as an adjustment of 1 per cent within one year. The authors should address this issue.

As the key difficulty arises from the limited data set for Poland I would recommend to use panel data analysis as a promising framework has already been developed in this paper and the data is available for eight and possibly further three countries. Exploiting data availability of other countries will provide further insights into the data structure and will carry the advantage of avoiding the usage of artificially generated data. This approach will also provide the possibility for creating a control group and open up avenues for obtaining further cross country patterns. Therefore, conclusions for Poland and other countries should be drawn based on robust results obtained by using a panel data regression framework.

STRENGTHENING POST-CRISIS FISCAL CREDIBILITY – FISCAL COUNCILS ON THE RISE. A NEW DATASET

Xavier Debrun[*] *and Tidiane Kinda*[*]

Institutions aimed at constraining policy discretion to promote sound fiscal policies are once again at the forefront of the policy debate. Interest in "fiscal councils", independent watchdogs active in the public debate, has grown rapidly in recent years. This paper presents the first cross-country dataset summarizing key characteristics of fiscal councils among IMF members. The data documents a surge in the number of fiscal councils since the crisis. It also illustrates that well-designed fiscal councils are associated with stronger fiscal performance and better macroeconomic and budgetary forecasts. Key features of effective fiscal councils include operational independence from politics, the provision or public assessment of budgetary forecasts, a strong presence in the public debate, and the monitoring of compliance with fiscal policy rules.

> *"A dependence on the people is, no doubt, the primary control on the government; but experience has taught mankind the necessity of auxiliary precautions."*
>
> (James Madison, 1788, cited by Acemoglu, Robinson and Torvik, 2013)

1 Introduction

The fiscal legacy of the 2008-9 economic and financial crisis has shaken the credibility of governments' commitment to sustainable public finances. While the most vulnerable countries have been facing the wrath of bond markets, others navigate at the fringe of "safe haven" territory, piggybacking on record-low borrowing costs allowed by unconventional monetary policies. Three ingredients have fueled the perfect storm threatening public budgets: a legacy of historically high public debts prior to the crisis, stimulus policies that have not yet paid for themselves by triggering a sustained recovery, and large cumulative revenue losses with respect to previously expected fiscal paths, compounding the already unsustainable growth in entitlement spending.

Against that backdrop, the uncertainty about future economic and financial trends puts an additional premium on *present* policymakers' capacity to provide clear directions for *future* fiscal policies. However, the pre-crisis track record of procyclicality in good times and delayed reforms, and the sheer magnitude of current challenges have seriously eroded public confidence.

In fiscal matters, the commitment problem is perennial, but its magnitude is unprecedented. James Madison's suggestion in the preamble quote that democratic accountability alone places insufficient constraints on governments has been echoed in many academic papers over the last three decades. Specifically, the time-inconsistency literature initiated by Kydland and Prescott (1977) explained how short-term gains could trap rational policymakers into a suboptimal course of

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Without implications in remaining errors or omissions, comments by Ali Abbas, Atilla Arda, Carlo Cottarelli, Tom Dowling, Julio Escolano, Martine Guerguil, Daniel Leigh, and Kazuko Shirono and participants in various seminars at the IMF and the 2014 Banca d'Italia Public Finance Workshop led to major improvements in the paper.

We are grateful to Petra Dacheva for superb research assistance and to Christian Krekel, Maximilian Podstawksi, and Rachel Wang for help with assembling the dataset.

action. Beyond time-inconsistency, a considerable political-economy literature also showed how the inherently distributive nature of fiscal policy – both across groups and over time – can motivate elected policymakers to opt for deficits and debts in excess of what the population actually wants. For instance, Feld and Kirchgassner (2001) observe that a higher degree of direct democracy seems associated with better fiscal outcomes, suggesting that policymakers' willingness to spend exceeds voters' demand for public goods and services. Debrun, Hauner and Kumar (2009) provide a survey on this matter. The difficulty to coordinate competing demands on a limited pool of public resources and the myopia affecting elected policymakers are two of the most common culprits for excessive debts and deficits.

The question then becomes: what type of "*auxiliary precautions*" can effectively constrain fiscal discretion?[1] Fiscal policy rules have historically been the institutional response of choice. Rules set explicit quantitative limits on relevant fiscal aggregates. Their effectiveness rests on the fact that budget plans or outcomes inconsistent with these limits entail some cost for the governments: pecuniary sanctions in the case of the EU Stability and Growth Pact, automatic and mandatory adjustments in the case of "debt brakes" (Switzerland and Germany), and reputational or electoral costs of missing a publicly announced target. Despite evidence that fiscal outcomes elaborated under the constraint of a fiscal rule have generally been better (see Debrun *et al.,* 2008), failures are not uncommon.[2] Rules are indeed vulnerable to three interdependent ills: the lack of underlying political commitment, an inadequate design, and weak enforcement.

More recently, proposals to replace "dead rules" by "living bodies", to borrow the language of Fatás *et al.* (2003), have emerged. The underlying idea is to "depoliticize" certain dimensions of fiscal policy in the same way as monetary policy was taken away from elected officials and delegated to independent experts. Many of these proposals revolve around the concept of an independent fiscal authority setting annual deficit or borrowing limits based on a clear mandate to devise a policy stance consistent with long-term debt sustainability and short-term macroeconomic stability (for instance Wyplosz, 2005).

However, strong normative and positive objections to the delegation of fiscal policy prerogatives (Alesina and Tabellini, 2007) drew attention on another class of independent fiscal institutions, labeled as fiscal councils. Unlike independent fiscal authorities, fiscal councils work mainly through influence and persuasion in the public debate. Experience in a handful of advanced economies suggests that these councils can influence the conduct of fiscal policy through independent analysis, assessments, forecasts, and possibly, recommendations. Prominent examples of fiscal councils include the Congressional Budget Office in the United States, the Central Planning Bureau in the Netherlands and the High Council of Finance in Belgium. More recently, fiscal councils have been created in Australia, Canada, France, Italy, South Africa, and the United Kingdom, among others. Unlike the above mentioned proposals of independent fiscal authorities, fiscal councils are not meant to substitute for failed rules; they can actually complement them. Debrun *et al.* (2013) provide a description of different models for fiscal councils and the rationale for these institutions.

This paper documents the recent surge of fiscal councils among IMF members and gathers some preliminary evidence on their effectiveness. First, the paper describes a new dataset compiling key characteristics and institutional features of existing councils. Second, the paper provides a first empirical pass at the data to explore potential determinants of effective fiscal councils. The results highlight key characteristics of fiscal councils (operational independence,

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[1] According to Acemoglu, Robinson and Torvik (2013), Madison had in mind more fundamental precautions such as the separation of power between the executive and the legislature, and the indirect election of the President through an electoral college. Our recent fiscal history points to the need to think beyond.

[2] The collapse of the first variant of the Stability and Growth Pact in November 2003 is a striking example.

forecasts provision or assessment, media presence, and fiscal rules monitoring) associated with stronger fiscal performance as well as more accurate and less biased macroeconomic and budgetary forecasts.

The rest of the paper is structured as follows. Section II briefly revisits the inherent credibility problem associated with fiscal rules and suggests how fiscal councils can alleviate the problem. Section III presents the new Fiscal Council Dataset and describes the main features of fiscal councils in place as of January 2013. Section IV draws from the new dataset to analyze the role of fiscal councils in fostering fiscal discipline. Section V concludes.

2 Fiscal councils and the credibility of fiscal rules

Interest in independent fiscal institutions grew out of the accumulating evidence that fiscal rules can fail. This section provides the simplest possible theoretical illustration of the inherent lack of credibility of fiscal policy rules (Debrun 2011). The discussion of the results suggests that a fiscal council can be used to generate sufficient electoral costs to deter violations of a fiscal rule and make it credible.

2.1 Fiscal rule and partisan deficit bias

Assume that identical private agents (voters) maximize a two-period, time-separable utility U which for the sake of the argument only includes public goods:

$$U(q) = E_0\left[\sum_{t=1}^{2} \beta^{t-1} v(q_t)\right] \tag{1}$$

where q denotes the per-capita consumption of public goods. E_0 symbolizes the expectations operator conditional on information available at the beginning of period 1 (time 0), and β is a subjective discount factor.

The political system is such that elected officials decide on public good provision. They belong to one of two political parties (C or L) indexed by Q. Preferences are identical across political parties and to those of the population, but officials only value public goods when in office (Alesina and Tabellini, 1990). These assumptions avoid the needless complexity of a partisan cycle in the conduct of fiscal policy, leading to a simple and well-defined deficit bias:

$$U_Q(q) = E_0\left[\sum_{t=1}^{2} \beta^{t-1} \rho^{t-1} v_Q(q_t)\right]; \; Q = C, L \; ; \; 0 \le \rho \le 1 \tag{2}$$

with $v_C(q_t) = 0$ if party L is in office, and $v_L(q_t) = 0$ if party C is in office. Elections with uncertain outcome take place at the end of period 1, and the parameter ρ^{t-1} captures the probability of the incumbent party to be in office at period t.

The intertemporal budget constraint of the government determines the amount of public goods (per capita) delivered in each period:

$$q_1 = \tau y + b - \delta_1 \tag{3a}$$

$$q_2 = \tau y - Rb - \delta_2, \tag{3b}$$

with τ denoting a constant proportional income tax rate, *R*, the interest factor, and *b* the overall deficit at the end of period 1 (or equivalently, the principal of the debt to be repaid in period 2). The budget constraints are subject to random shocks affecting government efficiency. At each period $t = 1, 2$, for a given amount of resources (tax revenue and borrowing), a positive realization of δ_t negatively affects public good delivery. Concretely, this could capture resource diversion by corrupt civil servants, the effect of poor administrative capacities, or unforeseeable policy mistakes. Of course, good surprises can also occur (more public goods being delivered with the same budgetary envelope). Hence, the shocks are non-serially correlated with zero mean and finite variance: $\delta_t \sim N(0, \sigma_\delta^2)$.

The socially-optimal solution results from direct maximization of the representative citizen's utility (1) by a benevolent "social planner". To economize on notation, we set $\beta = R = 1$ (discount and real interest rates are equal to zero) and assume quadratic utility functions $v(x) = -(x - \tilde{x})^2$. Decision-makers dislike deviations from pre-determined objectives denoted by a tilde. The Euler equation under the social planner thus yields a balanced budget:

$$q_1^* = q_2^* \Rightarrow b^* = 0 \tag{4}$$

However, the political equilibrium will feature a "partisan" *deficit bias*[3] if elected officials are uncertain about re-election. Indeed, any $\rho < 1$ causes policymakers' myopia in the sense that they discount future outcomes at a higher rate than the representative agent. In a population of identical individuals, electoral uncertainty can be rationalized by assuming informational asymetries between voters and policymakers. Specifically, one could think about voters unable to observe whether a given policy slippage δ reflects an intrinsic lack of competence of the elected policymaker or an exogenous event outside her control. The shocks affecting public good delivery can thus lead voters to punish competent officials or re-elect (reward) undeserving individuals, hence the uncertainty facing the politician.

Formally, the optimal budget deficit in the political equilibrium, denoted by a ** superscript is expressed as:[4]

$$b^{**} = \left[\frac{1-\rho}{1+\rho}\right]\tilde{b}, \text{ with } \tilde{b} = \tilde{q} - \tau y \tag{5}$$

Certainty about election outcomes defines two boundary cases. Certain re-election ($\rho = 1$) eliminates myopia, leading party C officials to opt for a balanced budget: $b^{**}\big|_{\rho=1} = 0 = b^*$. By contrast, certain defeat leads to blindness so that party C is not bound by the intertemporal budget constraint and chooses a level of public spending consistent with the expected delivery of $\tilde{q}$ in period 1. The corresponding budget deficit is $b^{**}\big|_{\rho=0} = \tilde{b}$. All other solutions fall in the $[0, \tilde{b}]$

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[3] The term deficit bias means that a utility-maximizing policymaker delivers a fiscal balance that is systematically weaker than if a representative agent was directly in charge of fiscal policy.

[4] The sequence of moves implicit to the equilibrium is the following. First, "Nature" draws the governing party (C by assumption here). Then party C officials prepare a budget setting the deficit for period 1, and by extension, the expected time path of public consumption over the two periods. Third, an efficiency shock materializes during period 1, and finally, elections take place. In period 2, the world ends after all debts have been paid off, and a new shock occurred. Applying backward-induction excludes time inconsistency.

interval. Myopic policymakers generate a deficit bias only if $\tilde{b} > 0$, which requires that the appetite for delivering public goods (parametrized by $\tilde{q}$) exceeds available tax money. This condition simply embodies the *common pool* problem inherent to budgetary decisions so that $b^{**} > b^{*}$.

A seemingly straightforward solution to the deficit bias could be a balanced-budget rule. Of course, a government will only comply with that rule if the supporting institutional arrangements make violations costly in utility terms. The costs can be merely reputational or result from a formal enforcement procedure with explicit sanctions (see Beetsma and Debrun, 2007). Under a fiscal rule, the "constrained" utility of the elected official would be:

$$V_C = U_C - f\left(b - b^{*}\right) \tag{6}$$

where *f* is a constant marginal cost of deviations from the deficit limit. The effectiveness of the fiscal rule arises form the fact that the policymaker now has to maximize V_C instead of U_C. It is easy to show that setting $f^{*} = (1-\rho)\tilde{b}$ implements b^{*} in the political equilibrium ($b^{**} = b^{*}$). That socially optimal rule suggests that countries where political instability and the appetite for public spending are higher require legal provisions that ensure higher costs for non-compliance.

A natural question is whether an elected government can realistically establish such a rule in the first place.[5] Indeed, absent delegation to an independent fiscal authority, the fiscal rule is essentially a contract of the government with itself. In fact, it is straightforward to establish that the rule (f^{*}, b^{*}) is not incentive-compatible for politicians as $E_0 V_C\left(q^{*}\right) < E_0 U_C\left(q^{**}\right)$. Hence, even if policymakers were to inherit the rule from benevolent founding fathers, they would have an incentive to flout it. Thus the rule itself lacks credibility, which explains in part why these arrangements periodically fail.

2.2 Introducing a fiscal council

The main lesson from the above illustration is that any mechanism aimed at directly constraining fiscal discretion is bound to be resisted by policymakers and therefore, at a high risk of being weakened or dismantled as soon as the opportunity arises. So how could a fiscal council change this game?

In our simple story of deficit bias, the only credible way a fiscal council could help is by alleviating informational asymmetries at the root of the deficit bias (Debrun, 2011). Specifically, by providing an objective analysis of fiscal performance, the council could help voters assess whether observable outcomes – in terms of public good delivery – are the result of either pure luck or competent policy making. Making that distinction would allow voters to adequately re-elect competent incumbents and send incompetent ones home. If the adherence to the fiscal rule is broadly perceived as the optimal policy (and the rule (f^{*}, b^{*}) is socially optimal), the objective assessment of compliance by a fiscal council can eliminate electoral uncertainty. With compliance being rewarded by certain re-election, the socially optimal policy would become incentive-compatible for the politician.

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[5] This argument is analogous to McCallum's (1995) second fallacy of central bank independence, stating that if governments have the discretion to set up an independent central bank with the right incentives, they also have the discretion to revert to a dependent central bank with inadequate incentives. Jensen (1997) formally demonstrates in the Barro-Gordon-Rogoff framework that delegation does not matter if the no-renegotiation assumption is lifted.

In sum, a well-functioning fiscal council should become the main source of information on the underlying quality of fiscal policy, allowing voters to reward good policies. Placing such a considerable amount of trust in a fiscal council would require important features to be in place to facilitate its work. These features include guarantees of independence from partisan influence, an active presence in the public debate on fiscal issues, technical contributions in the implementation of fiscal policy such as the provision or assessment of official forecasts, the monitoring of fiscal policy rules, or the costing of policy measures, and a clear definition of the policy objectives under the council's scrutiny (e.g., fiscal sustainability).

3 Fiscal councils on the rise

3.1 The fiscal council dataset

The lack of empirical evidence on the effectiveness of fiscal councils reflects both the small size of the population and the absence of comparative datasets beyond European Union member states. This paper addresses the second issue by collecting data on the most relevant dimensions of fiscal councils among IMF members.

The following definition has been used to identify fiscal councils (Debrun *et al.*, 2013): "*A fiscal council is a permanent agency with a statutory or executive mandate to assess publicly and independently from partisan influence government's fiscal policies, plans and performance against macroeconomic objectives related to the long-term sustainability of public finances, short-medium-term macroeconomic stability, and other official objectives. In addition, a fiscal council can also: (i) contribute to the use of unbiased macroeconomic and budgetary forecasts in budget preparation, (ii) facilitate the implementation of fiscal policy rules, (iii) cost new policy initiatives, and (iv) identify sensible fiscal policy options, and possibly, formulate recommendations".*

The Fiscal Council Dataset covers existing fiscal councils as well as councils for which the primary legislative texts had been adopted as of end-January 2013. The dataset used a variety of sources, including fiscal responsibility laws, fiscal councils' websites, IMF country papers, and in some cases, country authorities. The dataset also benefited from inputs by IMF desk economists. For EU and OECD member states, the dataset drew from the European Commission database on independent fiscal institutions, and the background country notes used by the OECD to prepare their draft Principles for independent fiscal institutions. Table 1 lists the fiscal councils covered by the dataset.

The fiscal council dataset includes general information such as the names and acronyms of the council and its date of creation. It also includes key institutional characteristics such as the existence of formal guarantees of independence, accountability requirements, and human and financial resources. Fiscal councils' remit, their specific tasks and the instruments at their disposal to influence the conduct of fiscal policy are also present in the dataset. Most variables in the dataset are binary (Box 1).

3.2 Fiscal councils: main trends and features

The number of fiscal councils has increased rapidly. From only one in 1960 – the Netherlands Bureau for Economic Policy Analysis, also known as the Central Planning Bureau – the number of councils has surged since the 2008-09 crisis, reaching 29 by the end of January 2013

Table 1

List of Fiscal Councils in the Dataset

Country	Fiscal Council	Start of Activity
Australia	Parliamentary Budget Office	2012
Austria	Government Debt Committee	2002
Belgium	High Council of Finance - Section "Public Sector Borrowing Requirement"	1989
Belgium	Federal Planning Bureau	1994
Canada	Parliamentary Budget Office	2008
Croatia	Fiscal Policy Council	2013
Denmark	Danish Economic Council	1962
Finland	National Audit Office of Finland	2013
France	High Council of Public Finance	2013
Georgia	Parliamentary Budget Office	1997
Germany	German Council of Economic Experts	1963
Hungary	Fiscal Council	2009
Ireland	Irish Fiscal Advisory Council	2011
Italy[1]	Parliamentary Budget Office	2014
Japan	Fiscal System Council	1950
Kenya	Parliamentary Budget Office	2009
Mexico	Center for Public Finance Studies	1999
Netherlands	Netherlands Bureau for Economic Policy Analysis	1945
Portugal	Portuguese Public Finance Council	2012
Romania	Fiscal Council	2010
Serbia	Fiscal Council	2011
Slovak Republic	Council for Budget Responsibility	2011
Slovenia	Institute of Macroeconomic Analysis and Development	1991
Slovenia[2]	Fiscal Council	2009
South Africa[1]	Parliamentary Budget Office	2014
South Korea	National Assembly Budget Office	2003
Sweden	Swedish Fiscal Policy Council	2007
United Kingdom	Office for Budget Responsibility	2010
United States	Congressional Budget Office	1974

[1] The South African and Italian PBOs are being established and expected to be fully operational by the end of 2014.
[2] The fiscal council in Slovenia has been formally established but it is not yet fully operational.
Chile has established a Fiscal Advisory Council in April 2013.

BOX 1
FISCAL COUNCIL DATASET: VARIABLES DESCRIPTION

Independence and governance:

Legal independence: The council's independence from political interference is guaranteed by law or treaty (Yes: 1, No: 0).

Safeguards on budget: Safeguards on the council's budget are deemed to exist if the budget is (i) set by the central bank, (ii) part of the overall budget of the legislative branch (i.e. protected from executive decisions), (iii) guaranteed by budget appropriations with separate line item in the budget, or (iv) subject to any other guarantee commonly granted to independent institutions, such as regulators.

Composition, appointment, and term of high-level staff: Various variables indicate whether or not (Yes: 1, No: 0) the high level staff of the council includes (i) non citizens, (ii) academics, (iii) policy experts, and (iv) civil servants. Three variables also indicate whether or not (Yes: 1, No: 0) the council high-level staff is appointed by (i) the government, (ii) the parliament, or other institutions (head of state or other independent institution). An additional variable captures the length of council members' terms (in years).

