THE MULTIFACETED RELATIONSHIP BETWEEN
FISCAL AND OTHER MACROECONOMIC IMBALANCES

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This paper aims at shedding light on how fiscal policy relates to other macroeconomic imbalances in Spain. An Error Correction Model is estimated to assess the effect of the public balance on the current account, obtaining a co-movement in sync with conventional wisdom. Furthermore, a Vector Autoregressive Model is used to examine the interaction between fiscal policy and domestic macroeconomic imbalances such as unemployment, credit and private investment. Within this empirical framework, booms of credit, investment and low unemployment are found to improve substantially public accounts. In turn, fiscal consolidation also tends to anchor good expectations and can engender these private imbalances. Finally, some empirical tests are performed to assess the sustainability of the Spanish fiscal position, obtaining evidence of weak sustainability.

1   Introduction

Fiscal policy refers to those discretionary actions put in place to alter public revenues or expenditures. The objective of those measures may be microeconomic, like correcting some market failures or attaining some redistributive gains, or macroeconomic. The traditional macroeconomic role of fiscal policy was limited to smoothing the economic cycle. Nonetheless, a more modern view considers other dimensions of macroeconomic stability, like the sustainability of public finances and the potential to address other macroeconomic imbalances. Furthermore, the public sector intervention in the economy should contribute to achieve a sustainable rate of growth in the long term, by focusing on the quality and efficiency of expenditures and by designing a growth-friendly tax system.

Setting aside the role of the public sector to promote long term growth, the most daunting and at the same time appealing task, this paper aims at shedding light on that modern notion of fiscal policy that goes well beyond output and employment stabilisation in the very short term. We put the lens on Spain, perhaps one of the most paradigmatic cases in this regard.

The long-term sustainability of public finances has been an issue profusely explored by the literature in the last 25 years. To that end, methodologies and tests have been developed to assess whether public expenditures and revenues have sustainable trends, compatible with the satisfaction of the intertemporal budget constraint (Trehan and Walsh, 1988 and 1991, and Quintos, 1995). This analytical framework has been applied to Spain as well (De Castro, 2005; and Bajo-Rubio *et al.*, 2010). This analysis is of utmost importance, given that, in order for the fiscal policy to promote macroeconomic stability, ensuring a sustainable path of expenditures and revenues should be first and foremost.

A more novel branch of research could be the potential of fiscal policy to address other macroeconomic imbalances, like the current account, competitiveness developments or asset, credit

and housing markets bubbles. The relevance of these imbalances in the global crisis and, especially, in the Euro Area has placed these issues under the spotlight of the theoretical and institutional debate, as the development of the Macroeconomic Imbalances Procedure (MIP) in the European Union signals. Some examples of the issues that could be studied in this regard are the macroeconomic impact of the fiscal stance on the current account (Lee *et al.*, 2008; and Salto and Turrini, 2010) and other imbalances, the effects of tax measures on the current account (de Mooij and Keen, 2012) and on other imbalances (Andrews *et al.*, 2011), or even the assessment of how a higher quality composition of expenditure can tame these imbalances.

Furthermore, macroeconomic imbalances and fiscal policy are interrelated in a bidirectional manner. In other words, these imbalances also impact public expenditures and revenues and hence deficit and debt. For instance, in some European countries (including Spain) excessive credit growth and other imbalances were inflating nominal revenues and public balances, although the underlying structural or permanent indicators were not that solid.

This paper aims at covering most issues raised in this first introductory section and, for that purpose, it is organized as follows. Section 2 allows for a bird's eye view of fiscal policy in Spain in the last three decades. Section 3 sets a model for interpreting the effects of fiscal policy on the current account from a macroeconomic point of view. Section 4 analyses, from an empirical perspective too, the interactions between fiscal policy and domestic macroeconomic imbalances. Section 5 takes a look at the long term sustainability of Spanish public finances through orthodox empirical tests. Section 6 contains the concluding remarks.

2   An overview of fiscal policy in Spain

Since the advent of democracy in 1975, the size of public revenues and expenditures relative to GDP started to increase in Spain, given the creation of a full-blown Welfare State, the construction of a decentralized fiscal framework and the design of a modern tax mix (De Castro, 2005). Therefore, public deficit and debt widened in the downward phases of the economic cycle (like the early '80s or the early '90s), owing to the play of automatic stabilizers and discretionary stimuli.

Nonetheless, the fiscal stance changed substantially in the mid 1990s. After the European Monetary System crisis in 1992 and the subsequent currency devaluations, Spain entered a sustained economic growth phase which would last more than a decade. This macroeconomic stability facilitated the success in fulfilling the Maastricht criteria in terms of lowering public debt and deficit, interest rates and inflation. In turn, the soundness in public finances laid the groundwork for nominal and real convergence with the European Union, anchoring expectations. This context can provide evidence of the non Keynesian effects of fiscal policy.

Figure 1 pictures these changes. Public balance improved from almost –7 per cent of GDP in 1995 to +1.9 per cent of GDP in 2007, while gross public debt went down from around 70 per cent of GDP to 36 per cent.

The first analysis carried out in the early 2000s pointed out that fiscal consolidation achievements in the mid and late 90s were due not only to the economic cycle and the lower interest payments, but also to the contraction in the cyclically adjusted primary balance (Hernández de Cos and Ortega, 2005). Moreover, the reduction in cyclically adjusted primary expenditure was the main driver behind the structural adjustment, as revenues kept more stable (Briotti, 2004).

In a nutshell, in the first phase of fiscal consolidation government spending declined substantially, well beyond the positive effects of the economic cycle and the lower interest rates. This allowed for statutory tax rate cuts not to affect total tax revenue amid an environment of

Figure 1

Evolution of Public Finance Benchmark Indicators in Spain from 1995
(percent of GDP)
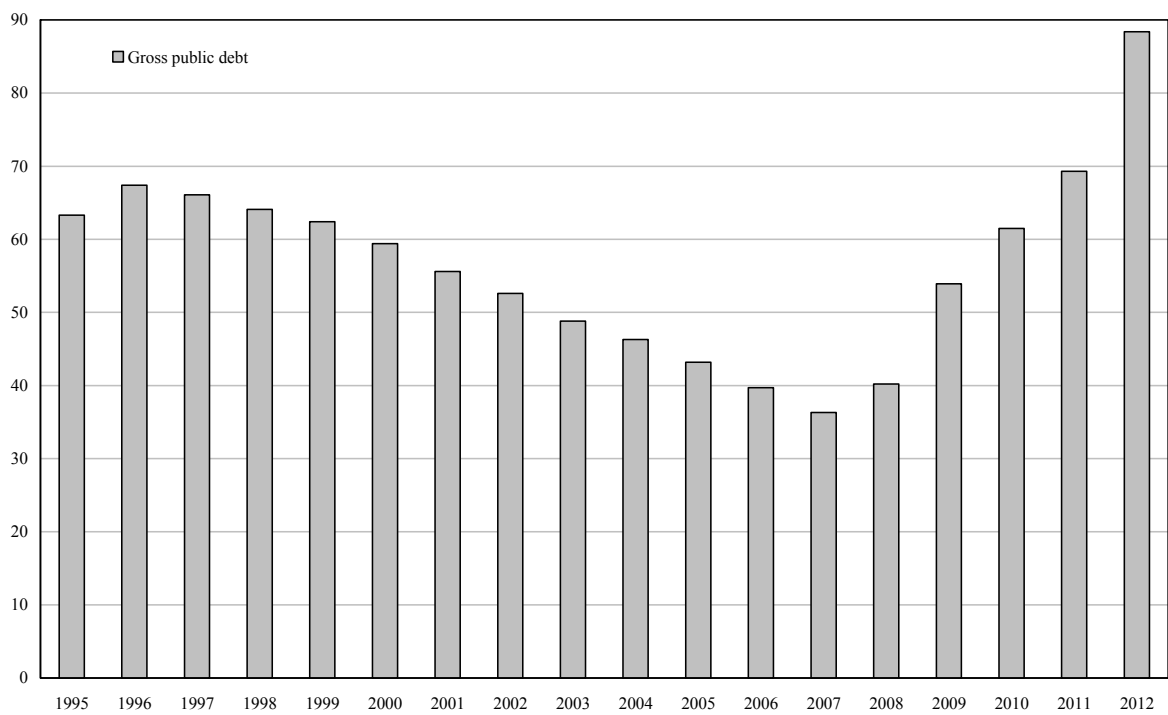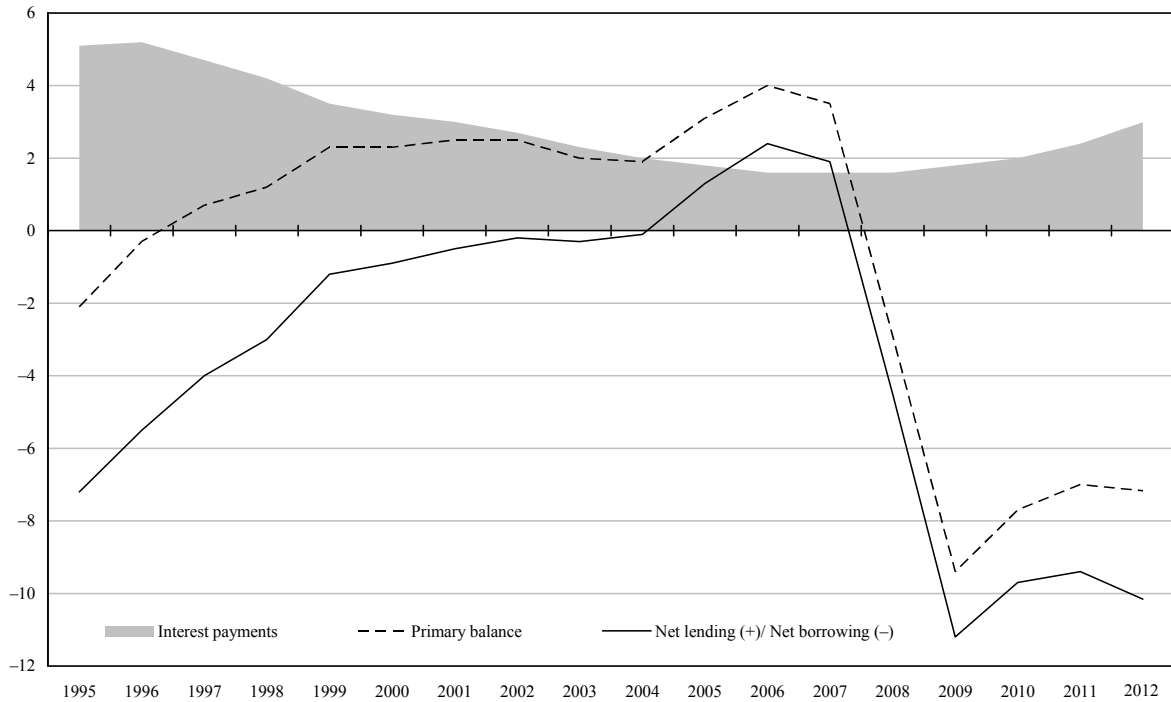
Source: AMECO and Eurostat.