Size of the council: Number of technical and administrative staff; number of management and high level staff.

Staff commensurate to tasks: Assessment of the ability to fulfill the tasks specified in the mandate qualitatively and quantitatively (Yes: 1, No: 0).

Remit of fiscal councils:

Forecasts provision/assessment: The council is mandated to provide or assess macroeconomic forecasts used for budgetary projections (Yes: 1, No: 0).

Monitoring of Fiscal rules: The council is mandated to monitor compliance with numerical fiscal rules (Yes: 1, No: 0).

Costing of measures: The council is mandated to provide costing of measures and reforms affecting public finances (Yes: 1, No: 0).

Long-term sustainability analysis: The council evaluates long-term sustainability issues (Yes: 1, No: 0).

Positive analysis: The council performs positive analyses (Yes: 1, No: 0).

Normative analysis or recommendations: The council performs normative analysis or provides recommendations (Yes: 1, No: 0).

Tasks and Channels of Influence

Public reports: The council prepares public reports on its activities (Yes: 1, No: 0).

High media impact: This variable reflects IMF staff assessment based in the number of publications, media references to these reports, and in the case of EU members, the authorities own assessment reflected in the Fiscal Institutions Database (Yes: 1, No: 0).

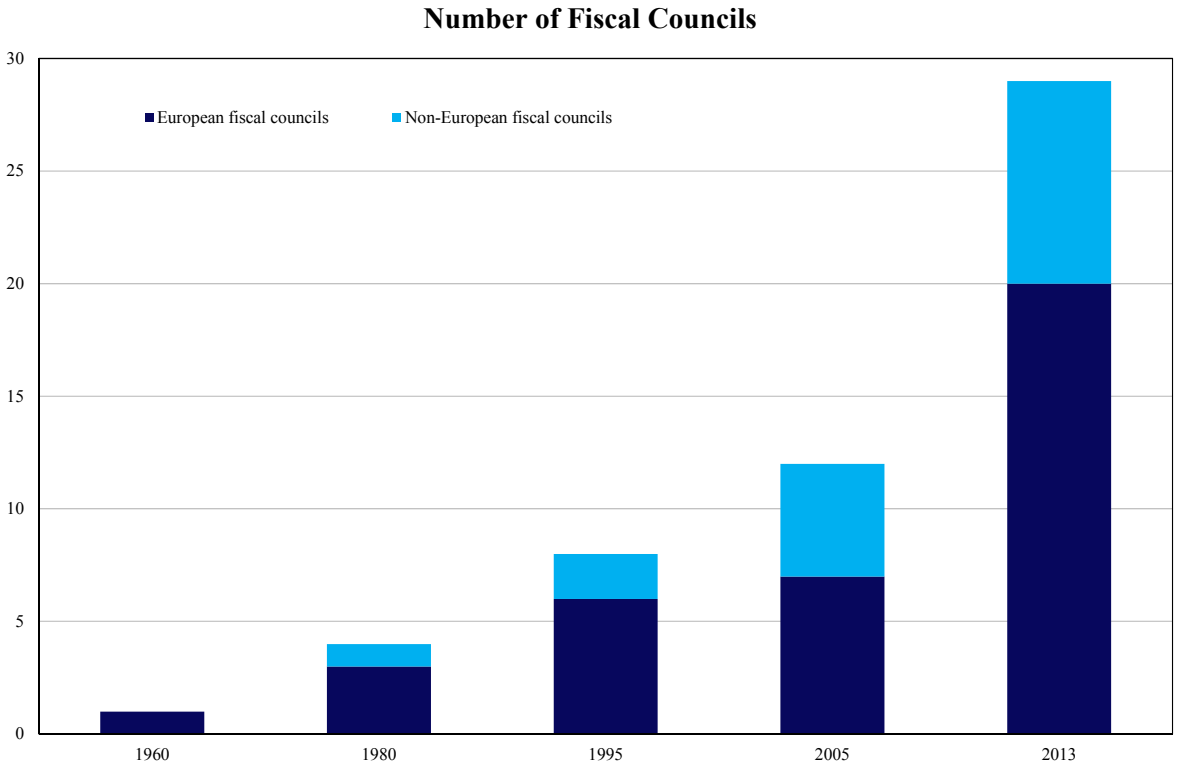
Binding forecasts: The council provides binding forecasts for the budget (Yes: 1, No: 0).

Formal consultation or hearings: Formal obligation of the government to consult and/or of the parliament to audition the fiscal council during the budget process (Yes: 1, No: 0).

Stall the budget process: The council has the legal mandate to stall the budget process (Yes: 1, No: 0).

Comply or explain: Legal or constitutional obligation to use the forecasts of the fiscal council, or the freedom of the government to use its own forecasts with the obligation to justify deviations from the forecasts of the fiscal council publicly (Yes: 1, No: 0).

Figure 1



Source: IMF Fiscal Council Dataset.

(Figure 1).[6] New fiscal councils include the Parliamentary Budget Office in Canada and South Africa, the Office for Budget Responsibility in the United Kingdom, and the High Council of Public Finance in France. Although most of established fiscal councils are in advanced economies, particularly in Europe, there is growing interest in emerging markets and developing economies.[7] This increasing interest in fiscal councils is likely to continue, particularly in Europe, where new legal requirements mandate most European Union member states to establish national independent bodies to monitor compliance with fiscal rules and produce or at least assess or validate macroeconomic and budgetary forecasts.

The design of each council ultimately reflects country-specific characteristics, such as available human and financial capacities, political traditions, and the causes for excessive deficits and debts. Fiscal councils therefore vary in terms of institutional models, remits, and tasks although all of them share the ultimate objective of promoting sound fiscal policies through independent oversight.

The dataset shows the considerable diversity of institutional models. Most of these institutions (90 percent) are attached to the legislature (parliamentary budget office), the executive, or set-up as stand-alone bodies (Figure 2). Parliamentary budget offices have historically emerged in presidential political systems (United States and Korea), but have more recently spread to a great

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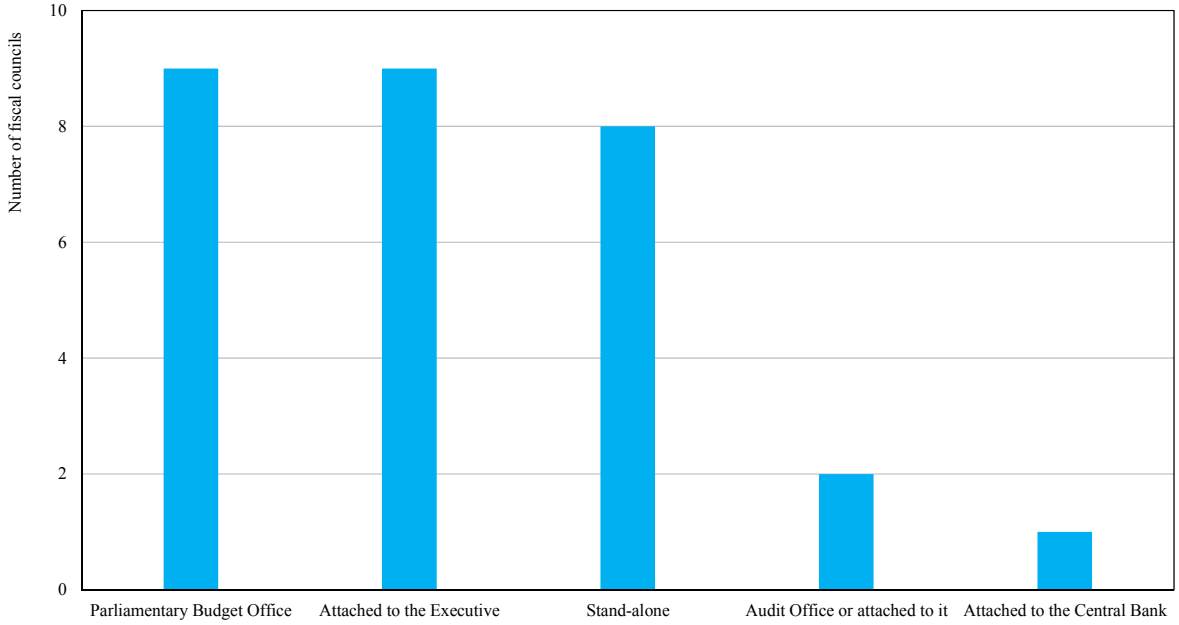
[6] The Spanish Congress approved on October 10, 2013 the draft bill of the Constitutional Law creating the Independent Fiscal Responsibility Authority along with amendments to this law on October 30.

[7] Chile has formally established a new fiscal council in June 2013.

Figure 2

Institutional Models of Fiscal Councils



Source: IMF Fiscal Council Dataset.

variety of advanced and developing countries (Australia, Canada, Italy, Georgia, Kenya, Mexico, and South Africa). Similar variety can be observed for fiscal councils attached to the executive (in Belgium, Croatia, Denmark, Japan, Netherlands, Slovenia, and the United Kingdom). Stand-alone fiscal councils are the closest to the model suggested in the academic literature and are also present a wide variety of countries (Germany, Hungary, Ireland, Portugal, Romania, Serbia, Slovak Republic, and Sweden). Only two countries (France and Finland) have their fiscal councils attached to the supreme audit institution.[8]

With respect to their remits, all existing councils perform positive analyses while the vast majority of them evaluates long-term sustainability issues and provides or assesses macroeconomic forecasts (Table 2). Less common but growing responsibilities among recently established council include the monitoring of compliance with fiscal policy rules and the costing of policy measures. Councils established in Romania (2010), Ireland (2011), Serbia (2011), Slovak Republic (2011), and Italy (2014) are explicitly tasked to monitor compliance with numerical rules and cost new policy initiatives.

The majority of fiscal councils benefit from legal protections against partisanship when fulfilling their mandate (Table 3). However, less than half of the councils have their budget protected from arbitrary cuts that could undermine their ability to fulfill their mandates. Safeguards on budget are more common among older councils such as the Danish Economic Council, the German Council of Economic Expert, the Mexican Center for Public Finance Studies, and the Congressional Budget Office in the US. Guarantees on the fiscal council's resources range from having a separate budget line subject to vote in Parliament, to multi-year appropriations.

[8] The audit office actually performs the task of the council in Finland.

Table 2

Fiscal Councils' Remits

Country	Fiscal Council	Positive Analysis	Long-term Sustainability	Forecast Preparation or Assessment	Normative Analysis or Recommendations	Monitoring of Fiscal Rules	Costing of Measures
Australia	Parliamentary Budget Office	X	X	X			X
Austria	Government Debt Committee	X	X		X	X	
Belgium	High Council of Finance	X	X		X	X	
Belgium	Federal Planning Bureau	X	X	X			
Canada	Parliamentary Budget Office	X	X	X	X		X
Croatia	Fiscal Policy Council	X	X	X		X	
Denmark	Danish Economic Council	X	X	X	X	X	
Finland	National Audit Office of Finland	X	X	X	X	X	
France	High Council of Public Finance	X		X	X	X	
Georgia	Parliamentary Budget Office	X		X	X		
Germany	German Council of Economic Experts	X	X	X	X		
Hungary	Fiscal Council	X		X		X	
Ireland	Irish Fiscal Advisory Council	X	X	X	X	X	X
Italy[1]	Parliamentary Budget Office	X	X	X	X	X	X
Japan	Fiscal System Council	X			X		
Kenya	Parliamentary Budget Office	X		X			
Mexico	Center for Public Finance Studies	X		X			X
Netherlands	Netherlands Bureau for Economic Policy Analysis	X	X	X		X	X
Portugal	Portuguese Public Finance Council	X	X	X	X	X	
Romania	Fiscal Council	X	X	X	X	X	X
Serbia	Fiscal Council	X	X	X	X	X	X
Slovak Republic	Council for Budget Responsibility	X	X			X	X
Slovenia	Institute of Macroeconomic Analysis and Development	X	X	X			
Slovenia	Fiscal Council	X	X			X	
South Africa[1]	Parliamentary Budget Office	X			X		X
South Korea	National Assembly Budget Office	X	X	X			X
Sweden	Swedish Fiscal Policy Council	X	X		X	X	
United Kingdom	Office for Budget Responsibility	X	X	X		X	X
United States	Congressional Budget Office	X	X	X			X

Source: IMF Fiscal Council Dataset. Coverage varies with data availability.

Table 3

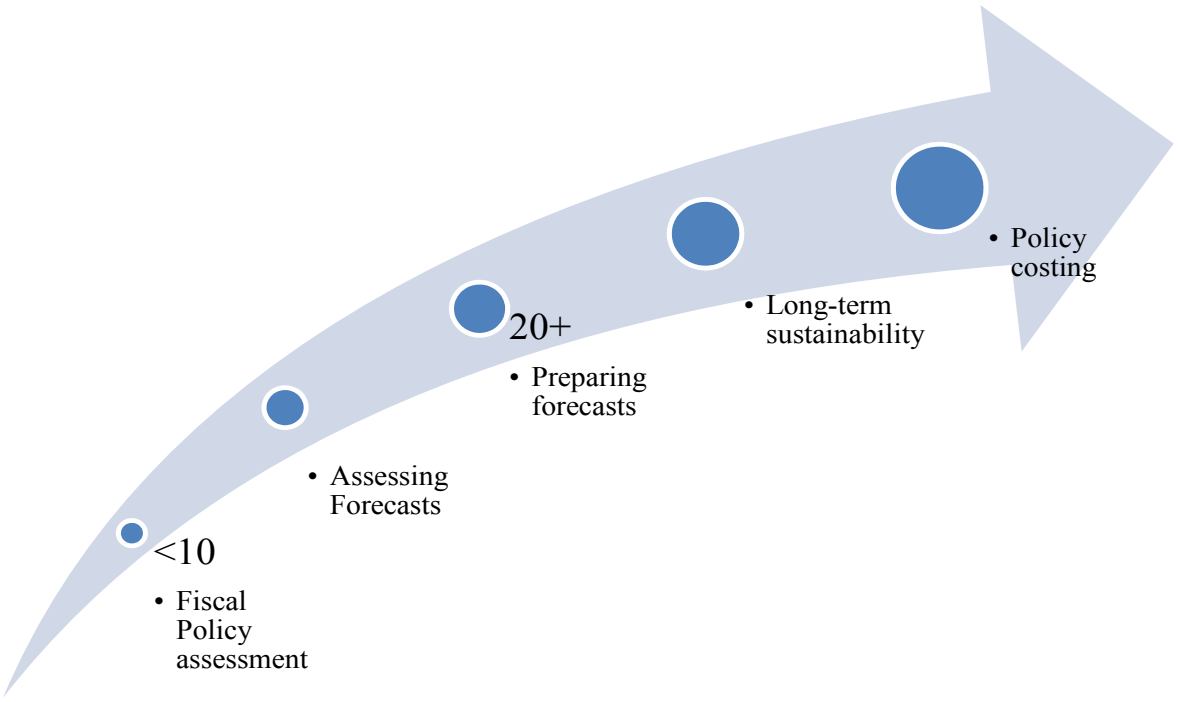
Fiscal Councils' Independence and Tasks

Country	Fiscal Council	Legal Independence	Safeguards on Budget	Public Reports	High Media Impact	Binding Forecasts	Comply or Explain	Formal Consultation or Hearings
Australia	Parliamentary Budget Office	X		X				
Austria	Government Debt Committee	X	X	X	X			
Belgium	High Council of Finance			X			X	
Belgium	Federal Planning Bureau	X		X	X	X		
Canada	Parliamentary Budget Office	X	X	X	X			
Croatia	Fiscal Policy Council	X		X				
Denmark	Danish Economic Council	X	X	X	X			
Finland	National Audit Office of Finland	X		X				X
France	High Council of Public Finance	X		X				X
Georgia	Parliamentary Budget Office		X	X				X
Germany	German Council of Economic Experts	X	X	X	X		X	
Hungary	Fiscal Council	X		X	X			X
Ireland	Irish Fiscal Advisory Council	X		X	X			
Italy[1]	Parliamentary Budget Office	X		X				X
Japan	Fiscal System Council			X				
Kenya	Parliamentary Budget Office			X	X			
Mexico	Center for Public Finance Studies		X	X	X			X
Netherlands	Netherlands Bureau for Economic Policy Analysis			X	X	X		
Portugal	Portuguese Public Finance Council	X	X	X	X			X
Romania	Fiscal Council	X	X	X	X			X
Serbia	Fiscal Council	X		X	X			X
Slovak Republic	Council for Budget Responsibility	X	X	X	X			
Slovenia	Institute of Macroeconomic Analysis and Development	X		X	X	X		
Slovenia	Fiscal Council	X		X				
South Africa[1]	Parliamentary Budget Office		X	X				
South Korea	National Assembly Budget Office	X	X	X	X			
Sweden	Swedish Fiscal Policy Council	X		X	X			
United Kingdom	Office for Budget Responsibility	X		X	X		X	X
United States	Congressional Budget Office	X	X	X	X			

Source: IMF Fiscal Council Dataset. Coverage varies with data availability.

Figure 3

Remits and Number of Technical Staff (FTE) in Fiscal Councils



Source: IMF Fiscal Council Dataset.

Unlike central banks, fiscal councils do not directly control policy instruments. They influence the conduct of fiscal policy mostly indirectly through the public debate, and only rarely through direct action in the budget process. All fiscal councils prepare public reports that often have a significant media impact (Table 3). This is an essential vehicle for the reputational impact that their work is expected to have on policymakers. Direct involvement in the form of providing forecasts that are either binding or linked to a "comply or explain" clause is rare. However, a sizeable number of new fiscal councils hold formal consultations with the government or hearings in Parliament on a regular basis, which gives them more direct access to decision makers. This is the case in countries such as Finland, France, Georgia, Italy, Romania, and Serbia.

Fiscal councils' size can vary greatly depending on their remits, the complexity of the government system, and the availability of human and financial resources. The dataset suggests that small councils tend to have narrower remits than larger ones (Figure 3 and Table 4), although there remains significant heterogeneity in size even among institutions with similar mandates. Small fiscal councils (less than 10 full-time professionals) are often tasked with the assessment of fiscal policy (e.g., Finland, Ireland, and Slovenia) while much larger councils usually combine different functions including forecast preparation, long-term sustainability analyses, and the costing of policy measures (e.g., Netherland, South Korea, and the United States). Most of councils' staffs are academics, policy experts, and civil servants but a growing share of councils are welcoming foreign experts in their senior management, increasing the perception of independence from local politics and allowing access a greater pool of talents.

Table 4

Fiscal Councils' Size and Composition

Country	Fiscal Council	Size		Length of Contract in Years (Management)	Possibility of Non-Citizenship (Management)	Composition			
		Management	Technical and Administrative			Academics	Policy Experts	Politicians	Civil Servants
Australia	Parliamentary Budget Office	1	1	5	X		X		X
Austria	Government Debt Committee	15	3	6		X	X		X
Belgium	High Council of Finance	27	14	5		X			X
Belgium	Federal Planning Bureau	2	90	9			X		
Canada	Parliamentary Budget Office	1	15	5			X		X
Croatia	Fiscal Policy Council	7	0	5		X	X		X
Denmark	Danish Economic Council	25	30	6	X	X			
Finland	National Audit Office of Finland	7				X	X		
France	High Council of Public Finance	11		5			X		X
Georgia	Parliamentary Budget Office	10	1						X
Germany	German Council of Economic Experts	5	20	5	X	X			
Hungary	Fiscal Council	3	4	6		X	X		
Ireland	Irish Fiscal Advisory Council	5	3	4	X	X	X		
Italy[1]	Parliamentary Budget Office	5		6					X

Country	Fiscal Council	Size		Length of Contract in Years (Management)	Possibility of Non-Citizenship (Management)	Composition			
		Management	Technical and Administrative			Academics	Policy Experts	Politicians	Civil Servants
Japan	Fiscal System Council			2	X	X	X		
Kenya	Parliamentary Budget Office								
Mexico	Center for Public Finance Studies	6	32			X	X		X
Netherlands	Netherlands Bureau for Economic Policy Analysis	3	117	7	X	X	X		X
Portugal	Portuguese Public Finance Council	7	15	7	X	X	X		X
Romania	Fiscal Council	5	6	9		X	X		
Serbia	Fiscal Council	3	4	6		X	X		
Slovak Republic	Council for Budget Responsibility	3	18	7	X	X	X		X
Slovenia	Institute of Macroeconomic Analysis and Development	3	65	5	X		X		X
Slovenia	Fiscal Council	7	0	5	X	X	X		
South Africa[1]	Parliamentary Budget Office	12							
South Korea	National Assembly Budget Office	1	125	2	X	X	X		X
Sweden	Swedish Fiscal Policy Council	6	6	3	X	X	X		
United Kingdom	Office for Budget Responsibility	4	17	5	X	X	X		
United States	Congressional Budget Office	1	250	4		X	X		X

Source: IMF Fiscal Council Dataset. Coverage varies with data availability.

4 The effectiveness of fiscal institutions: New evidence from novel datasets

This section reassesses and expands the empirical evidence on the effectiveness of fiscal institutions in light of the information collected in the new dataset. As the number of observations remains limited, this exercise should be seen as a first pass aimed at unveiling broad trends and significant correlations. Since fiscal councils and fiscal rules often coexist (Debrun *et al.,* 2013), it is important to explore their impact jointly. For that purpose, we will use the IMF dataset on fiscal rules, which also covers the entire IMF membership (Schaechter *et al.*, 2012).

4.1 What do we know?

Attempts to analyze the impact of fiscal institutions on fiscal performance have mostly concerned fiscal rules only and been limited to specific regions (Europe, Latin America) or subnational entities within federations (See for instance Alesina and Bayoumi (1996) for the United States, Alesina and Perotti (1999) for the OECD, and Schmidt-Hebbel (2012) for resource-rich countries). Recently, the most comprehensive studies have focused on national fiscal rules in European Union member states (Debrun and Kumar, 2007; Debrun *et al.,* 2008; Deroose, Moulin, and Wierts, 2006; European Commission, 2006). These studies use information on national fiscal rules compiled by the European Commission and summarized in fiscal rule indexes to highlight that national fiscal rules have been generally associated with improved fiscal performance.

Empirical evidence on the impact of fiscal councils on fiscal performance is very limited. Hagemann (2011) surveyed a few country-specific case studies (Belgium, Chile, Hungary, and United Kingdom) that compare fiscal performance indicators before and after the establishment of a fiscal council. Some of these analyses suggest that fiscal councils contributed to improve fiscal performance (Lebrun, 2006; Coene, 2010). The European Commission (2006) illustrates the effectiveness of fiscal councils on fiscal performance by combining answers to its questionnaire with a literature survey and descriptive statistics. Only Debrun and Kumar (2007) provide cross-country evidence on the impact of fiscal councils fiscal discipline in mature EU countries (EU-15 excluding Luxembourg). They used survey data from the EC to assess the impact of fiscal institutions (fiscal rules and fiscal councils) on fiscal performance. They found that fiscal rules were associated with stronger fiscal performance and that fiscal councils could impact fiscal outcomes through the operation of numerical rules.

4.2 Institutions and fiscal discipline: New evidence

To analyze the potential impact of fiscal institutions on fiscal discipline, we will rely on two indicators to capture fiscal discipline: fiscal performance measured by the primary balance, and the quality of budgetary forecasts.

4.2.1 Fiscal institutions and fiscal performance

The empirical analysis builds on a cross-country panel data covering 58 advanced and emerging countries over the period 1990-2011. About half of the countries in the sample established a council during the period of analysis. The estimated model is the standard fiscal "reaction function" proposed by Bohn (1998). It explains the primary balance (PB) by its own lagged value (to allow for persistence), the lagged gross debt (to capture long-term solvency constraint), and control variables (X_k) including the output gap (to control for the cyclicality of fiscal policy).

For the purpose of our exercise, the basic regression model is augmented with a fiscal rule index (FR) that captures the comprehensiveness of numerical fiscal rules and a dummy variable indicating the existence of a fiscal council (FC).[9] The dummy for fiscal council is subsequently replaced by specific characteristics of the councils such as independence, forecast assessment, etc. The empirical results focus on statistically significant characteristics of fiscal councils, which were also identified as critical in the theoretical discussion (Section II.B).

$$PB_{i,t} = \gamma PB_{i,t-1} + \sum_k \beta_k X_{k,i,t} + \theta DEBT_{i,t-1} + \vartheta FR_{i,t} + \varphi FC_{i,t} + \mu_i + \delta_t + \varepsilon_{i,t} \qquad (7)$$

where i and t represent countries and years respectively. μ_i represents country fixed effects, δ_t are time dummies, and $\varepsilon_{i,t}$ is the error term. Because the number of observations (N) is large and the time dimension (T) is finite in our dynamic specification, standard estimation techniques such as least squares dummy variable estimators are not consistent. The bias-corrected Least Square Dummy Variable (LSDVC) dynamic panel estimator suggested by Bruno (2005) is therefore preferred as it approximates the bias inherent to dynamic unbalanced panels and constructs a consistent estimator.

The results show that countries with better designed fiscal rules exhibit stronger fiscal performance (Table 5). This result is consistent with Debrun and others (2008) who found a statistically significant, robust, and causal relationship between their fiscal rule index and the cyclically-adjusted primary balance using a much smaller sample of European Union countries.

The results also suggest that the mere existence of fiscal councils is not by itself conducive to stronger fiscal balances. Interestingly, it is only by focusing on certain characteristics of fiscal councils that a significantly positive association arises (Table 5). This comes in addition to the positive relation between fiscal rules and fiscal performance. This suggests that fiscal councils exhibiting certain features could complement and add to the discipline-enhancing role of numerical fiscal rules. Important features of effective fiscal councils are:

- *Independence*: Countries with independent fiscal councils, either with legal guarantees through legislations or with operational guarantees through adequate human resources, have on average better fiscal outcomes.
- *Fiscal rule monitoring*: Fiscal councils evolving within a clear fiscal framework, with a numerical fiscal rule that they monitor, are associated with higher fiscal performance. This result illustrates the potential impact of fiscal councils when the fiscal framework, particularly fiscal targets and objectives, are clearly defined through numerical rules. The existence of numerical fiscal rules could indeed facilitate the task of the fiscal council by providing a simple and transparent benchmark to assess fiscal performance. More broadly, this points a complementarity between rules and councils.
- *Forecasts production/assessment*: More technical contributions from fiscal councils such as the assessment of official forecasts or the costing of governments' measures are also associated with better fiscal outcomes. These inputs to the budget process could be instrumental in reducing the deficit and procyclicality biases that often impact discretionary fiscal policy. This result is arguably linked to the previous one, as overoptimistic forecasts are often a way for governments to escape from the constraints imposed by numerical fiscal rules (Frankel and Schreger, 2012). Although this only increases *ex ante* compliance with the numerical targets, the cost of non-compliance *ex post* is generally low given the weak enforcement mechanism characterizing many fiscal rules.

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[9] The fiscal rule index captures the comprehensiveness of numerical rules by aggregating the average number of rules and their key features of such as coverage, legal basis, and formal enforcement procedure. See Schaechter *et al.* (2012) for details on the methodology to construct the fiscal rules index.

Table 5

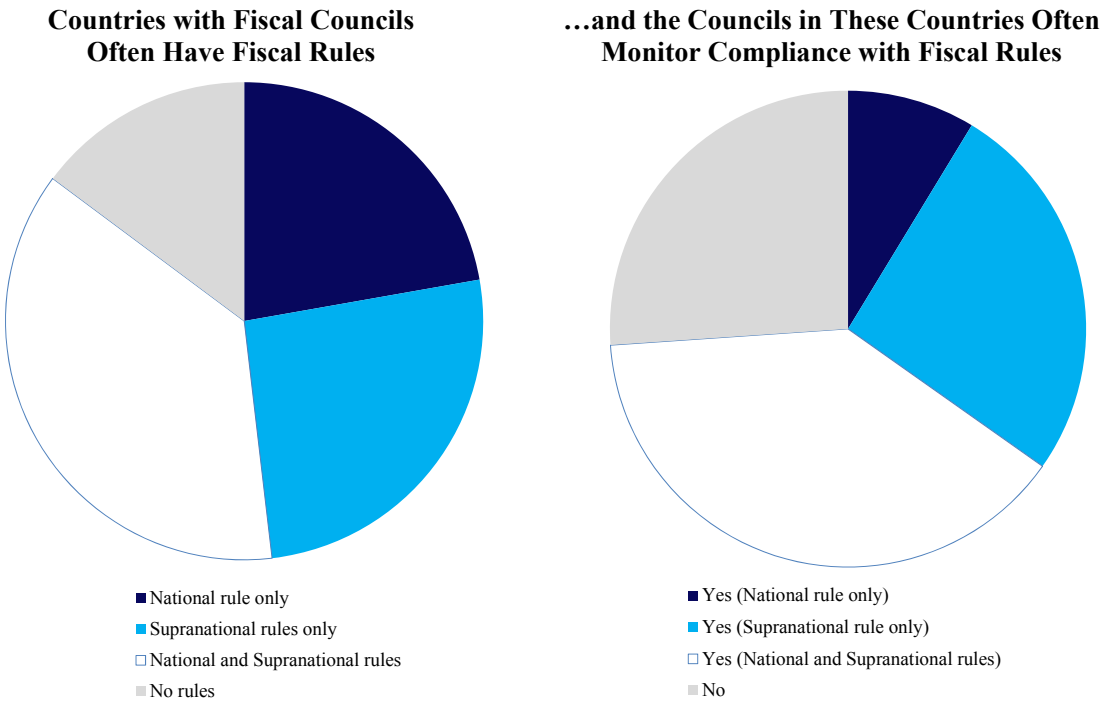
Fiscal Councils and Fiscal Performance – Bias Corrected LSDV Dynamic Panel Model
(dependent variable: primary balance, percent of GDP)

Primary Balance (t–1)	0.823 *(27.07)***	0.824 *(26.84)***	0.821 *(26.53)***	0.821 *(24.03)***	0.826 *(26.96)***	0.826 *(27.49)***	0.826 *(28.07)***	0.824 *(27.13)***
Debt (t–1)	0.015 *(2.92)***	0.017 *(3.37)***	0.016 *(3.24)***	0.023 *(3.69)***	0.016 *(3.24)***	0.016 *(3.14)***	0.016 *(3.31)***	0.017 *(3.40)***
Output Gap (t–1)	–0.095 *(3.05)***	–0.094 *(3.03)***	–0.096 *(3.09)***	–0.091 *(2.40)**	–0.098 *(3.17)***	–0.095 *(3.06)***	–0.092 *(2.98)***	–0.093 *(2.99)***
Fiscal Rules Index (FRI)	0.277 *(2.62)***	0.275 *(2.59)***	0.283 *(2.66)***	0.249 *(2.26)**	0.232 *(2.27)**	0.289 *(2.73)***	0.295 *(2.79)***	0.280 *(2.65)***
Fiscal Council	0.543 *(1.42)*							
Legal indep.		0.930 *(2.38)**						
Safeg. on budget			0.386 *(0.71)*					
Staff number (High level)				0.296 *(2.34)**				
Fiscal rule monitoring					1.524 *(2.80)***			
Costing of measures						1.355 *(2.57)**		
Forecast Assessment							1.293 *(2.78)***	
High media Impact								0.904 *(2.32)**
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	901	901	901	890	901	901	901	901
Countries	58	58	58	58	58	58	58	58

Absolute bootstrapped t–statistics in parentheses.
* significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent.

Figure 4

Fiscal Councils and Fiscal Rules



Sources: IMF Fiscal Council Dataset, and staff calculations.

- *Media impact*: As fiscal councils do not directly impact fiscal policy, their influence hinges importantly on the reputational and electoral impact of their analysis for policymakers. The results indicate that countries where the fiscal councils have a higher media impact tend to exhibit better fiscal outcomes.

Of course, these results should be interpreted with caution for three main reasons. First, more than half of existing fiscal councils have been created after 2005. The limited time span for a good number of fiscal councils could potentially affect the empirical results. Reassessing the issue in the future as longer time series become available would be sensible. Second, the econometric analysis itself is subject to limitations. As in any empirical study of the impact of institutions on policies, the model may not identify a causal relation because the institutions we measure could potentially reflect deeper unobserved preferences that would be the true cause of strong outcomes. Third, the key characteristics of fiscal councils are highly correlated (Table 8). This complicates the assessment of their combined impact on fiscal performance. Because of these limitations, the empirical results should be seen as robust conditional correlations.

A formal test of complementarity between fiscal rules and fiscal councils would be to assess whether the marginal impact of our fiscal rule index differs in countries with fiscal councils as opposed to countries without such a council. This would illustrate that in addition to promoting fiscal discipline individually, fiscal rules and fiscal councils could be stronger when used together. Introducing an interaction term between the fiscal council variable (or its main characteristics) and the fiscal rule index did not unveil any statistically significant effect. This is likely due to the limited variation between the two variables since most countries with fiscal councils also subject their fiscal policy to a numerical rule (Figure 4).

4.2.2 Fiscal institutions and the quality of budgetary forecasts

The presence of a council could discourage governments to fool voters about compliance with the rule. One common manifestation of such attempts is to produce optimistic macroeconomic and revenue forecasts to ensure *ex ante* compliance with the rule and justify *ex post* deviations with "unexpected" revenue shortfalls. Strauch *et al.* (2004) find that political economy factors can explain more optimistic forecasts by some governments. A straightforward empirical test of this hypothesis is to look into the quality of official forecasts and assess whether the presence of a fiscal council makes a difference for the better.

The existing literature on the potential impact of fiscal institutions on official forecasts focuses on European countries. Jonung and Larch (2006) show that forecast bias in the EU may be politically motivated and that forecast by an independent authority such as a fiscal council would be preferable to forecast provided by the Ministry of Finance. Frankel and Schreger (2012) find that official budget forecasts are over-optimistic, particularly in Euro area countries. The authors also show that real GDP forecasts are over-optimistic during booms. They find that independent fiscal institutions producing budget forecasts reduce the over-optimistic bias when countries do not comply with the 3 percent cap on budget deficits. However, Abbas *et al.* (2012) show that fiscal councils per se cannot assure better (less optimistic) forecasts than other forecasters when there is inherent uncertainty around near-term GDP and fiscal variables.

This paper measures the quality of official forecasts for 3 key variables: the primary balance, the cyclically-adjusted primary balance, and real GDP growth. Official forecasts are assessed on the basis of their accuracy as well as their bias. The forecast error is defined as the difference between the forecast of the aggregate for t made in t–1 and the outcome, which is the estimate for t made in t+1. The mean forecast error thus captures the extent of forecasting bias in official projections. The mean of the absolute value of forecast errors assesses forecasts accuracy.

Figure 5 shows that well-designed fiscal councils contribute to unbiased or slightly conservative forecasts for primary balances in countries where they operate, while other countries have overoptimistic projections on average. Interestingly, real growth forecasts remain overoptimistic, although one should note that the smallest bias is observed in countries with formally independent councils. This may reflect the fact that manipulations of basic macroeconomic forecasts tend to be more easily detected given the many alternative sources providing similar forecasts. By contrast, estimating the budgetary impact of economic activity is technically more involved and may offer more opportunities for manipulation.

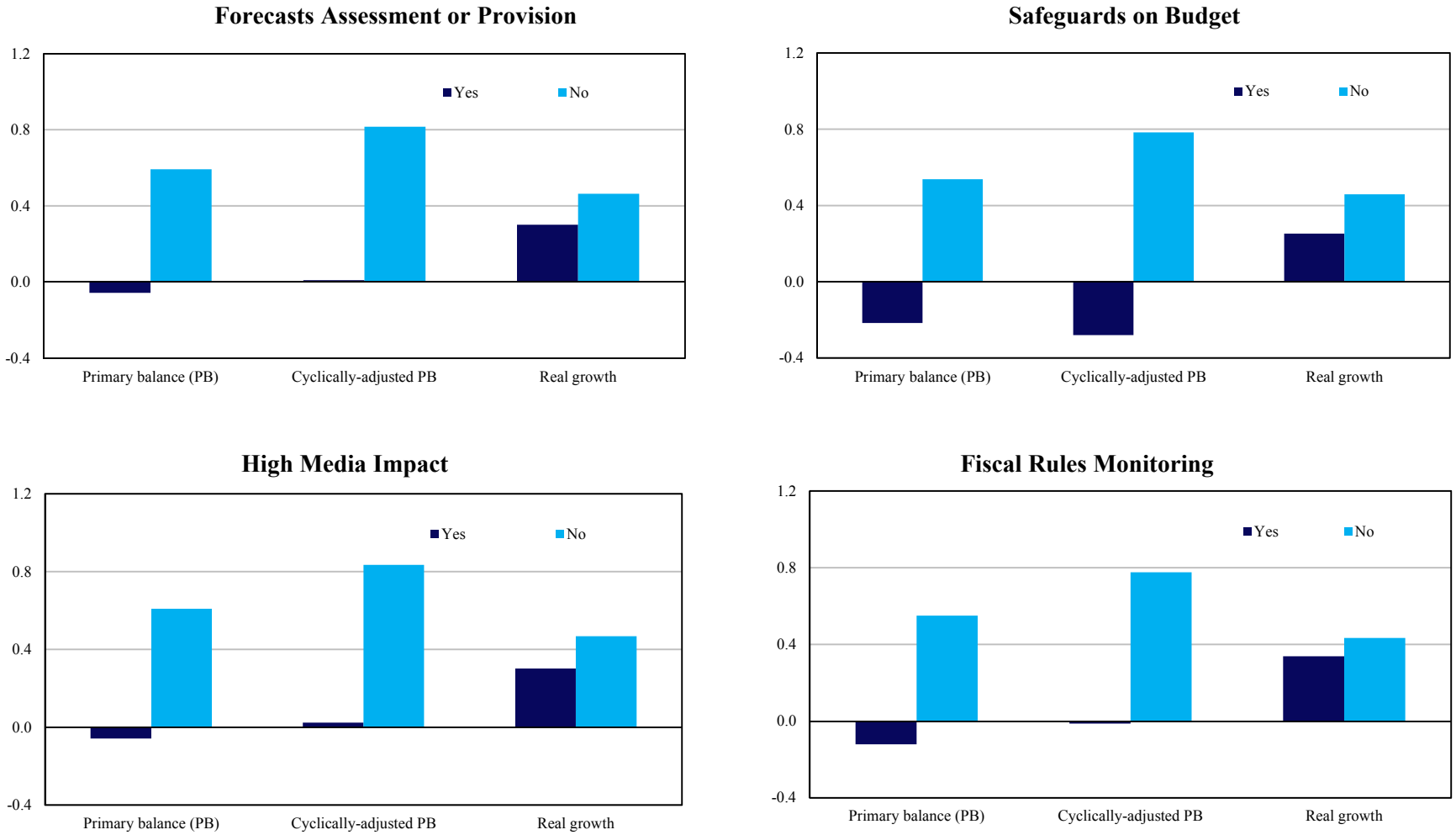
In addition to the statistical evidence, simple regressions confirm that fiscal councils and their key characteristics are associated with lower forecast errors. The paper relies on pooled regressions controlling for the output gap (GAP) and the fiscal rules index (FR) to evaluate the impact of fiscal councils and their key characteristics (FC) on forecasting errors. The dependent variable, forecasting errors (Error), is firstly defined to capture forecasting bias and secondly to measure forecasts accuracy. We estimate the following equation:

$$Error_{i,t} = \gamma GAP_{i,t-1} + \vartheta FR_{i,t} + \varphi FC_{i,t} + \mu_i + \delta_t + \varepsilon_{i,t} \quad (8)$$

The analysis uses a sample of 26 advanced and emerging European countries over the period 1998-2010 to show that countries with fiscal councils have less biased and more accurate budgetary forecasts. Specifically, countries where fiscal councils are independent, have a high media impact, provide or assess macroeconomic forecasts, and monitor fiscal rules have lower bias in their official forecasts of the budget balance (Tables 6). The countries also have a better accuracy when forecasting the budget balance (Appendix, Table 2). Independent fiscal councils could therefore contribute to the implementation of fiscal rules by, for instance, preventing overoptimistic forecasts that would hinder the implementation of fiscal rules and the compliance with the defined targets.

Figure 5

Mean Forecast Error and Fiscal Councils' Characteristics



Source: IMF staff estimates.
Note: The forecast error is defined as the forecast minus the actual value so that a positive number for the mean error indicates an optimistic forecast.