strong private demand. In this regard, that policy contributed positively to macroeconomic stability by improving the soundness of public finances and by creating a more flexible and competitive economy. In contrast, a consolidation strategy based on tax hikes would have been more harmful for economic growth in the medium term.

Furthermore, even if public revenues were stable relative to GDP, there were qualitative changes within them. The tax mix started to step more at indirect taxes and less at direct taxes (Von Hagen *et al.*, 2001). In principle, this combination could be conducive to the correction of the external deficit and other imbalances, providing a friendlier framework to growth and competitiveness.

The initial relative satisfaction with the fiscal consolidation process in Spain can be better understood thanks to Figure 2. The improvement in the public balance from 1995 to 2007 amounted to more than 8 percentage points of GDP. Nonetheless, the structural primary balance correction was equivalent to around 3 percentage points. Furthermore, that "discretionary impulse" took place in two relatively short periods. The first, between 1995 and 1997, consisted in cuts in structural expenditure, what could explain the initial complacency with the consolidation. The second period, between 2003 and 2007, stepped at cyclically-adjusted revenues increase, which perhaps were not that "permanent".

After taking into consideration the whole period of consolidation, and with the benefit of hindsight, the analysis has drawn different conclusions from the pieces of research abovementioned (Bank of Spain, 2011). The roaring tax collection in the 2000s casted some doubts on whether and how much of the revenue base increase was structural. The booming development of construction and real estate fuelled output and public revenues (IMF, 2009a and 2011). This growth model was impacting and inflating the fiscal position through indirect tax collection due to housing sales and, more subtly, through social security contribution and personal income taxes (given the labour intensity of these sectors). Even the corporate income tax (a figure which is very procyclical and suffers from hysteresis) was bound to be generating windfall revenues (IMF, 2009b). When the housing market and the pattern of growth collapsed, a substantial part of the tax base seemed to vanish.