Table 6

Fiscal Councils Characteristics and Primary Balance Forecast Error
(dependent variable: forecast error (primary balance))

Output gap	0.059 *(0.63)*	0.060 *(0.65)*	0.067 *(0.72)*	0.059 *(0.63)*	0.064 *(0.69)*	0.059 *(0.63)*
Fiscal rules index	–0.215 *(1.70)**	–0.252 *(1.95)**	–0.213 *(1.58)*	–0.215 *(1.70)**	–0.261 *(1.98)***	–0.193 *(1.43)*
Fiscal council	–0.783 *(3.32)****					
Legal independence		–0.911 *(3.76)****				
Safeguards on budget			–0.821 *(3.14)****			
High media impact				–0.783 *(3.32)****		
Forecasts provision /assess					–0.863 *(3.35)****	
Fiscal rules monitoring						–0.653 *(2.28)***
Constant	–0.107 *(0.16)*	–0.001 *(0.00)*	–0.378 *(0.68)*	–0.107 *(0.16)*	–0.004 *(0.01)*	–0.406 *(0.76)*
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.32	0.33	0.32	0.32	0.32	0.31
Observations	225	225	225	225	225	225
N. of countries	26	26	26	26	26	26

Robust t-statistics in parentheses.
* significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent.

Table 7

Fiscal Councils Characteristics and Real Growth Forecast Error
(dependent variable: forecast error (primary balance))

Output gap	0.377 *(4.48)***	0.377 *(4.49)***	0.380 *(4.51)***	0.377 *(4.48)***	0.378 *(4.49)***	0.377 *(4.46)***
Fiscal rules index	0.140 *(1.56)*	0.126 *(1.42)*	0.151 *(1.66)**	0.140 *(1.56)*	0.123 *(1.37)*	0.155 *(1.57)*
Fiscal council	–0.285 *(1.28)*					
Legal independence		–0.297 *(1.27)*				
Safeguards on budget			–0.456 *(1.73)**			
High media impact				–0.285 *(1.28)*		
Forecasts Provision/assess					–0.192 *(0.75)*	
Fiscal rules monitoring						–0.300 *(1.07)*
Constant	–1.707 *(1.45)*	–1.679 *(1.41)*	–1.824 *(1.65)*	–1.707 *(1.45)*	–1.708 *(1.47)*	–1.827 *(1.66)**
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.60	0.60	0.60	0.60	0.60	0.60
Observations	225	225	225	225	225	225
N. of countries	26	26	26	26	26	26

Robust t-statistics in parentheses.
* significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent.

Similarly to Frankel and Schreger (2012), our results illustrate that real growth forecasts tend to be over-optimistic during booms (Table 7). Only independent fiscal councils seem to be associated with lower bias of real output forecasts. Fiscal councils and their key characteristics (independence, provision or assessment of macroeconomic forecast, and high media impact) are also associated with better accuracy of real output forecasts (Appendix Table 3). Real GDP forecasts also tend to be less accurate during booms.

5 Conclusion and policy implications

This paper compiles a unique dataset summarizing key characteristics of existing fiscal councils across the IMF membership and draws from this new dataset to investigate the role of fiscal councils in fostering fiscal discipline. The dataset illustrate that the number of fiscal councils has surged since the crisis. Existing fiscal councils cover a wide variety of possible institutional forms and differ greatly in terms of remits and tasks. Ultimately the design of effective councils should reflect country-specific characteristics, such as available human and financial resources, political traditions, and the specific causes for excessive deficits and debts.

The empirical analysis suggests that only well-designed fiscal councils are associated with stronger fiscal performance as well as more accurate and less biased forecasts. Key features for effective fiscal councils include an operational independence from politics, the provision or public assessment of budgetary forecasts, a strong presence in the public debate, and an explicit role in monitoring fiscal policy rules. The paper also adds to the existing evidence about the discipline enhancing role of fiscal rules, using a much broader sample of countries than previous studies, and suggests that fiscal councils could complement rules in promoting sound policies.

Fiscal rules and fiscal councils represent institutional solutions to countries' quest for more credible fiscal policy following the crisis. In particular, fiscal councils could help address the inherent inflexibility that tends to undermine the credibility of fiscal rules. Fiscal councils can encourage greater fiscal discipline by fostering fiscal transparency and stimulating a productive public debate on fiscal issues.

APPENDIX I
CORRELATIONS AMONG FISCAL COUNCILS' FEATURES

Table 8

Correlation Matrix

	Legal Independence	**Independent Budget**	**Fiscal Rule Monitoring**	**Forecast Assessment**	**High Media Impact**
Legal independence	1				
Safeguards on budget	0.75*	1			
Fiscal rule monitoring	0.43*	0.39*	1		
Forecast assessment	0.80*	0.65*	0.32*	1	
High media impact	0.89*	0.77*	0.61*	0.81*	1

* significant at 1 per cent.

APPENDIX II
FISCAL INSTITUTIONS AND THE ACCURACY OF FORECASTS

Table 9

Fiscal Councils Characteristics and Primary Balance Absolute Forecast Error
(dependent variable: forecast error (primary balance))

Output gap	0.000 *(0.00)*	0.002 *(0.03)*	0.007 *(0.08)*	0.000 *(0.00)*	0.006 *(0.07)*	0.002 *(0.02)*
Fiscal rules index	–0.082 *(0.74)*	–0.122 *(1.07)*	–0.098 *(0.83)*	–0.082 *(0.74)*	–0.131 *(1.13)*	–0.074 *(0.63)*
Fiscal council	–0.813 *(4.11)***					
Legal independence		–0.857 *(4.13)***				
Safeguards on budget			–0.576 *(2.70)***			
High media impact				–0.813 *(4.11)***		
Forecasts provision /assess					–0.770 *(3.41)***	
Fiscal rules monitoring						–0.549 *(2.31)***
Constant	1.105 *(2.88)***	1.187 *(3.01)***	0.857 *(2.64)***	1.105 *(2.88)***	1.171 *(3.04)***	0.819 *(2.45)***
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.21	0.22	0.19	0.21	0.20	0.19
Observations	225	225	225	225	225	225
N. of countries	26	26	26	26	26	26

Robust t-statistics in parentheses.
* significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent.

Table 10

Fiscal Councils Characteristics and Absolute Real Growth Forecast Error
(dependent variable: forecast error (primary balance))

Output gap	0.266 *(3.01)***	0.267 *(3.00)***	0.271 *(3.03)***	0.266 *(3.01)***	0.270 *(3.04)***	0.267 *(2.97)***
Fiscal rules index	–0.004 *(0.05)*	–0.031 *(0.36)*	–0.002 *(0.02)*	–0.004 *(0.05)*	–0.034 *(0.40)*	0.003 *(0.03)*
Fiscal council	–0.512 *(2.48)***					
Legal independence		–0.441 *(2.02)***				
Safeguards on budget			–0.555 *(2.52)***			
High media impact				–0.512 *(2.48)***		
Forecasts Provision/assess					–0.635 *(2.88)****	
Fiscal rules monitoring						–0.364 *(1.35)*
Constant	1.649 *(4.38)****	1.671 *(4.48)****	1.470 *(3.21)****	1.649 *(4.38)****	1.739 *(5.04)****	1.466 *(3.14)****
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.48	0.48	0.48	0.48	0.48	0.48
Observations	225	225	225	225	225	225
N. of countries	26	26	26	26	26	26

Robust t-statistics in parentheses.
* significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent.

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COMMENT TO "STRENGTHENING POST-CRISIS FISCAL CREDIBILITY: FISCAL COUNCILS ON THE RISE. A NEW DATASET" BY XAVIER DEBRUN AND TIDIANE KINDA

Geert Langenus[*]

Thanks to the organisers for putting together such an impressive programme and having me again. It is always a pleasure to be here. I want to start my discussion of Debrun and Kinda by reiterating the paper's key contributions and main messages.

First, the authors have created a new and very rich dataset on existing fiscal councils and their characteristics. Second, they present some empirical evidence on the beneficial impact of those councils. On the one hand, they seem to coincide with better fiscal outcomes, in particular higher primary surpluses, on the basis of a standard fiscal reaction function approach *à la* Bohn (1998). On the other hand, countries with fiscal councils seem to produce better one-year ahead fiscal and, to a lesser extent, macroeconomic projections. Third, to be more precise, this beneficial impact is not so much linked to the mere existence but rather to certain specific characteristics of fiscal councils that pertain to their mandate, mechanisms to ensure non-partisanship, as well as their media impact. Finally, the empirical results also lend support to the mainstream view that fiscal rules and fiscal councils are complements, rather than substitutes.

Before I go into the specifics of the paper, let me remind you of the general context. Fiscal councils are indeed on the rise, as the paper's title suggests. In the European Union, recent legislation has made them an integral part of the fiscal governance framework. It is by now widely accepted that they can provide some protection against the government's deficit basis and can help the general public to assess rule compliance. They come in two forms – parliamentary budget offices or independent fiscal institutions but the paper does not go into that distinction (the authors' dataset comprises both types) so I won't either. There is also a broad agreement on the desirable features of independent fiscal institutions. Many of them (non-partisanship, specific mandate, operational capacity, media impact, etc…) are picked up in Debrun and Kinda's paper. So we have a rather precise view, a blueprint of which kind of fiscal council we want to be part of an effective budget framework.

What we don't have, however, is very strong empirical evidence on the actual impact of these councils. Most of the evidence is anecdotal and drawn from individual country studies. Broader econometric approaches typically have difficulties to establish real causality. This paper tries to address this gap and generally comforts us in the belief that these councils do work even if, in my view, more direct tests of regime changes are still necessary: I will not name names as I want to keep good relations with all colleagues around the table but can countries with a weak fiscal governance track record really change their ways by establishing a fiscal council? Given that the more modern fiscal councils – the ones that comply with the aforementioned principles – are relatively recent phenomena, it may be too early to tell.

At this point, I have a confession to make: I am not the world's best discussant for this paper, not because I don't like it but because I like it too much. I genuinely believe and want to believe in the conclusions of the paper! It is like reading a paper that provides econometric evidence of the fact that my favourite football team, the mighty *Biancoceleste*, is not just the best team in Rome or

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This discussion reflects the views of the author and not necessarily those of the National Bank of Belgium.

in Italy but, indeed, the best team in the world. Would I feel inclined to waste my time and have a critical look at this econometric evidence? Of course not, because I simply know it's true!

However, if I don't do my job as a discussant, I may not be invited anymore by the Banca d'Italia colleagues and I don't want to run that risk. So I try to put my positive bias aside and will offer some comments. I start with the authors' dataset, the companion, if you will, of the existing dataset on fiscal rules. Actually, this is not the first dataset of this kind: as mentioned in the paper, the EC maintains a database on fiscal institutions for EU countries. Apart from the country coverage, the key difference is that the authors' database relies more on expert assessment rather than on self-reporting by the authorities via questionnaires. Even if I know that there is some peer review and in-depth cross-checking of the EU countries' fiscal frameworks, I have to admit that I feel more at ease with the Debrun and Kinda approach. More generally, I have always considered it a tremendous challenge to capture a wide variety of characteristics in a number of simple binary or quantitative indicators. You inevitably lose some detailed information once you try to compare institutions across countries. In the end, some expert judgment will always be required.

So I know how hard this exercise is and I am not going to bother you with any criticism on the specific judgement made in the paper. Let me just raise a few general issues. Take a crucial feature like independence for instance: this is really hard to measure even if the paper already goes beyond the basics and provides data on who appoints who in fiscal councils. In the end, what matters is, how the council behaves, so, in principle, you also need to score their actions in a way. Ideally, one should look at the (time) consistency and coherence of their reports, whether they do not simply reflect a pre-existing government consensus, etc.

Media impact is another crucial issue: how is this measured? I remembered that, in earlier papers, Xavier Debrun looked at the number of times a council is mentioned to in the media. However, there is also a qualitative dimension, right? One short paragraph on p. 27 of the newspaper referring to an arcane descriptive report that was published by a government-friendly fiscal council should not have the same weight as, say, Kevin Page or George Kopits stating publicly and clearly that their respective governments got it wrong.

Finally, taking stock of all these features is just one step. In further work, you may also want to think about constructing a synthetic Fiscal Council Index taking into account your empirical findings of which characteristics are important. I now turn to the econometrics and will first make some general comments on the approach before going to the results.

First, the authors use a dynamic panel approach but two different country samples and periods. I was wondering about the second sample, which is smaller and shorter (1998-2010), that is used for forecast analysis. Not that many changes took place in the fiscal council landscape in that particular period as far as I know. According to Table 1 only 7 fiscal councils were created then; the "new-generation" fiscal councils are typically more recent. Actually, that number includes some specific cases such as the Austrian public debt committee, for which the numbers in the dataset may overstate the actual impact, and the first Hungarian fiscal council that was so effective and independent that it got closed down two years later. So, I am wondering whether the authors have sufficient within-country variation in the dataset to get robust conclusions.

Second, the dataset includes both EU and other countries. Maybe one needs to acknowledge the existence of the European Commission by including an EU dummy for the former? Otherwise any positive impact from this supranational watchdog could be wrongly attributed to the national institutions.

Third, due consideration should be given to the use of interaction terms that seek to capture the joint impact of different independent variables. On the one hand, I am not fully convinced by the need to study the interaction between fiscal rules and fiscal councils, which the authors have tried. They have shown that both matter: this is in my view sufficient to establish complementarity.

On the other hand, interaction terms may be necessary for different dimensions of the same characteristic: independence comes to mind, in particular if one thinks about the fate of the aforementioned previous Hungarian fiscal council. An institution can only be truly independent if guarantees exist with respect to all dimensions of this independence, which to me suggests interacting at least some of the dummies for independence (legal/budget) that the authors consider.

I now turn to the specific results of on fiscal performance. My first question is why the observed primary balance rather than the cyclically-adjusted or structural one is used. Distinguishing between good policies and good luck is one of the core tasks of a fiscal council so you may want to analyse more precisely how the council contributes to good policies and correct the estimates for any impact of good luck. The output gap appears among the explanatory variables but it is lagged so that should not raise a particular problem. Second, I was simply wondering why the number of fiscal council staff only appears in this section of the econometric part and not in the other section on forecast performance. At the same time, I am curious why the authors do not consider a broader spectrum of characteristics in the dataset: the dummy describing whether the council's remit includes normative analysis or making specific recommendations would seem to be an ideal candidate to be included in these regressions. Third, apart from the aforementioned need for an EU country dummy, one may include, in these equations in particular, a dummy for the incidence of specific adjustment periods (the Excessive Deficit Procedure or, especially, the recent troika-managed programmes for specific euro area countries). Under such programmes, budget targets will be more binding and not taking that into account may bias the coefficients, e.g., for fiscal council characteristics, to some extent. Finally, I want to come back to the issue of correlation vs. causality that the authors duly mention in the paper. If the omitted variable bias is linked to a country's social preferences regarding fiscal discipline, it can obviously be more of an issue when one specifically tries to find out if good fiscal institutions contribute to good fiscal performance.

As regards the second part of the empirical analysis, that focuses on the link between fiscal councils and forecast performance, I was struck by the graph showing the optimistic macro forecast bias, also in countries that have effective fiscal councils, even if the over-prediction seems smaller in that case. Probably the Great Recession also came as a surprise for the Wise (Wo)Men in those fiscal councils and the large forecast error in 2008-09 has a significant impact on the average. Staying with the issue of the councils' impact on the macro forecast error, I found the empirical results somewhat difficult to interpret: the authors seem to show that, for real growth, the reduction in the absolute forecast error – or the increase in forecast accuracy – is significant (Table 10 in the Annex), while that in the average or mean forecast error – or the bias – is not (Table 7). Should we then conclude that, on this particular topic, the value added of independent fiscal institutions primarily lies in technical expertise (smaller errors), rather than in non-partisanship (smaller bias)? However, the descriptive statistics depicted in Figure 5 do seem to suggest that some fiscal council characteristics are positively correlated with less (over)optimistic forecasts.

For this empirical analysis it may also be useful to consider a specific hierarchy of fiscal council characteristics. One may expect that the councils' mandate to provide or assess official forecasts would be the most important feature here. Hence, it may be useful to include interaction terms of this remit variable with other characteristics of fiscal councils, e.g., independence. Maybe the joint impact of a truly independent council that has some say over the official macro forecasts could be more significant than the separate impact of both the remit and the independence variable? One other minor quibble relates to the use in pooled regressions of actual forecast errors for different countries and, hence, different business cycles. As the amplitude of the cycles may differ, forecast errors should perhaps ideally be normalised. Finally, as one of my core tasks is to coordinate macro forecasts, I just want to highlight also the quantitative results for the absolute real growth forecast error: coefficients of fiscal council dummies in Table A.3 tend to be in the [0.4;0.6]

interval. This seems to suggest that the accuracy gain of giving a fiscal council some responsibility over the official growth forecasts is actually huge!

Turning then to the analysis regarding the budget forecast performance, it should be stressed that the weak contribution of the fiscal rule index in explaining the average primary balance forecast error is somewhat surprising (and disappointing?). At the same time, European colleagues, for instance, will probably recall many episodes where rule circumvention seems to have been an equally important guiding principle than rule compliance. However, the empirical results regarding the impact of fiscal councils are actually more clear-cut than for the macro forecast performance discussed earlier.

In this connection, I was wondering whether there could be a story here. Clearly, for most countries there are quite a lot of growth forecasts on the market. In this sense, a multitude of both private forecasters, as well as international organisations may already offer the necessary checks and balances for the official macro forecasts used in the budgetary process. Governments that want to cheat may face an uphill task if they have to explain why their growth forecasts are much more benign than the average of those of the relevant international organisations such as the IMF, the OECD and the EC and private think-tanks. This may be somewhat different for the actual budget, i.e. government revenue and expenditure, forecasts that are derived from those macro projections. In this area the government typically has an information advantage over other forecasters, e.g., regarding actual tax elasticities, spending risks, the impact of new measures, etc. For this reason, the existence of these other forecasts may not be sufficient to deter the government from presenting overoptimistic estimates in the budget.

If this is the case, then the real value added of independent fiscal institutions could lie in verifying the way in which budget projections are derived from macro forecasts. This is consistent with the authors' empirical findings. This also suggests that the mandate of such independent fiscal institutions should definitely include responsibilities related to the costing of measures and, more generally, government revenue forecasting. As soon as there is sufficient variation, the authors may also want to check the empirical significance of the costing dummy in their dataset. In this connection, a specific case can also be made for the costing of electoral platforms to make sure that political parties do not present unrealistic plans before the elections.

These were my (minor) comments on the Debrun and Kinda paper. Let me just reiterate that, in my view, this is a very interesting and important paper. Both the descriptive analysis based upon the new dataset and the empirical results on the effectiveness of fiscal councils are significant contributions to the literature. I congratulate the authors and encourage them to continue this line of research.

JUST ROUND THE CORNER? PROS, CONS, AND IMPLEMENTATION ISSUES OF A FISCAL UNION FOR THE EURO AREA

Fabrizio Balassone,[*] *Sandro Momigliano,*[*] *Marzia Romanelli*[*] *and Pietro Tommasino*[*]

The experience of other successful monetary unions and economic theory suggest that the euro area would benefit from the establishment of a supranational fiscal capacity. The institutional reforms prompted by the crisis (e.g., the European Stability Mechanism and the banking union) are introducing – though to a limited extent – elements of cross-country risk sharing. Nevertheless, further steps are probably needed. Proposals to create a sort of rainy-day fund for the euro area present major practical difficulties – associated, inter alia, to the uncertainty characterising the identification of shocks in real time. A more appropriate solution, consistent with how risk sharing operates in existing federations, may be centralizing specific public functions (for instance, by introducing a common unemployment benefit scheme). We argue that consideration could also be given to the creation of a euro-wide, notional-defined contribution pension scheme.

1 Introduction

The sovereign debt crisis taught European policy-makers several lessons: first, European fiscal rules were backed by weak enforcement mechanisms; second, those rules were in any case insufficient, since they did not consider other macroeconomic imbalances; third, the European framework lacked crisis-resolution instruments to deal with sovereign crises in an orderly way; fourth, the potential implications of the link between sovereigns and banks in a monetary union had been underestimated; and, fifth, the costs of debt deleveraging and macroeconomic adjustment are exacerbated in a monetary union, if there is no fiscal federal authority and national ones are constrained by insufficient fiscal space.

Some of these lessons were predictable on the basis of well-established economic principles (as argued forcefully by Krugman, 2013) but they involved thorny issues, such as the necessity to complement a monetary union with a fiscal union, which were knowingly side-stepped by European policy makers. Indeed, a report on the fiscal union (the MacDougall Report) was published already in 1977 on behalf of the European Commission, and a mention concerning the economic desirability of a Community budget is present even in the 1970 Werner Report.[1]

In the end, the crisis prompted serious efforts to address the above-mentioned shortcomings. Fiscal rules have been strengthened – through the Six-pack, the Two-pack and the Fiscal Compact – and mechanisms for crisis management have been introduced: the European Financial Stabilization Facility (EFSF) first, and the European Stability Mechanism (ESM) later. The Six-pack has also provided a new surveillance tool to monitor and correct imbalances other than the

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We thank seminar participants at the Bank of Italy and the XXVI Villa Mondragone International Economic Seminar for helpful comments and suggestions. Corresponding author: Pietro Tommasino: pietro.tommasino@bancaditalia.it

The opinions expressed in this paper are the authors' and do not necessarily reflect those of Bank of Italy.

[1] Later on, the technical papers accompanying the 1989 Delors Report and especially European Commission (1993a, b) discussed the topic in depth. On May 3, 1998, when Europe was completing the last steps before the adoption of the single currency, Tommaso Padoa Schioppa wrote in a column for *Corriere della Sera*: "The Union has full competence for microeconomic policy (…), but its capability for macroeconomic policy is, with the exception of the monetary field, embryonic and unbalanced: it can avoid harm (excessive deficits) but it cannot do good (a proper fiscal policy). (…) It is thus right not only to applaud yesterday's step but also to underline its unfinished nature, the risks and the rashness".

fiscal ones, *i.e.*, the macroeconomic imbalances procedure (MIP). In addition, the creation of a banking union was devised as a means to sever the link between banks and sovereigns.

Much work is still needed to refine the new tools introduced by these tightly sequenced reforms: the management of sovereign insolvency crises remains somewhat unstructured compared to the detailed procedures defined for dealing with liquidity crises through the ESM; the banking union project needs completing; the effectiveness of the MIP remains to be tested.

Most importantly, little progress has been made in the way of defining stabilization mechanisms which can supplement national budgets. The need to remedy the asymmetry of a single monetary policy and multiple national budgets was recognized in reports released in 2012 by the European Commission and by the President of the European Council. Both reports envisaged the creation of a fiscal capacity for the economic and monetary union (EMU) to support member states in the absorption of shocks and in the implementation of structural reforms. However, discussion of a subsequent proposal by the European Commission in March 2013 to implement such contractual agreements lead to no constructive result.[2] Since then, the official debate on a fiscal union for EMU has been at a stand-still.

Against this background, the paper reviews the economic rationale for a fiscal union in EMU (Section 2) and the lessons learned from other successful federal countries (Section 3). It then summarizes the "official" proposals put forward in the debate (Section 4), examines existing risk-sharing mechanisms in the euro area (Section 5) and discusses the possible ways to implement a fiscal union in Europe (Section 6). Section 7 concludes.

2 The economics (and politics) of fiscal unions

Economists have discussed the costs and benefits of membership of a monetary union since Mundell (1961). The main intuition behind the so-called theory of optimum currency areas (OCA) is that, once the exchange rate is irrevocably fixed, nation-specific shocks to aggregate demand induce current account imbalances that – to the extent that domestic prices are sticky – translate into lengthy and painful internal deflation which cannot be addressed by the area-wide monetary policy. Therefore the expected net benefits of a monetary union are higher if each member economy produces a quite similar and well-diversified mix of products (so that sizable asymmetric demand shocks are rare), if domestic wages are flexible and cross-country labour mobility is high, and if labour market institutions are similar.[3]

Kenen (1969) was the first to point out that a shared fiscal policy could reduce the costs of being a member of a monetary union.[4] He argued that the operation of area-wide automatic fiscal stabilizers would allow to re-establish equilibrium while limiting the necessary reduction (increase) in domestic prices and wages in a countries affected by an adverse (positive) asymmetric demand shock. This mechanism would be particularly desirable in the euro area as its member states display less cross-country labour mobility compared to the US and other established federations (Obstfeld and Peri, 1999) and appear relatively more likely to be hit by asymmetric shocks (Bayoumi and Eichengreen, 1992).[5]

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2 Communication from the Commission to the European Parliament and the Council COM(2013) 165 final.

3 For a survey of the OCA literature, see Mongelli (2005), Dellas and Tavlas (2009) or De Grauwe (2012).

4 The importance of area-wide automatic stabilizers is greater in the case of adverse shocks, given that prices and wages are more likely to be rigid downward than upward.

5 Frankel and Rose (1998) argued that the introduction of the single currency itself would have increased the synchronization of business cycles across member states and the degree of flexibility and competitiveness of the internal market, thanks to the

(continues)

Kenen's (1969) argument is subject to three main objections:

1) *Member states' fiscal policies could be in principle sufficient to absorb the effects of cyclical fluctuations.* Indeed, member states of the euro area run sizable budgets and the EU budgetary framework grants enough fiscal room for manoeuvre to countries which enter a "normal" downturn with deficits near to their medium-term objectives and debts close to 60 per cent of GDP. However, economies in a monetary union are more integrated than stand-alone countries. This magnifies spillovers and reduces the effectiveness of national fiscal reactions. As remarked by Oates (1972), "[in highly open economies] the leakages from a marginal dollar of private spending are likely to be quite large. As a result, in a simple Keynesian system, the expenditure multiplier is likely to be quite small".[6] Coordination of national fiscal policies could be an alternative way to internalize cross-country spillovers, but it is subject to the delays and the difficulties inherent in international negotiations.
2) *Financial markets could provide insurance against national income fluctuations analogous to that provided by a fiscal union*. Indeed, well-developed financial markets could be used by citizens of a country hit by an adverse economic to smooth consumption *ex post*, borrowing from citizens of countries which have not been hit by the shock. More importantly, financial markets provide *ex ante* income insurance: holding foreign assets, citizens of each member country can build a portfolio whose returns are not correlated with economic conditions in their own country. The extent to which it is possible to insure against country-specific shocks using financial markets is an empirical matter: this risk-sharing channel is much more developed in the US than in Europe (Atkeson and Bayoumi, 1993, Sorensen and Yosha, 1998), where there is still a pronounced national segmentation, even if there are some signs of convergence (Afonso and Furceri, 2008, Kalemli-Ozcan *et al.*, 2005). Moreover, this channel for risk-sharing might not be easily accessible to low-income households, and it is likely to become less accessible during a major recession. Finally, Fahri and Wening (2013) have recently argued that, even with perfect financial markets, economic agents tend to under-insure, because they neglect the aggregate-demand externalities inherent in their choices.[7]
3) *The insurance-incentives trade-off.* A strong political-economy objection to the establishment of a fiscal union is the increased risk of moral hazard (Persson and Tabellini, 1996). For example, if countries could count on supranational instruments to reduce the cost of unemployment, they would have less incentives to pursue policies which might reduce unemployment risk to start with, especially if such policies entailed significant political costs. However, it must be acknowledged that the reform of European governance has strengthened the safeguards against moral hazard.

3 The size of federal automatic stabilizers in successful fiscal unions

While economic theory identifies the main trade-offs involved in the decision to complement a monetary union with a supranational fiscal capacity, and therefore it is helpful to frame the discussion about a possible fiscal union for the euro area, theory alone cannot say whether such a fiscal union is desirable, let alone determine its optimal scope and size. In this section we try to cast

elimination of the exchange rate risk and the reduction of transaction costs. However, this process seems far from complete (Afonso and Furceri, 2008).

6 The size of fiscal policy spillovers in the euro area has been assessed in several papers (e.g., Cwik and Wieland, 2011, Beetsma *et al.*, 2006). Recently it has been shown that cross-country spillovers tend to be larger in recessions (Auerbach and Gorodnichenko, 2013).

7 By making their income less volatile, each economic agent contributes to make aggregate-demand less volatile, which entails benefits for other agents as well.

more light on these questions, considering the amount of fiscal risk-sharing prevailing in established federations.

Starting from Asdrubali *et al.* (1996), the literature on risk-sharing in federal countries has focused on three main channels. First, (as we mentioned above) each region can smooth country-specific income shocks by holding a geographically well-diversified portfolio of assets; second, it may benefit from transfers from other states or from higher levels of government; third, it may reduce its savings.

What is mainly relevant for our discussion is the fraction of risk-sharing obtained through the federal budget – currently close to zero for the euro area. Concerning the US, there is a consensus that 10-15 per cent of individual states income variability is offset by the federal fiscal system (Asdrubali *et al.*, 1996; Melitz and Zumer, 2002). Similar results are found for Canada (Melitz and Zumer, 2002; Obstfeld and Peri, 1998) and other federal countries.

These findings suggest that the absence of a "federal" budget puts euro area countries at a disadvantage compared to US states when faced with asymmetric adverse shocks.

Interestingly, in the US, the most significant shift in the fiscal balance of power between the Federal government and the individual states was spurred by the Great Depression. At the beginning of the '30s about 70% of government expenditures in the US pertained to the sub federal level, while in 1940 this share dropped to slightly above 50%, with overall government spending remaining almost unchanged (Wallis, 1984).

4 A fiscal union for the euro area: the official debate

The official debate on a fiscal union for EMU started in mid-2012, when the European Council invited its President "to develop, in close collaboration with the President of the Commission, the President of the Eurogroup and the President of the ECB, a specific and time-bound road map for the achievement of a genuine Economic and Monetary Union".

Official proposals put forward since then, share the following conclusions – though with differences in emphasis:

1) a fiscal capacity is necessary for the EMU to increase its ability to absorb asymmetric shocks;
2) a microeconomic approach, supported, for instance, by unemployment benefits, is preferable over a macroeconomic one, grounded on rule-based transfers from a common pool of resources accrued to a "rainy-day fund" (Section 6 provides a thorough discussion of both approaches);
3) the related increase in risk-sharing should be accompanied by adequate safeguards against moral hazard (some further strengthening of surveillance and coordination mechanisms may be therefore needed);
4) a fiscal union for the euro area is a medium- to long-run project, not something to be implemented to help countries out of the current crisis.

Manifest controversy concerns instead the possibility to accompany such risk-sharing arrangement by some form of redistribution through permanent transfers, and to extend the common fiscal capacity to cover common shocks and to finance euro-wide investment projects.

In its November 2012 *Blueprint for a Deep and Genuine Economic and Monetary Union*, the European Commission proposes a phased approach to strengthening the EMU and developing its fiscal capacity. In the short term (within the next 6-18 months) there would be "the establishment of a financial instrument within the EU budget to support re-balancing, adjustment and thereby growth of the economies of the EMU" (p. 12). In the medium term (18 months to 5 years), a proper fiscal capacity for the EMU should be established to support the implementation of the policy

choices resulting from deeper policy coordination. Finally, in the long term (beyond 5 years), "the establishment of an autonomous euro area budget providing for a fiscal capacity for the EMU to support Member States in the absorption of shocks should become possible" (p. 12).

A similar approach is taken in Report by the President of the European Council.[8] Setting up "a mechanism for stronger coordination, convergence and enforcement of structural policies based on arrangements of a contractual nature between member states and EU institutions [backed by] temporary, targeted and flexible financial support" (p. 4) is recommended in the short term, before end-2014. "[E]stablishing a well-defined and limited fiscal capacity to improve the absorption of country specific economic shocks, through an insurance system set up at the central level" (p. 5) is seen as a goal for the longer term.

Concerns over moral hazard are voiced more explicitly compared to the Commission's *Blueprint*: fiscal risk-sharing "needs to be complemented with a mechanism to induce stronger economic convergence, based on structural policies aiming at improving the adjustment capacity of national economies and avoiding the risk of moral hazard inherent to any insurance system. Hence, in addition to fulfilling their intrinsic purpose, successfully implementing reforms specified in a contractual arrangement could also serve as a criterion for participating in the asymmetric shock absorption function" (p.10).

The *Report* stresses that: "elements of fiscal risk-sharing related to the absorption of country-specific shocks should be structured in such a way that they do not lead to unidirectional and permanent transfers between countries, nor should they be conceived as income equalisation tools." (p. 12).

A recent IMF Staff Discussion Note (Allard *et al.*, 2013) argues along similar lines. Four elements are identified as essential for a successful fiscal union: first, better oversight and stronger incentives for sound national fiscal policies; second, and subject to the above, some system of temporary transfers or joint provision of common public goods or services to increase fiscal risk-sharing; third, credible pan-euro area backstops for the banking sector to help break the sovereign-banking link; fourth, some form of common borrowing (backed by common revenue) to provide a safe asset and reduce the potential for large portfolio shifts between sovereigns.

The IMF Staff Note excludes a redistributive role for the common fiscal capacity. Diverging from the Report of the President of the Council and more aligned with the Commission's *Blueprint*, the *Note* puts significant weight on the issue of common borrowing.[9]

A recent paper by French Treasury Staff (Caudal *et al.*, 2013) also argues in favour of "a permanent stabilisation mechanism capable, in particular, of dealing with asymmetric shocks"[10] However, the French paper does not limit the function of the common budget to the absorption of asymmetric macroeconomic shocks. First, "the function of a public backstop at European level within the framework of the banking union could also depend ultimately on the euro area budget." (p. 6). Second, "giving the budget a capacity to provide fiscal stimulus in the event of a simultaneous contraction of activity in all euro area member states would complete the action of monetary policy […]. Moreover, over and beyond its fiscal stimulus function, one could envisage authorising a limited structural deficit, for example in order to finance investments" (p. 8).

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[8] The report *Towards a Genuine Economic and Monetary Union* was presented in June 2012 and updated the following December.

[9] As a way to deal with the existing debt overhang problem the *Note* refers to the Debt Redemption Fund proposal put forward by the German Council of Economic Experts (Doluca *et al.*, 2012). A similar reference can be found in the Commission's *Blueprint*, not in the *Report* of the President of the Council.

[10] The paper is critical of the solutions based on a rainy-day fund. In a recent follow-up (Direction Générale du Trésor, 2014), the French Treasury Staff discusses in more detail implementation issues (see Section 6).

The paper argues that the euro-area central budget could also involve an element of permanent redistribution: "given the highly heterogeneous structure of the individual member states' economies, and the existence of potential agglomeration effects within currency areas leading to the concentration of activity at the area's core at the expense of peripheral states, some regions could experience greater and more recurring difficulties than others. It could therefore be justifiable, in economic terms, for these peripheral regions to benefit from the common budget more frequently." (p. 11).

The issue of moral hazard is not overlooked in the analysis: "the creation of a euro area budget, reflecting greater solidarity between member states, could ultimately justify a further strengthening of European economic governance, subject to the democratic legitimacy of the arrangement" (p. 11).

The position of the French paper echoes the resolution adopted by the European Parliament on November 20, 2012 on the *Interim Report* by the President of the European Council. Indeed, the Parliament "is of the opinion that a 'genuine EMU' cannot be limited to a system of rules but requires an increased budgetary capacity based on specific own-resources (including a financial transaction tax) which should, in the framework of the Union budget, support growth and social cohesion addressing imbalances, structural divergences and financial emergencies which are directly connected to the monetary union".[11]

5 Prodromes of a fiscal union for the euro area

Before discussing proposals for a fully-fledged fiscal union, it must be acknowledged that the ESM and the banking union, once fully established, will provide for a non-negligible degree of shock absorption at the supranational level.

5.1 The ESM

The ESM is a permanent mechanism providing financial support to countries in (potential) distress. It was created in 2011, following in the steps of the European Financial Stability Facility (EFSF), a temporary mechanism with the same function which was set up a year before.

Three elements make the ESM a starting block of a common fiscal capacity. It may provide stability support also on a precautionary basis; raise funds by issuing financial instruments (or by entering into other financial obligations) mutually guaranteed by member states, even if only up to the capital committed by each of them.

However, there are limits to the analogy between the ESM and a fiscal union. First, ESM financial assistance is not automatic: it is provided to requesting countries subject to strict conditions and to a preliminary debt sustainability analysis; for countries whose debt is deemed unsustainable, a debt-restructuring plan would have to be negotiated with private creditors; these features can strongly reduce moral hazard but also limit the extent of possible stabilization. Second, the lending capacity of the ESM is strictly constrained by the amount of its capital (paid-in and callable) that was agreed upon when it was set-up. Finally, if ESM assistance is not provided on a precautionary basis, it risks being systematically late, providing support when the social and economic costs of a crisis have already turned substantial.

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[11] Resolution P7_TA(2012)0430, 20.11.2012, Par. 11.

5.2 The banking union

The crisis made patent to what extent a country's public finances and stability of the financial sector are interrelated. The ongoing implementation of a banking union aims at: (a) breaking the link between sovereigns and banks and curbing the probability of future systemic banking crises, and (b) avoiding the fragmentation of financial markets along national borders, thus limiting the risk of abrupt reversal of capital market flows (see Beck, 2012; Goyal *et al.*, 2013; Draghi, 2014).

As argued by Rey (2013), a well-designed banking union will help in smoothing out some of the most relevant asymmetric shocks that can affect the euro area, given also the relevance of its banking sector relative to other areas (e.g., the USA).

The banking union has three key components: a single supervisory mechanism (SSM), a single bank resolution mechanism (SRM) and harmonized deposit insurance schemes. Priority has been given to the construction of the first component, the SSM, comprising the ECB and the national supervisory authorities. Its launch is scheduled in November 2014. An agreement on the SRM was reached by the European Council in December 2013 and amended and finalized with the European Parliament and the Commission in March 2014. Moreover, the recent *Bank Recovery and Resolution Directive* harmonizes heterogeneous national practices, rules and tools for bank crisis management. Concerning the third component of the banking union, a directive has been approved that standardizes all relevant features of national deposit guarantee schemes.

A well-functioning SRM requires a common, stable and sizable pool of resources: "if markets cannot ascertain *ex ante* how resolution will be financed, and in what quantities, they may find themselves having to price-in a residual risk of national government involvement, thus perpetuating the bank-sovereign nexus" (Draghi, 2014). [12]

According to the recent agreement, a Single Resolution Fund will be established to which all banks in the participating member states would contribute. The Fund has a target level of €55 billion and will be able to borrow from the markets. Its resources will have to reach at least 1 per cent of covered deposits over an 8-year period. During the transition, the Fund will comprise national compartments corresponding to each participating member state. The resources accumulated in those compartments would progressively be mutualised within 8 years, starting with 40 per cent of these resources in the first year.

The agreement reached includes a commitment to allow the Fund to borrow from the market.[13] The loans should be repaid by future contributions from the banking sector itself. In principle, there is no limit to the ability of the SRF to borrow. However, during a financial crisis such ability could prove insufficient, as markets may not be willing to lend.

6 Implementing a fiscal union for the euro area

Regardless of the elements of a fiscal union that are already present, even if not explicit, in the ESM and in the banking union, the inherent limitations of these institutions as risk-sharing tools, in particular in addressing real shocks at an early stage, call for an additional shock absorber at the euro area level.

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[12] Indeed, all the existing federations, at least during the current crisis, have kept the responsibility of resolution and deposit insurance at federal level with substantial support from the public finances.

[13] If the exclusion of a common fiscal backstop to the SRF is eventually confirmed in the final legislation, then the agreement would represent a step back compared to the explicit reference in the December 2013 agreement to a common fiscal backstop.

In designing this additional element, two options are available. In the first, insurance against country-specific income shocks would be provided, on the basis of an *ex ante* formula, by transfers from the euro area budget to the government suffering from the shocks. In the alternative case, insurance would be provided implicitly by the cyclical characteristics of the euro area budget. For example, as revenues are counter-cyclical, while expenditures are a-cyclical or counter-cyclical (as in the case of unemployment benefits) this implies that the country hit by the shock would be a net beneficiary, drawing from the common pool of resources an amount larger than its contribution to it. This second mechanism is the standard stabilization tool in existing federations, generally complemented by discretionary transfers.

6.1 Rainy-day funds and temporary cross-country transfers

Rainy-day funds would reallocate resources inter-temporally but also across participants in different positions along the economic cycle. The idea is quite simple: member states at the top of the cycle would contribute to the fund whereas transfers would be granted to those at the bottom. [14] Permanent transfers from one region to the other would be avoided: in the long-term there should be neither net recipients nor net contributors.

One of the main problems of such a mechanism consists in the identification of a country's position in the economic cycle and consequently in the measure of the net contributions each member state will have to pay in a given period. Reference is often made to estimates of the output gap, which however have proved to be quite fragile in real time. Caudal *et al.* (2013) clearly show this point by highlighting the differences between real-time estimates and *ex post* evaluations of the output gap, which do not only concern the magnitude of the estimated gaps but also their sign. In these conditions, one could find out *ex post* that those who were net recipients based on real-time estimates should have been net contributors instead.

The allocation of net contributions could also be based on differences between the actual unemployment rate and a measure of structural unemployment (Artus *et al.*, 2013). In this case, net contributions would be computed as a percentage[15] of the aggregate payroll multiplied by the gap between actual and structural unemployment rates. It must be noted that the problem of the cyclical position of an economy is in this case simply shifted from estimating the output gap to determining the structural unemployment.[16] Moreover, the support would reach the country with a substantial delay, summing the lags with which employment reacts to the shock to those with which this reaction is recorded by official statistics and the rainy-day funds allocated.

In order for the stabilisation fund to properly function in case of negative symmetric shocks as well, its size and possibly its ability to borrow would be crucial. Concerning the size, Allard *et al.* (2013) indicate in 1.5 to 2.5 per cent of GNP the annual contributions required by each euro area member state so as to achieve a level of overall income stabilization comparable to the one commonly observed in existing federations. Sufficiently large contributions would allow the accumulation of resources in good times, providing for proper inter-temporal smoothing also in case of large common shocks. As for the ability to borrow, a stable and guaranteed flow of revenues (for instance, a dedicated tax stream) would provide a means to ensure a high rating and a low cost of funding.

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[14] An early proposal is the one by Hammond and von Hagen (1998). More recently, Gros (2014) highlights the advantages of providing for a deductible in the design of the scheme.

[15] Such percentage should be set as a fraction of the current average replacement rate provided by unemployment insurance schemes in member states.

[16] For a survey of the debate on the structural rate of unemployment, see Richardson *et al.* (2000).National may also hamper the use of the actual unemployment rate as a cyclical indicator.

The difficulties in identifying idiosyncratic shocks and the consequent possible delivering of permanent transfers exacerbates the moral hazard problem. Imposing an *ex post* conditionality would, however, contrast the very nature of a stabilization fund, thus the free-riding problem should be addressed, as much as possible, *ex ante*. Strengthening fiscal rules and improving coordination in the policy making process are then important tools. Conditioning the access to the implementation of agreed structural reforms (along the lines suggested in the Report of the President of the Council and discussed in Section 4) could also be considered.

6.2 Unemployment benefits

Unemployment insurance has been another widely debated solution for organizing temporary transfers among countries hit by idiosyncratic shocks. Both the funding of unemployment benefits and their use in the short term are indeed highly correlated with the economic cycle. The development of a common unemployment scheme would thus, at least in part, overcome the problem of identifying the position along the economic cycle, which is one of the drawbacks of rainy-day funds. Moreover, risk sharing would directly concern individuals (with transfers provided to those hit by exogenous shocks and contributions paid in proportion to salaries), rather than being managed at the aggregate (country) level (Dullien, 2013).

In this case too, however, the risk of a time lag between the economic crisis and the fiscal response is present. Indeed, as already mentioned unemployment tends to react with some delay to economic downturns, depending also on labour market characteristics (e.g., employment labour protection legislation, wage bargaining arrangements, the relative weights of temporary and permanent contracts, etc.; see IMF, 2010a). In addition, this mechanism would smooth out the impact of a negative shock only for those who have access to unemployment benefits, leaving the remaining part of the population out in the cold.

A centralized unemployment scheme, in terms of funding and benefit provisions as well as a harmonized legal framework, is a feature common to some, but not all federations. Interestingly, in the US unemployment schemes are basically decentralized at the state level, even though the federal government usually supplements the system with discretionary transfers during severe downturns.

The realization of a European unemployment scheme would require the harmonization of labour market legislation at least partially across the euro area, leading to a stronger integration of the single market. This would be a good thing in itself, but is not an easy task, given the highly heterogeneous level of employment protection (Table 1).[17]

The common scheme could be set up at the level of the least generous system for short-term unemployment currently present in the euro area (Table 2),[18] leaving it to member states whether to provide any integrations. Taking the least generous system as a minimum reference point could facilitate a political agreement on the characteristics of the common mechanism.

Alternatively, federal resources could kick in only in particular circumstances and add to state programmes: for instance, additional benefits could be provided (or the time-span over which benefits are granted extended) only where unemployment exceeds a given threshold. Once the parameters are set, the insurance would operate automatically, with less room for political bargaining among participating countries.

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[17] For a comparison between labour market institutions across euro area countries, see Esser *et al*. (2013).

[18] According to OECD data, net replacement rates in euro area countries for the initial phase of unemployment varied between 20 and more than 90 per cent in 2011.

In both the alternatives just discussed, it seems likely that the amount of resources channelled to a country by the common unemployment benefit system would not be large, even in the case of a sizeable asymmetric shock.

Another important issue to be settled is whether contribution rates should be fixed (in this case, an area-wide recession would induce a deficit) or adjusted in order to ensure that the scheme is balanced at each point of the business cycle.[19]

Treatment of long-term unemployment, which is likely to be more dependent on structural weaknesses and thus endogenous to national policy choices, should be left at national level. Otherwise, the common system would provide permanent net transfers to those regions characterized by higher structural unemployment, with the risk of discouraging reforms. This could be partially overcome by conditioning participation in the common (short-term) unemployment benefit scheme to the implementation of a European employment contract containing those elements deemed necessary for a more functional labour market (Artus *et al.*, 2013). Another possibility (Lellouch and Sode, 2014) would be to impose higher contribution rates to countries with higher structural unemployment.

6.3 A contribution to the debate: a centralized NDC pension scheme for the euro area

Even though federations tend to have a single unified, centrally-funded public pension system, to our knowledge the centralization of (part of) the pension system has not been proposed, either in the official or in the academic debate on the fiscal union for the euro area during the crisis. This is all the more surprising in view of the fact that an authoritative proposal for a coordinated pension system in Europe had been put forth before the crisis (Holzmann, 2006).[20] This neglect may be related to the lengthy transition associated with any changes to such systems. However, since there is a wide consensus that the fiscal union is a long-term project, this should not warrant the outright exclusion of pensions from the toolkit.

Stabilization achieved through a unified pension system would not be negligible. If the size of the system were limited to that of the countries where the first-pillar public scheme provides only a basic support (being heavily complemented by occupational schemes or mandatory private pensions), the revenue and expenditure involved would be of the order of 5 per cent of GDP. Allowing an exception for these (few) countries, the size of the centralized scheme would amount to 7 per cent of GDP (Table 3).[21]

Most of the stabilizing power of public budgets comes from their size, as revenue are cyclical while expenditure are largely insensitive to the cycle. Centralizing the pension system would imply shifting to the euro-area level between 1/8 (if the first alternative mentioned above is adopted) and 1/6 of national budgets and a corresponding quota of the associated automatic stabilizers. This is still small compared to other federations (the share ranges between 34 and 61 per cent in the sample surveyed in Allard *et al.*, 2013).

A standard analysis to gauge the stabilizing capacity of the public sector follows two steps and refers to a balanced shock to all private components of GDP. In the first step, the automatic reactions of revenue and cyclical expenditure (in general, unemployment benefits) to such shock is

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[19] A paper by the the French treasury staff (Lellouch and Sode, 2014) argues for the second option and proposes that in the case of an aggregate recession the temporary deficit of the scheme should be funded by jointly-issued debt securities (in their plan, in the medium run, fiscal neutrality should be achieved by periodical adjustments of the initial contribution rates).

[20] The Holzmann's proposal envisages a European coordinated system of NDCs, while here we discuss a centralized euro-area scheme.

[21] These values can be seen as upper bounds, as they include also elements of social assistance, which are extraneous to a NDC scheme.

computed (in the reference scenario all budgetary components remain constant). In the second step, short-term fiscal multipliers are applied to these cyclical reactions. In our case, assuming an elasticity of 1 with respect to GDP for social contributions and a fiscal multiplier of 1/3,[22] the stabilizing effect of the reformed euro-area budget would be of the order of 2 per cent of the shock, against an estimate of around 17 per cent, on average,[23] for national budgets in the euro area.

Besides enhancing fiscal risk sharing, a unified, centrally-funded public pension system for the euro area would have a number of advantages.

First, it would eliminate an obstacle to labour mobility across countries in the area. The comparatively low labour mobility is probably the most important factor hampering adjustment to shocks within the euro area. According to Holzman (2006), "one important mechanism to support a common currency and adjustments after shocks is a pension system that does not lock persons into sectors and countries, but instead supports full labour mobility across professions and States – a requirement that is far from reality in the European Union. (…) The European Union does not have a coordinated – and even less a harmonized – pension system, which characterizes other economically integrated areas under a common currency (such as Australia, Brazil, Canada, Switzerland, and the United States). These federations or confederations exhibit many differences at state or provincial levels (including income taxes or short-term social benefits), but they have one thing in common – a public retirement income scheme across states." (p. 240).

Second, centralizing the pension system would imply large economies of scale in terms of management of financial flows and of data storage and processing, while the size of the staff in the new pension institution would be limited compared to other functions: European citizens would still largely interact with their national institutions. Notwithstanding this, the reform may lead to significant improvements, in some countries, in terms of transparency and communication to the public by setting minimum/uniform standards.

Third, the establishment of a common pension system may also reduce uncertainty concerning fiscal sustainability in specific countries and the capacity of the respective national institution to fulfil pension commitments.

Fourth, this reform could also reduce mistrust across European citizens concerning fiscal behaviour in other countries, thereby lessening opposition to solidarity mechanisms among member states (on this point, see also the remarks by Jacques Delors reported at the end of Section 2). Indeed, at the height of the crisis, a number of newspaper articles pointed out that a main concern in Germany was the too generous pension system in Greece.[24]

Fifth, contrary to unemployment insurance, it would be relatively easy to design the system so that no redistribution between States is involved, using an actuarially fair Notional Defined Contribution (NDC) System.[25] Actually, a properly design NDC system guarantees that no redistribution takes place not only across countries, but also across and within generations. Indeed,

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[22] This estimate, in line with that used by Caudal *et al.* (2013), is also consistent with estimates for revenue items in Jerome et al (2004) for the euro area countries and with an overall fiscal multiplier close to 0.5 – as found by IMF (2010b) using a sample of advanced economies from 1980 till 2009 – taking into account that most empirical evidence indicates that short-term expenditure multipliers are higher than revenue ones.

[23] Caudal *et al.* (2013) obtain this estimate by assuming revenue multipliers equal to 1/3 and expenditure multipliers equal to 1.

[24] The article "Greece's Generous Pensions. What Makes Germans So Very Cross About Greece?", *Economist* web site, Feb 23, 2010, made exactly this point: "IT IS the pensions, stupid. That, I am coming to conclude, is the cause of the real venom being expressed towards Greece in places like Germany. […] It is striking how often their annoyance is expressed in angry comparisons of the Greek and German retirement pension rules." See also *Der Spiegel*, May 18, 2011:

http://www.spiegel.de/international/europe/german-chancellor-on-the-offensive-merkel-blasts-greece-over-retirement-age-vacation-a-763294.html

[25] Differences in growth between countries could be taken into account by allowing for rates of return to be linked to the national origin of contributions. An analysis of notional defined contribution (NDC) pension schemes can be found in Palmer (2006).

for each cohort in each country the internal rate of return of the system would depend on the growth of the wage bill recorded during its own working years in the country, and on its own life expectancy. This rate of return would be the same for every individual in the cohort (in the appendix we provide a slightly more formal introduction to the logic of NDC pensions and to our proposal of a European NDC scheme).

Finally, a NDC system presents a number of additional advantages with respect to alternative arrangements. It guarantees financial stability *vis-à-vis* economic and demographic shocks. As it is actuarially fair, it minimizes distortions in the labour market (*i.e.*, it reduces the incentive to early retirement). As an NDC pension scheme can be implemented by crediting workers' contributions in personal accounts resembling standard banking accounts, it is also easy to understand and contributes to broadening pension literacy.

While entailing the many potential benefits described above, the establishment of a common pension system is a challenging endeavour, in view of the variety of pension arrangements now existing in euro area countries. It will also require a number of crucial decisions concerning the design of the system and its implementation, in particular with respect to its phasing in.[26] As already mentioned, it may indeed be reasonable to design such reform so that it would produce its effects very gradually, considering also that workers close to retirement are unable to adjust to sudden changes to the pension rules. The new system should be applied only to contributions paid after a certain date, posterior to the approval of the reform. As happened in Italy following the 1995 reform introducing a NDC system, two systems to compute benefits would coexist for several decades: the old one, with reference to contributions paid until the selected date, and the new one, with reference to the contributions paid afterwards.

It may also be reasonable that the new euro area pension institution be given responsibility only over the new system. For a long period, social contributions paid would largely exceed benefits; during this period, it may be reasonable that national budgets would continue to record contributions paid in, transferring to the new institution only the amount sufficient to match the payments due.[27]

7 Final remarks

The EU has been called by some commentators a "half-built house" (Spolaore, 2013) and the problems of being in mid-stream are constantly stressed both by those who advocate more integration and by sceptics who think that integration has gone too far.

The architects of the monetary union were fully aware of its unfinished nature. The need to complement the single currency with a federal budget was stressed already in the '70s, during the early discussion of the project. The fiscal union never came because the political conditions were not there. Too much sovereignty was to be forgiven, for too deep were the changes needed to fundamental laws and institutions in individual countries.

Nowadays, official reports once again explicitly talk of a fiscal and political union as the cornerstone of a "deep and genuine economic and monetary union". Yet it is a long-term endeavour. It is not just the depth and technical complexity of the reform, it is once again a matter of political conditions. In particular, a crucial precondition is a deeper sense of trust among

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[26] In discussing how a pan-European pension system would come about, Holzman (2006) conjectures that such scheme "at some moment in the future [will be] espoused by a charismatic European politician as reform champion. Perhaps this will happen after the first main asymmetric shock hits Euroland".

[27] Moreover, national budgets may permanently include the flows pertaining to the country specific component of the pension scheme.

(citizens of) Member States (Algan *et al. (*2014) argue that this is true for any social insurance scheme), whereas currently trust seems to be lacking in the European context. [28]

To get out of this deadlock, one possibility, suggested among others by Habermas (2013), is to increase perceived democratic legitimacy by strengthening the role of the European Parliament, moving toward a closer political union *before* the establishment of a fiscal union.

Alternatively, one could hope that a well-designed and gradual introduction of elements of a fiscal union could in itself contribute to rebuild cross-country solidarity.[29] Sharing part of their welfare system, European citizens would gradually learn its benefits and the whole process of the European integration would re-gain legitimacy and momentum. Delors himself stated in one of the papers accompanying his 1989 *Report*: "…federal budgetary mechanisms (…) are both the product and the source of the sense of national solidarity which all the relevant economic and monetary unions have".

For this second strategy to be successful, the choice and the design of the starting block of the fiscal union is crucial. In this paper we propose for consideration, as a possible first step (possibly complementary to other initiatives), a euro-wide pension system based on the notional defined contribution logic.

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[28] Guiso *et al.* (2013) reports survey evidence that the majority of Germans were consistently against financial aid to Greece, and at the same time most Greeks had an unfavourable view of Germany.

[29] This approach is in line with the considerations put forward by Draghi (2012): "A new architecture for the euro area is desirable (…). Yet this new architecture does not require a political union first (…). Economic integration and political integration can develop in parallel. (…) How far should this go? We do not need a centralisation of all economic policies. Instead, we can answer this question pragmatically: by calmly asking ourselves which are the minimum requirements to complete economic and monetary union. (…) Those who claim that only a full federation would be sustainable set the bar too high".

APPENDIX 1
THE SIMPLE ARITHMETIC OF A (SUPRANATIONAL) NDC PENSION SCHEME

Consider a very simple economy in which each individual lives at most two periods. He works with probability $(1-u_t)$ during the first period, and he survives with probability α_t into the second period, during which he is retired. Assume a simple linear production technology, in which labour is the only factor of production:

$$y_t = (1-u_t)A_tL_t$$

The size of each generation (L_t) grows at rate n_t and productivity grows at rate a_t. Labour is paid its marginal product: wages are equal to A_t.

A PAYG pension scheme is such that each period social contributions are equal to: $\tau(1-u_t)w_tL_t$ (where τ as the payroll contribution rate) and outlays are $\alpha b_t(1-u_{t-1})L_{t-1}$ (where b_t is the amount of each pension). The pension deficit is therefore given by:

$$Deficit_t = \alpha_t(1-u_{t-1})b_tL_{t-1} - \tau(1-u_t)w_tL_t$$

To grant a balanced pension budget, one needs:

$$b_t = (\tau/\alpha_t)[(1-u_t)/(1-u_{t-1})](1+n_t)\, w_t$$

or, put differently, one needs a replacement ratio equal to:

$$b_t/w_{t-1} = (\tau/\alpha_t)[(1-u_t)/(1-u_{t-1})](1+n_t)(1+a_t) = (\tau/\alpha_t)(1+g_t) \qquad (1)$$

where $g_t = Y_t/Y_{t-1}$ is the growth rate of the economy. In general, condition (1) will not be satisfied in a standard Defined Benefit (DB) system. Indeed, by definition, in DB schemes the replacement ratio is fixed, therefore it cannot be a function of economic developments, such as the rate of growth, nor of demographic developments: longevity (α_t) does not play any role in the determination of the individual pension benefit.

An NDC system addresses specifically these issues. NDC pensions are computed as a function of three elements:

- what the retiree has "saved" in a (notional) account when young: τw_{t-1};
- the "notional" rate of return awarded to those savings, which depends in turn on the rate of growth of GDP;
- a "transformation coefficient" which captures expected longevity at retirement (in our stylized setting, it is equal to α_t) in an actuarially fair way, analogously to what private insurance companies do when pricing annuity contracts.

Therefore, in an NDC scheme, the benefit is equal to:

$$b_t = \tau w_{t-1}(1+g_t)(1/\alpha_t)$$

which is exactly the condition for a balanced pension budget according to equation (1).

Suppose now that the growth rate is not constant but equal to g_{high} with probability ½ and $g_{low}<g_{high}$ with probability ½. Then if the notional rate of return of the NDC scheme is set equal to $\frac{1}{2}g_{low}+\frac{1}{2}\, g_{high}$, the system will be balanced in expectation: it will be in surplus in good years and in deficit in bad years.[30] As risk is pooled across different generations, the system is able to provide insurance to workers.

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[30] A similar arrangement is in place in the Italian version of the NDC mechanism: the notional rate of return is indeed equal to the 5-year average of GDP growth.

Assume now that that there are two countries, subject to country-specific growth shocks. For simplicity we will assume here that they share the same average growth rate (γ_t), and that there is no aggregate uncertainty (as in the single country case). For example, assume that:

$$\text{with probability } ½\text{: } g_t = \gamma_t+\varepsilon_t \text{ and } g_t^* = \gamma_t-\varepsilon_t^*$$

$$\text{with probability } ½\text{: } g_t = \gamma-\varepsilon_t \text{ and } g^*_t = \gamma+\varepsilon^*_t,$$

where $\varepsilon_t, \varepsilon_t^*$ are both positive, and $\varepsilon_t = (Y_t^*/Y_t)\,\varepsilon^*_t$

(the last equality captures the no-aggregate-uncertainty hypothesis).

Then, it is easy to see that in this setting full risk-sharing and budget balance can be achieved at once, if a common pension authority collects contributions by workers in both countries at the same contribution rate τ, and awards to retirees in different countries the following pensions:

$$b_t = \tau w_{t-1}(1 + \gamma_t)(1/\alpha_t)$$

$$b^*_t = \tau w^*_{t-1}(1 + \gamma_t)(1/\alpha^*_t)$$

Under this rule, benefits are different in the two countries, reflecting different fundamentals at the beginning of the period, however each worker is able to know ex ante with certainty the rate of return awarded to his/her contributions.

On average there will be no redistribution across countries, but in each year the "unlucky" country will be subsidized by the "lucky" one. This is an improvement with respect to the single-country case discussed above, which can be clearly appreciated in the aftermath of a bad shock: in this case, workers of the "unlucky" country are not burdened with debt to be carried on, such as in the case of a single-country scheme. On the contrary, the budget of the pension scheme (which is now an area-wide budget) will be always balanced. Put differently, via the budget of the common supranational pension institution, pensions in the adversely-hit countries are subsidized by workers of the "lucky" country.

APPENDIX 2
TABLES

Table 1

OECD Indicators on Employment Protection Legislation 2013[1]

Country	Protection of Permanent Workers Against Individual and Collective Dismissals	Protection of Permanent Workers Against (Individual) Dismissal	Specific Requirements for Collective Dismissal	Regulation on Temporary Forms of Employment
Austria	2.44	2.12	3.25	2.17
Belgium	2.95	2.08	5.13	2.42
Estonia	2.07	1.74	2.88	3.04
Finland	2.17	2.38	1.63	1.88
France	2.82	2.60	3.38	3.75
Germany	2.98	2.72	3.63	1.75
Greece	2.41	2.07	3.25	2.92
Ireland	2.07	1.50	3.50	1.21
Italy	2.79	2.41	3.75	2.71
Luxembourg	2.74	2.28	3.88	3.83
Netherlands	2.94	2.84	3.19	1.17
Portugal	2.69	3.01	1.88	2.33
Slovakia	2.26	1.81	3.38	2.42
Slovenia	2.67	2.39	3.38	2.50
Spain	2.28	1.95	3.13	3.17
Latvia	2.91	2.57	3.75	1.79

(1) Data refer to 1 January 2013. Scale from 0 (least restrictions) to 6 (most restrictions).
Source: *OECD Employment Protection Database*, 2013 Update.

Table 2

Net Replacement Rates for Single Earner, 2011: Initial Phase of Unemployment[1]
(available euro-area countries)

Country	Not Qualify for Cash Housing or Social Assistance "Top Ups"[2]						Qualify for Cash Housing or Social Assistance "Top Ups"[3]					
	67% of AW		100% of AW		150% of AW		67% of AW		100% of AW		150% of AW	
	No child.	2 child.	No child.	2 child.	No child.	2 child.	No child.	2 child.	No child.	2 child.	No child.	2 child.
Austria	55	71	55	68	45	54	55	83	55	68	45	54
Belgium	85	85	63	67	47	52	85	85	63	67	47	52
Estonia	55	63	54	60	53	58	55	63	54	60	53	58
Finland	57	73	53	66	46	57	64	85	54	74	46	60
France	69	67	66	67	69	68	69	67	66	67	69	68
Germany	59	72	59	70	57	65	59	79	59	70	57	65
Greece	49	55	35	39	24	28	49	55	35	39	24	28
Ireland	50	64	36	63	28	52	73	65	53	64	41	53
Italy	68	76	55	68	40	53	70	75	57	69	42	54
Luxembourg	83	89	85	92	77	80	83	90	85	92	77	80
Netherlands	76	71	75	71	58	57	76	76	75	77	58	57
Portugal	75	77	75	77	75	77	75	77	75	77	75	77
Slovakia	62	72	65	93	67	87	62	72	65	93	67	87
Slovenia	85	85	76	86	54	65	85	91	76	88	54	68
Spain	79	77	58	73	40	51	79	77	58	73	40	51
Latvia	86	76	87	80	78	74	86	76	87	80	78	74
Malta	39	63	28	48	20	34	51	66	39	53	28	38

(1) Initial phase of unemployment but following any waiting period. Any income taxes payable on unemployment benefits are determined in relation to annualised benefit values (*i.e.*, monthly values multiplied by 12) even if the maximum benefit duration is shorter than 12 months. Where receipt of social assistance or other minimum-income benefits is subject to activity tests (such as active job-search or being "available" for work), these requirements are assumed to be met. Children are aged four and six and neither childcare benefits nor childcare costs are considered.
(2) After tax and including unemployment benefits and family benefits. No social assistance "top-ups" or cash housing benefits are assumed to be available in either the in-work or out-of-work situation.
(3) After tax and including unemployment and family benefits. Social assistance and other means-tested benefits are assumed to be available, subject to relevant income conditions. Housing costs are assumed equal to 20 per cent of AW.
Source: OECD, *Tax-Benefit Models* (last revised 06/12/2013); www.oecd.org/els/social/workincentives

Table 3

Public Expenditures on Old-age and Survivors' Benefits

Country	Public Expenditure on Cash Benefits for Old-age and Survivors									Total inc. Non-cash *(percent of GDP)*
	Level *(percent of GDP)*					Change	Level *(percent of total government spending)*		Level in Net Terms *(percent of GDP)*	
	1990	1995	2000	2005	2009[1]	1990-2009	1990	2009[1]	2009[1]	2009[1]
Austria	11.4	12.3	12.2	12.4	13.5	*18.3%*	22.1	25.5	11.8	14.0
Belgium	9.1	9.3	8.9	9.0	10.0	*10.2%*	17.4	18.7	8.9	10.2
Czech Republic	5.8	6.1	7.2	7.0	8.3	*42.9%*		18.5	8.3	8.6
Denmark	5.1	6.2	5.3	5.4	6.1	*19.3%*	9.2	10.5	4.5	8.2
Estonia			6.0	5.3	7.9			17.6	7.8	8.1
Finland	7.3	8.8	7.6	8.4	9.9	*36.3%*	15.1	17.7	8.3	11.1
France	10.6	12.0	11.8	12.4	13.7	*29.2%*	21.4	24.2	12.8	14.1
Germany	9.7	10.5	11.1	11.4	11.3	*15.7%*		23.4	10.9	11.3
Greece	9.9	9.7	10.8	11.8	13.0	*31.2%*		24.2	13.0	13.2
Hungary			7.6	8.5	9.9			19.4	9.9	10.5
Ireland	4.9	4.3	3.1	3.4	5.1	*5.2%*	11.5	10.5	4.8	5.6
Italy	10.1	11.3	13.5	13.9	15.4	*53.3%*	19.1	29.8	13.5	15.6
Luxembourg	8.2	8.8	7.5	7.2	7.7	*-6.1%*	21.6	17.8	6.9	7.7
Netherlands	6.7	5.8	5.0	5.0	5.1	*-23.9%*	12.2	9.9	4.7	6.1
Norway	5.6	5.5	4.8	4.8	5.4	*-5.2%*		11.5	4.4	7.4
Poland	5.1	9.4	10.5	11.4	11.8	*129.1%*		26.4	10.8	11.8
Portugal	4.9	7.2	7.9	10.3	12.3	*151.9%*		24.8	11.6	12.5
Slovak Republic		6.3	6.3	6.2	7.0			16.9	7.0	7.4
Slovenia			10.5	9.9	10.9			22.1	10.9	11.0
Spain	7.9	9.0	8.6	8.1	9.3	*17.3%*		20.1	9.0	9.9
Sweden	7.7	8.2	7.2	7.6	8.2	*6.8%*		15.0	6.2	10.8
United Kingdom	4.8	5.4	5.3	5.6	6.2	*28.1%*	11.6	12.1	5.9	6.8
OECD	**6.1**	**6.7**	**6.9**	**7.0**	**7.8**	***27.0%***		**16.6**	**7.3**	**8.3**

Note: See Adema, W. and M. Ladaique (2009), "How Expensive is the Welfare State? Gross and Net Indicators in the OECD Social Expenditure Database (SOCX)", OECD Social, Employment and Migration Working Paper, No. 92, OECD Publishing, Paris, http://dx.doi.org/10.1787/220615515052 for more details on the data, sources and methodology.
Source: OECD *Social Expenditures Database* (SOCX) ; OECD *Main Economic Indicators Database*.

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COMMENT TO "JUST ROUND THE CORNER? PROS, CONS, AND IMPLEMENTATION ISSUES OF A FISCAL UNION FOR THE EURO AREA" BY FABRIZIO BALASSONE, SANDRO MOMIGLIANO, MARZIA ROMANELLI AND PIETRO TOMMASINO

Teresa Ter-Minassian[*]

1 Main messages of the paper

This paper by Balassone and others provides a comprehensive and up-to-date picture of the current state of affairs in the debate on a fiscal union for the Euro area. The paper highlights that both economic theory and lessons from the recent Euro crisis point to a need for further progress in a number of respects, in particular:

- Greater convergence of national fiscal and structural policies

  The paper notes that the institutional architecture to promote such convergence has already been put largely in place. The main steps have been the adoption by most EU members of the Fiscal Compact; the promulgation of the so-called Six-Pack and Two-Pack regulations; the creation of a number of new Independent Fiscal Councils; and the implementation of a Macroeconomic Imbalance Procedure. Questions remain, however, on how effective the new architecture will prove in practice. The test will be in its implementation and enforcement in the years ahead.
- Putting in place the three key planks of a banking union:
  - A single supervisory mechanism: this is now well on its way
  - A single resolution mechanism: after protracted negotiations, some progress has taken place in the more recent months, but the firepower of the single resolution fund remains inadequate, since it lacks a true mutualized fiscal backstop
  - Harmonization of national deposit insurance and other banking crisis management tools: progress has been made with the recent promulgation by the EC of the Bank Recovery and Resolution Directive
- The design and implementation of the building blocks of a fiscal union for the Euro area

  A key component of a fiscal union would be the creation of effective mechanisms to counteract temporary country-specific shocks. The paper discusses a number of options in this respect:
  - The European Stabilization Mechanism: this is certainly a useful tool, but, as currently structured, it deals mainly with crisis cases
  - A Euro area-wide rainy-day fund? The paper notes the difficulty of identifying in practice truly cyclical shocks
  - A centralization of unemployment benefits? The paper argues that it would provide only a partial safety net, with limited stabilizing power. Its effective implementation would require greater harmonization of labor market institutions and practices
  - A centralized notional defined contributions (NDC) pension scheme for the Euro area? The paper views this option as more promising in the long run, since it would have significant benefits:
    - A substantial size, and thus stabilizing power, at a cruising speed
    - Would facilitate labor mobility and strengthen trust within the EA, including confidence about fiscal sustainability

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The paper also discusses some more ambitious proposals for a fiscal union (e.g., a substantial expansion of EU budget; a mutualization of part of existing public debt; the issuance of Eurobonds), but considers them unlikely to fly politically.

2 Main comments

I liked the paper, not only because of its comprehensiveness, timeliness and readability, but also because I found its analysis thoughtful, and agree with many of its conclusions. In particular, I share the view that, unfortunately, progress in the directions outlined in the paper is likely to be slow, since the Euro crisis, and therefore the sense of urgency in strengthening the resilience of the Euro area to shocks, are receding; and Euro-skeptics are gaining political ground in many countries.

I agree with the paper's comments on the difficulties and limitations of rainy-day funds, and of a centralization of unemployment benefits, but would favor some initial limited experimentation with such mechanisms. I would also see some scope for a limited Euro area-wide investment fund, to finance infrastructure projects with clear positive cross-border externalities, which could be also used as a counter-cyclical tool.

The paper's proposal for a centralized system of NDC pensions is intriguing, but, in my view, even less likely to fly than other options dismissed by the paper as politically unrealistic. I agree that the potential advantages of such a system on a cruising speed would be significant, although its stabilizing power would be concentrated on the revenue side. But how to get there is the key question, which is largely not addressed by the paper. I would note that:

- The current pension systems in the Euro area vary widely in terms of key parameters (coverage; retirement age; replacement rates; indexation systems); and the mix of defined-contributions and defined-benefits, and of pay–as-you-go and pre-funding regimes
- The move to a uniform centralized NDC system would likely have major fiscal and distributional consequences. Substantial technical work would be needed to answer this questions in a minimally satisfactory manner, and the answer would likely be very different across Euro area members
- Even at the national level, pension reforms are among the most difficult ones in political economy terms**.** Finding the social and political consensus at the Euro area level on a fundamental change such as that proposed in the paper seems to me likely to be a daunting task.

PANEL DISCUSSION

NEW RULES FOR EMU?

Marco Buti[*]

1 An improved framework

The euro is a radically new project, for which there was no ready-made blueprint. The original Maastricht assignment has been shaken by the crisis. Europe has put together an impressive policy response, albeit with difficulties. Now that the acute symptoms of the financial crisis have abated, it is timely to take stock of progress in reforming the architecture.

A fundamental insight from Maastricht remains. Monetary policy can only reach its stability objectives if it enjoys fiscal backing (as emphasised early on by Sargent and Wallace, 1981). In a monetary union, that creates an obligation for all members to pursue fiscal discipline. The Maastricht architects were keenly aware of this fact. But they did not wish, or felt they could not, encroach much on national fiscal sovereignty. So fiscal rules were introduced in Maastricht, and further developed in the SGP, in order to constrain national behaviours that remained supposedly sovereign.

As we know, the Maastricht compromise underwent a series of problems. One important aspect is the design of fiscal rules: they have been charged with being either too lax (in good times) or too stringent (in bad times). Another long-standing issue is weak enforcement mechanisms. But the crisis brought to the fore previously unsuspected problems as well. Notably, massive contingent fiscal risks emerged from the private sector, especially the financial sector. And sovereigns of a monetary union with freely moving capital could be exposed to just the kind of liquidity stops that were thought to be the lot of emerging markets.

The package of steps taken over the past few years is substantial:

a) Fiscal governance has been refurbished, albeit in an "incremental" manner. This is the trilogy Six pack/Two pack/Fiscal Compact. In a nutshell the attempt is to have smarter rules, stronger enforcement and deeper national ownership. Surveillance has also been broadened with the macroeconomic imbalances procedure.
b) Banking union is a potential game changer. The single supervisory mechanism should help prevent the building up of excessive risk, while the provisions for resolution, including bail-in and a degree of pooling, should protect taxpayers and help cut feedback loops.
c) Financial safety nets have been developed. These include the European Stability Mechanism, but also the Outright Monetary Transactions (OMT) programme. It may also be worth mentioning the TARGET2 system (though not an innovation from the crisis), which has acted as crucial buffer of BoP adjustment (Bretton Woods did not have a TARGET, as noted by Bordo, 2014).

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This discussion piece has greatly benefited from contributions by Nicolas Carnot, Advisor on fiscal policy, and Lucio Pench, Director for fiscal policy in the Directorate General for Economic and Financial Affairs.

2 Open questions

The question we are faced with today is whether we now have an architecture that is "fully fit". The answer is that we are probably not yet there. The remaining open questions include:

a) The design of the rules, again. They are smarter but said to be too complex. And maybe still too pro-cyclical, in bad times (Blanchard and Leigh, 2013) but also in good times. This is all the more important that the macroeconomic impact of fiscal policy as shock absorber has increased importance in a monetary union.

b) The relationship between fiscal and economic surveillance. It has been noted that deep reforms, which are indispensable to guarantee sustainability, often take time to bear fruits and may present short-run costs, though not always. What are the pros and cons of a trade-off between fiscal flexibility and structural reforms? In particular, how can we overcome the information asymmetry which makes a deal based on the promise of bolder reforms very difficult to enforce (can contractual arrangements be the answer)?

c) The question of enforcement remains work in progress. The two-pack has given the centre some greater weight, by introducing an ex ante look at national budgets. But the final say remains in national hands. And some observers insist (Wyplosz, 2013; Mody, 2013) that the Stability and Growth Pact collides with the de facto prevalence of national politics. Meanwhile, the Fiscal Compact has introduced a complementary but also potentially competing track, where enforcement is delegated to national control institutions.

d) The possible under-provision of risk-sharing in current EMU. One paper of the previous session argues that "macroeconomic" forms of risk-sharing are unworkable because of problems in assessing real-time business cycles. It says the route is shifting microeconomic competences to the centre, such as pensions, which would also increase area-wide insurance mechanisms. Perhaps, but this is really very long term. Better private risk-sharing is also worth exploring ("more equity, less debt"), as it may not face the same political opposition.

e) The ability to overcome the "debt overhang". This is an over-riding challenge today, and in fact one that poisons the rest of the discussion on the architecture. In terms of the economic outlook, things are getting a bit better in the EU economy, but we know that the road is long for better flows to translate into better stocks. Some influential observers are advocating more radical policies.

There is overall an interrogation about the very direction of institutional reforms: shall we head towards more centralisation or some decentralisation? More of common tools, or a return to strict policy of no bail out? There are conflicting views on these matters.

3 The way forward

One path suggested in the debate is putting more emphasis on market discipline. This proposal starts from the presumption that fiscal policy is a national business and will remain so. Therefore, only a credible no bail out system can create the right incentives for discipline. This approach is a big gamble though. For one, it assumes that we would not face a "too big to fail" issue when it comes to sovereigns. And it leaves smaller sovereigns at the mercy of the whims of markets. One says it works for US states but the setting is massively different: US states have small budgets and debts in comparison to EU states, and there is a big centre. The comparison is flawed. This is not to say that market discipline has no role to play whatsoever in EMU, but whether it can be its very cornerstone is a different matter.

The Commission Blueprint (European Commission, 2012) did lay out a different sense of direction. It made the case for further common tools, including CCI, a fiscal stabilisation tool,

possible further interference on national budgets and Eurobonds. But traction has somehow been eroded as we got out of the acute phase of the crisis, while some progress was achieved on the banking union front. We need to keep some momentum, even if we depart from the specific prescriptions of the blueprint.

In general all proposals need to consider their compatibility with the EU legal framework. What can be achieved within the current Treaty and what would require a Treaty change? The Blueprint made clear that some of the profound changes would require an evolution in EU primary law. International agreements can at best be a temporary patch, and at worse create legal hydras.

Today it is absolutely essential to continue restoring the credibility of our public finances. The situation is fragile. Markets are benign today but may not be forever, even with OMT. Member States, starting with the big ones, bear a huge responsibility in pursuing the path of reform, especially now that the economic prospects are slowly improving. Restoring trust in banking systems is also vital. The most topical issue is arguably how to carry out in a low-inflation environment the needed deleveraging, in particular, how to respect the debt rule for the public sector. Would there be a risk of monetary dominance in such a situation (overburdening fiscal policy, so somehow turning Sargent and Wallace on its head)?

Meanwhile, institutional changes to address the remaining weaknesses of our architecture will need to resume at some point, e.g. once conditions of a "veil of ignorance" are re-instated. For the fiscal framework, one may have to think in terms of simplifying the rules and giving them sound economic content. That would assume overcoming the curse of the "complete contract" which has led to an over-engineering of the fiscal rules. It would imply finding a consensual balance between mechanical rules and economic judgement, not an easy assignment. One would also need to strike the right balance of competences between the national and EU dimensions.

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PANEL DISCUSSION

Daniele Franco[*]

A never ending debate

When the Treaty of Maastricht was agreed over two decades ago, after a lengthy debate among EU Member States, no one probably expected that the EMU fiscal framework would have been subject to a nearly continuous debate and would have been repeatedly modified. Extensive reforms were introduced in 1997, 2005 and in 2011-12. In parallel, the European Council and the European Commission kept working on the definition of procedures and the interpretation of rules. It has been an incremental process, with new rules adding to previous ones, marked by accelerations and sudden changes, under the pressure of economic and political developments.

These developments and the uncertainty about the end point of the process reflect the novelty of EMU: a single market and a single currency are associated to multiple budgetary authorities. It is a voyage into uncharted waters.

From the very first, the single currency project in Europe was conditional upon gradual progress towards more integrated markets and increasing economic convergence. One of the key aspects was the completion of the single market in 1992, as indicated in the Single European Act of February 1986. When the rules for eligibility and multilateral surveillance were laid down in the Maastricht Treaty in December 1991, two features became evident: i) the pivotal role of nominal stability in the selection of the convergence criteria required for membership of the single currency area and ii) the dominance of the coordination and surveillance of national policies with respect to collective policy formation as a tool for preserving stability over time. In this framework, the commitment of national governments to fiscal discipline was essential, as shown by the Treaty's excessive deficit provisions.

In 1992, the Treaty establishing the European Community introduced the deficit and public debt conditions for joining EMU. In 1997, the Stability and Growth Pact (SGP) defined rules to accompany EMU on a permanent basis. The general government deficit should not exceed 3 per cent of GDP save in exceptional circumstances, on a temporary basis and for a limited amount. Countries should set a medium-term objective (MTO) for the deficit either close-to-balance or in surplus in structural terms, enabling stabilizers to operate freely, combining soundness and stabilization. Multilateral surveillance is to operate via medium-term programmes (stability programmes), the excessive deficit procedure (going from early recommendations to financial sanctions) and the common statistical framework.

The weak points of this arrangement soon became clear: the incentives and disincentives in good times were weak, and there was no independent enforcer (no federal government). These problems emerged clearly in the extensive crisis of 2002-04: several countries had deficits exceeding 3 per cent of GDP, debt ratios in some countries went above the threshold of 60 per cent, the application of the rules appeared to reflect contingent events and needs, the extensive use of temporary measures endangered the credibility of rules, and there were problems with the statistical framework, such as large ex-post revisions of key data.

The 2005 reform of the SGP gave greater importance to cyclical issues and long-term sustainability, increased flexibility in implementation, revised the clause for exceptional circumstances and introduced country-specific MTOs. It also called for the development of national budgetary rules and greater involvement of national parliaments. The reform increased

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complexity and the scope for discretion, loosening EDP criteria and deadlines. The focus remained on fiscal issues, and macroeconomic imbalances continued to get little attention.

A view from 2005

In 2005, in the concluding paragraphs of our book on "Fiscal Policy in Economic and Monetary Union. Theory, Evidence and Institutions", Marco Buti and I noted, "Whatever judgment is ultimately made regarding the revision of the Stability and Growth Pact, it would be wrong to assume that the Pact will become irrelevant. First, the reasons why fiscal rules were adopted in a monetary union of many sovereign countries in the first place are still valid. The future enlargement of the euro area to Central and Eastern European countries actually strengthens the need for a common fiscal framework. Second, as shown by the debate on the reform of the Pact, no viable alternative to a credible supranational rule emerged, since all the other potential solutions came up against serious criticism of one kind or another. Third, many countries need sound fiscal policies leading to a reduction in debt levels also for purely domestic reasons – particularly the demographic shock which lies around the corner: an external anchor may continue to be useful for many countries. Finally, it is likely that, as soon as serious imbalances emerge in some countries threatening the stability of the euro area, the other euro-area members will step up the pressure for rigorous implementation of the rules.

Therefore, in our view, the Stability and Growth Pact will not become yet another ineffective coordination process that, after a burst of attention, fades away and de facto be forgotten. This does not mean that with the agreement of March 2005 the controversy over the Pact will be laid to rest. On the contrary, as rules are necessary in a monetary union, but as such put a constraint on national choices, it can safely be predicted that the revised Pact will remain at the core of policy debate in Europe and that there will be no shortage of proposals for the 'reform of the reform'."

We also stressed that the crucial test would have been the capacity of governments to exploit the cyclical upswing to acquire adequate safety margins and noted that we cannot rely only on EU fiscal rules. We argued that we also need: (a) strong national budgetary institutions, rules and procedures, (b) market discipline (the issue being how to make it more gradual), (c) policy coordination (from peer pressure to EU investment and stabilization funds), possibly leading to federal institutions and policies. Finally, we emphasized the need for more fiscal transparency (concerning, inter alia, off-budget liabilities, cash and accrual data, projections, sustainability indicators) and for independent statistical offices and institutions informing the public and the markets.

Several years later: old problems, new problems

Fiscal risks have actually materialized: the SGP did not guarantee the adoption of prudent fiscal policies in good times; some countries failed to build adequate buffers in good times. New problems became prominent. There were no procedures for managing sovereign debt crisis: this created uncertainty and increased the time required to reach a solution. The interaction of sovereign debt and banks proved very problematic, creating funding problems for banks or the deterioration of public accounts due to the cost of rescue. The focus on fiscal issues proved insufficient. Fiscal imbalances are not the only critical factors in a monetary union; macroeconomic imbalances can undermine fiscal sustainability and sharpen financial tensions: part of private debt often becomes public debt (Franco and Zollino, 2014). Macroeconomic imbalances were not properly monitored.

Most of the weaknesses and vulnerabilities unveiled by the sovereign debt crisis were known long before the inception of EMU. Attention was directed to the adverse effects of macroeconomic

imbalances and lack of structural cohesion among Member States as far back as the Delors Report, not to mention a number of academic papers. However, the rules were ineffective initially, because they focused almost exclusively on fiscal discipline and, absent an independent enforcer, their implementation often depended on contingent events. Although the rules were later amended, the critical implications of macroeconomic imbalances for fiscal sustainability as well as for financial stability were largely neglected.

Progress in market integration and economic convergence since the inception of the EMU may have played a role. The evidence shows that disparities greatly abated as candidate members resolutely sought to attain the numerical targets for EMU membership, and the trend continued right up to the financial crisis, which provoked a general halt to convergence if not a regression. Nevertheless, the moderately increasing convergence in such variables as inflation and lending rates did not extend to productivity and economic growth. Accordingly, the divergence in external competitiveness widened, and since the mid-2000s, internal imbalances worsened. Moreover, although the European institutions realized that enforcing fiscal discipline, though necessary, was not sufficient to preserve macroeconomic stability, no major institutional reform was attempted prior to the outbreak of the crisis.

A broad reform effort

In recent years, European policy makers tried to cope with the new challenges by introducing further, and more radical reforms. Fiscal rules were strengthened with the introduction of the European semester; with the Six pack introducing an expenditure rule, a debt reduction rule, reverse majority voting and sanctions in the preventive arm; with the Two pack strengthening the coordination and surveillance of budgetary policies; with the Fiscal compact requiring a structural balanced budget in national legislation and an automatic correction mechanism for offsetting slippages. Monitoring and correction of macroeconomic imbalances were enhanced by the new procedure introduced with Six Pack. New financial support mechanisms were also introduced: EFSF in 2010: ESM in 2011. Finally, banking union was launched in 2014. Altogether, this is an enormous progress. It shows that the EU can react to challenges and move forward with great determination.

Several problems are still open. For instance, the multiplicity of fiscal rules makes the EU framework difficult to manage and to be understood by national policymakers. In particular, one may consider whether we really need an expenditure rule. National expenditure rules can play an important role at the national level and complement the EU rules concerning the deficit and the debt. National governments can control spending more than revenue and deficit, which can lead to greater accountability. Moreover, expenditure rules do not hamper stabilisers on the revenue side, which is consistent with tax smoothing and cyclically adjusted targets, and expenditure rules can curb the tendency to increase spending in upturns. Finally, expenditure rules can be easily explained and monitored and can link the annual budgetary process to a multi-annual policy framework.

The use of expenditure rules in a multinational context, such as the EU, appears more problematic (Buti *et al.*, 2003). First, uniform spending rules would impose homogeneous social preferences to politically heterogeneous countries while country-specific rules would be difficult to enforce. Second, spending norms do not refer to the fiscal variables that can produce negative externalities. While a rising deficit or debt level in one country can create area-wide problems, a rising expenditure level as such does not have negative repercussions on other countries. Moreover, expenditure rules cannot prevent deficit and debt increases stemming from tax cuts. Therefore, they would have to be complemented by a deficit or a debt rule. Finally, the size of the budget typically

reflects the political preferences of the government. A new government may want to renegotiate the commitments of its predecessor.

Some technical aspects of the EU fiscal framework remain problematic. For instance, the use of cyclically-adjusted figures has sometimes proved problematic (Franco and Zotteri, 2011). In particular, estimates of output gaps have frequently been revised, sometimes significantly. When they have been revised upwards (*i.e.*, becoming less negative), the cyclical component has been overestimated, with an underestimation of the cyclically-adjusted deficit. Additional problems may arise from the fact that revenues sometimes fluctuate more than would be expected on the basis of the GDP cycle, for instance due to movements in asset and commodity price. These fluctuations cannot be easily dealt with by standard methodologies for cyclical adjustment. Revenue windfalls and shortfalls may offer room for expansionary policies in good times and require pro-cyclical contractionary policies in bad times. These problems do not suggest the abandonment of cyclically-adjusted figures, rather their use with some degree of caution. Independent scrutiny of fiscal policy and good information to the public would also be useful in tackling this problem.

Rules that are more automatic and a strengthened role for the Commission will certainly help in coping with the new challenges. Still, for a long time there will no European federal government enforcing the rules. Moreover, the EU budget will most likely remain small. The introduction of new rules at the national level is certainly useful, but ownership of the new rules should not be taken for granted. National fiscal rules can make policies more time consistent, contribute to fiscal discipline and facilitate stabilisation. However, rules are not a magic wand. Governments can choose to override (either explicitly or implicitly) their own rules. A number of factors (cyclical developments, unexpected shocks, structural changes) may require adjustments of the rules, which can endanger their credibility. Rules can only work if they are grounded on a comprehensive fiscal framework and high transparency standards. They can be successfully implemented over a long period only if public opinion considers them a valuable contribution to policy making. The success of fiscal councils should also not be taken for granted.

It is very likely that financial market discipline will remain crucial. While it would be extremely risky to replace fiscal rules with market mechanisms, greater transparency in fiscal accounts would allow markets to complement rules.

In the end, the success of EMU will rely on the strengthened EU rules, on national fiscal frameworks and on the pressure exerted by financial markers. It will also rely on the capacity to correct unsustainable imbalances. In this regard, one should not forget that the correction of macroeconomic imbalances is primarily a national responsibility and is in the national interest.

Coming challenges

One should not underestimate the coming challenges. When MTOs have been achieved, there will be plenty of room for counter-cyclical policies, but in the transition to the MTOs policies may result pro-cyclical. Moreover, countries will have to be ready for the rise in interest rates in coming years. They will need sound primary balances and adequate growth rates. In order to meet the impact of ageing, many countries should have reduced their debt ratios (to swap lower interest spending for higher pension and health spending). In several countries this has not been the case so far. Finally, there are political tensions. In many countries, the public seem increasingly dissatisfied with the EU.

Fiscal developments will certainly be important, but macroeconomic developments will be crucial. Several countries should tackle the growth issue, being aware that higher deficits do not buy higher growth in the medium term. Structural reforms enhancing competitiveness will be decisive. This is primarily a national responsibility, but the EU can help via the surveillance of

macroeconomic imbalances. This is probably the main challenge at the EU level: it implies interfering with economic policy at the national level in a very broad sense. In the end, it implies an extensive EU evaluation of national policy making. This opens a number of issues. First of all, measures to prevent macroeconomic vulnerability are quite controversial. For example, the same values in current account balances or house price changes may have different relevance depending on country-specific factors. In this respect, developments that can be considered growth-enhancing and welfare-improving today may harbour the seeds of harmful imbalances if the general situation changes, due to either domestic or external shocks. Moreover, it is not straightforward to design policies to address the instability risks detected. Indeed, different mixes of factors may underlie the macroeconomic vulnerabilities, and the identification of policy priorities may be controversial. Structural reform is particularly challenging, in that the beneficial impact on macroeconomic imbalances is hard to assess and may be slow in emerging, and possibly even with an adverse impact in the short run. In the case of unsustainable asset inflation, for instance, it is notoriously difficult to identify a bubble before it bursts, and preventive action would carry the political cost of curbing the economy's growth prospects. Accordingly, policy recommendations to prevent and correct macro imbalances can be hardly unequivocally identified by theoretical analysis, and in the current institutional set-up they may hinge on the political economy of inter-governmental competition, as well as on contingent events and needs. Finally, one should consider whether macroeconomic monitoring should be carried out by the same institutions in charge of enforcing fiscal rules and along similar lines.

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PANEL DISCUSSION

Karsten Wendorff [*]

It is a pleasure to contribute to the panel discussion on new rules for EMU. I will try to be pointed and provocative in order to stimulate the discussion and I will focus briefly on two issues: First, the general framework of the monetary union and, second, the European fiscal rules. To summarize: With regard to both frameworks, I am worried that we are not moving towards a stable framework in the medium to long term.

The most general question with regard to rules in EMU is: Do we need rules at all?

Being as German as possible my answer is: "I have rules, therefore I am."

A French person might answer: "Of course we need rules, and I will sign up to all of them, but: what are rules?"

Both of these exaggerations may reflect the traditions of the countries concerned. France has a history of centralisation, where the nation votes for its president and government, and these take decisions for the nation as a whole and have quite large scope for discretion. The President of France decides on French matters and represents the French people.

Germany is more federalist in structure. Its regions have a larger role in the political decision-making process. There is no single central decision-maker taking decisions on a discretionary basis. Instead, there is greater reliance on *ex ante* contracts and rules – kind of treaties under which the regions have agreed to give up sovereignty to the center where the major decisions are taken.

Setups like the EU and the European monetary union still consist of highly individual countries, which still feel themselves as nations. They retain important powers at the national level. From my (German) point of view, such a setup needs credible treaties and rules and a particular trust in the legal framework. These are important for living together and further integration because credible treaties are needed when the countries give up some of their sovereignty. Negotiations are conducted, compromises are found and in such a setup it is crucial that everyone can rely on compliance with the agreements. For example, a country agrees to something which it does not like too much, but which is important to another country, and, in exchange, it may be provided with a regulation it likes, but with which the other country is not so happy. A fiscal rule might, for example, be granted in exchange for greater mutualisation, but there must be trust that the rule is not just on paper.

We would face severe problems if the various countries and as well private actors had doubts about the ability to reach credible agreements that are also binding in the medium to long term. Therefore, I am convinced that EMU and its further integration cannot be built on discretion but only on credible treaties, agreements and rules. Of course, if the environment or opinions change, it should be possible to change things. But, in such a situation, it is, in my view, important to amend the treaties and agreements in the context of a regular democratic decision-making process.

I fully agree that a crisis calls for a certain degree of give and take and, of course, treaties, rules and agreements should allow a certain amount of flexibility and room for interpretation. However, I fear that we risk overdoing it.

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By observing the European debate, there is sometimes the impression that policymakers want to change things, but that they are afraid of the general public, because the general public might not agree, for example, to the amendment of existing treaties. Therefore, rules, treaties and agreements are reinterpreted. Strange and extremely complex legal constructions are assembled in order to make them hopefully conform with the pre-existing framework - or in case of doubt make them incomprehensible for the public at large. There is a tendency to a high level of discretion and decisions are shifted away from populations and parliaments towards councils and, at best, to the ECB and the Eurosystem, which, being independent, is the furthest removed from democratic processes and theoretically, of course, has unlimited financial resources.

I fear that we are putting acceptance of the European integration process at risk, that we risk undermining trust in the legal principle and, as a central banker, I fear in particular that we risk overburdening monetary policy.

In the Workshop also the opposite was said: namely, that there is a risk that monetary policy could overburden fiscal policy. In my view, this clearly indicates the pressure monetary policymakers will be facing in the future. As soon as an interest rate increase is deemed to be appropriate in the face of mounting price pressures in the euro area as a whole, we will certainly face calls for delaying that increase on the grounds that it will place too great a burden on some countries and on fiscal policy. The resulting risk for financial stability will be emphasised and monetary policy will be called on to assume responsibility for financial stability and keep the interest rate low.

Now, let me turn more specifically to fiscal rules in EMU.

In my view, the changing framework of governance in EMU means, if anything, that the importance of fiscal rules has increased. Even though many things have changed in the crisis, the deficit bias of politics in the short term is still there.

At the same time, in response to the crisis, one important disciplining mechanism has been weakened: market discipline.

- The “no bail out” provision has been transformed more or less into a “bail-out promise”.
- The fiscal support mechanisms have mutualised debt and there is almost no interest surcharge, which I feel is a very problematic incentive.
- The Eurosystem has announced that it will do “whatever it takes” - within its mandate.

So, given the less pronounced roles played by market discipline, “no bail-out” and the prohibition of monetary financing, the role of credible fiscal rules has become more important.

We have heard earlier in this session what credible fiscal rules are. In my view, in particular:

- They should be not too complex, so some “stupidity” is unavoidable. Of course some exemptions are needed, but they should be as clearly defined as possible.
- The rules should be set as an upper limit, so that the government has full flexibility when being below the threshold. The rules should not be an instrument for fine-tuning the fiscal stance.
- The rules should be understandable for the policymakers and the general public.
- They should be implemented rather strictly and, in particular, they have to build up credibility after being reformed, which could be achieved by an even stricter implementation.
- It is crucial that the general public can follow, so that the rules can increase the political cost of higher deficits and thereby counter the deficit bias. The rule is a potential tool for the opposition, which can blame any government’s unsound fiscal policy more easily.

So, what about the reformed European rules?

Just after the latest reform process with all the various "pacts", my assessment was rather favourable.

- The statistical production should become more reliable.
- Greater prominence seemed to be given to the debt ratio.
- There was a shift of power from Ecofin, which was quite weak in its decision-making, to the Commission, which should have the potential to be more rigorous.
- The Fiscal Compact and its implementation in national law should have improved national ownership and also focused the national debate more on the existing European rules. It was also intended to make non-compliance a national legal problem.

Overall, in my view, the rules could have been strengthened. But finally it of course crucially depends on the way the rules are implemented. It has to be borne in mind that no national sovereignty has been transferred. We have not entered a fiscal union and national parliaments can, in principle, do what they want.

Now, after the initial excitement, from the present perspective I am somewhat disillusioned with regard to the implementation of the fiscal rules. In the past, when somebody asked me about my profession, I said that I am a fiscal expert. However, I would expect that being a fiscal expert means you should at least roughly understand how the basic fiscal rule is exactly working. I don't any more. So, if someone now asks me about my profession I say that I work on fiscal issues.

I fear we currently risk eroding the fiscal rules. Yes, some flexibility is needed. The rules may not be that simple. A little discretion may be warranted. But current developments are taking things too far.

The rules are becoming incredibly complex, intransparent, arbitrary and discretionary.

There is the impression that they are designed with a search for exemptions in mind. For example, the assessment of "effective action" and hunting for the "green light". My current understanding is:

- If you have reached the nominal target, you are more or less off the hook. Even if it is done with the help of the cycle or one-offs.
- If not, there is a test whether the structural deficit can be used as an excuse. Here, we have the chance to fine-tune the assessment by increasing the real time output gap through changing the underlying methodology – where we may allow even for options for the country to decide on the methodology.
- If this does not work, we correct for alphas and betas where the calculations are complex and, I had the impression, vary somehow.
- If the country fails to comply with the former criteria, we turn to a bottom-up where you take on board country-specific measures. This is a move to the micro level, where almost no-one can follow apart from the Commission and the country in question. Peer pressure from other countries and from the general public is eliminated and we have reached a very high degree of discretion and room for manoeuvre.
- We would reach full discretion if the former five tests were negative, and there would be a final round with an overall assessment, where all other factors could be taken into account which may come to the mind of the national government or the Commission.

All in all, to my mind we are in the process of transforming a rules-based framework into a framework of full discretion, where consolidation risks being postponed and the disciplining power becomes lost.

In my view, the Commission has significantly reinterpreted its role in this process.

Initially, I had the perception that the Commission was interested in stringent rules and that they saw themselves as a referee guaranteeing sound public finances by implementing the existing rules. Having clear-cut rules and a lack of discretion protects the Commission – the referee – from political pressure and influence. As a result, the transparency of the rules should give clear guidance to policymakers and the general public, thereby giving them binding force.

Now, the Commission seems no longer to be interested in being the referee on the basis of rules, but rather in being a decision-maker and negotiator on the basis of a discretionary assessment. However, as there is much discretion, the rule becomes a bargaining process, in which political influence and pressure become important. As a result, if politicians and populations become aware of the available scope for discretion, the rules lose their power, because it is always possible to believe that exemptions can be negotiated.

If it became obvious during a football match that the referee was not applying the rules of the game impartially but was instead blowing his whistle on a discretionary basis, the atmosphere in the stadium would become very heated, but this would certainly not improve the game.

It will be particularly interesting to see how the rules are implemented in the case of Italy and France, whose governments recently announced that they do not care much about deficit reduction.

To avoid any misunderstanding: I am greatly impressed by the work of the Commission: its high analytical power, its European approach, how it handles its role between the Parliament, the Council and the national governments. But, the debate we had in this Workshop on the optimal design of Fiscal Councils supports the view that it is the wrong institution to implement the fiscal rules. I therefore believe it would be a productive idea to shift the task of assessing fiscal developments, plans and compliance with the fiscal rules to an independent institution that has a clear and only focus on that task, which does not have several other policy goals and which is outside the regular European bargaining process.

So, in conclusion: If Europe does not decide on fundamental change and is willing to enter a fiscal and political union, we have to strengthen rather than weaken the current framework, including the incentives for sound public finances.

This means:

- Keeping market discipline alive by ensuring that investors remain responsible for their investment decisions.
- In doing so, it is very important to make financial markets and the banking system much more resilient to pressure so that it can absorb fiscal stress without posing a threat to financial stability in the euro area as a whole.
- Breaking the nexus between banks and governments. Mutualising the risk of the banking systems, which we are currently doing, is one course of action. But to be symmetric, we should also sever this nexus by placing a clear limit on public debt included in the balance sheet of the individual banks. At the same time, we should ensure that taxpayers retain responsibility for electing their national government and, thus, for its economic and fiscal policy. It is therefore advisable to limit bail-outs and to provide support only against interest surcharges and strict conditionality.
- Finally, keeping fiscal rules as simple and transparent as possible and keeping relevant assessments outside the political bargaining process.