Given the shortcomings related to the measurement of potential output and the cyclically-adjusted balance (thoroughly assessed in De Castro *et al.*, 2008), it seems plausible that the Spanish structural fiscal position was overestimated. Some experts (IMF, 2009b, and Bank of Spain, 2011) point out that the outstanding improvement in the public balance (over 8 percentage points of GDP) between 1995 and 2007 was due to cyclical developments, the drop in the interest burden and, especially, a *dark matter* unexpected jump in public revenue (over 5 percentage points of the GDP). The cyclically-adjusted primary expenditure barely contributed and the revenue-side would have played an expansionary role, given the legal tax cuts. In this regard, it has been argued that the improvement in the public balance from 2005 to 2007 seems to be due mainly to non-discretionary efforts, most likely to higher tax elasticities than the ones assumed (OECD, 2010).

Nevertheless, the decline in interest payments (one of the forces behind fiscal consolidation) should not be considered as totally exogenous or away from the control of the authorities, given that lower sovereign debt yields also reflect confidence in the government's policies. Furthermore, the decrease in interest payments was caused as well by the descent in public debt, which responds to changes in deficit and to other policies. For instance, in the late 1990s Spain implemented far-reaching privatization policies which paved the way for public deleveraging.

In any case, it is reasonable to assume that fiscal policy did not contribute enough to macroeconomic stability or to address other imbalances. Another issue often raised is the role of the tax treatment of the housing market in its different dimensions, especially as far as the

Figure 2

Evolution of Structural Budget Indicators in Spain from 1995
(percent of GDP)
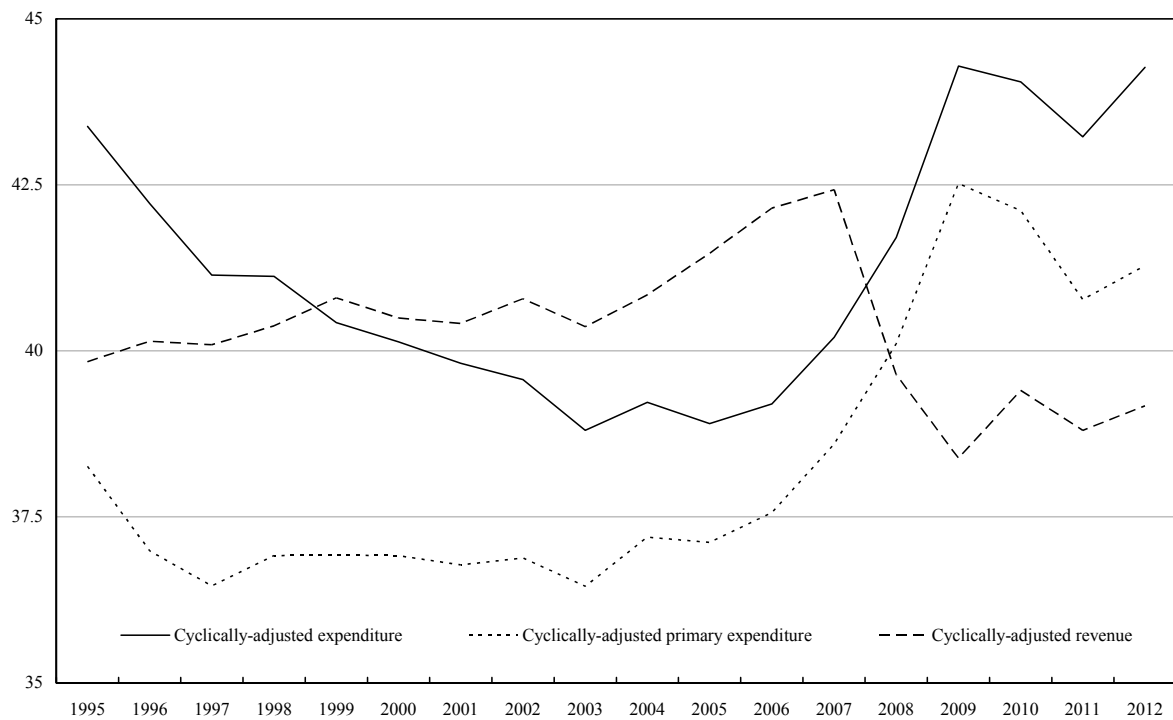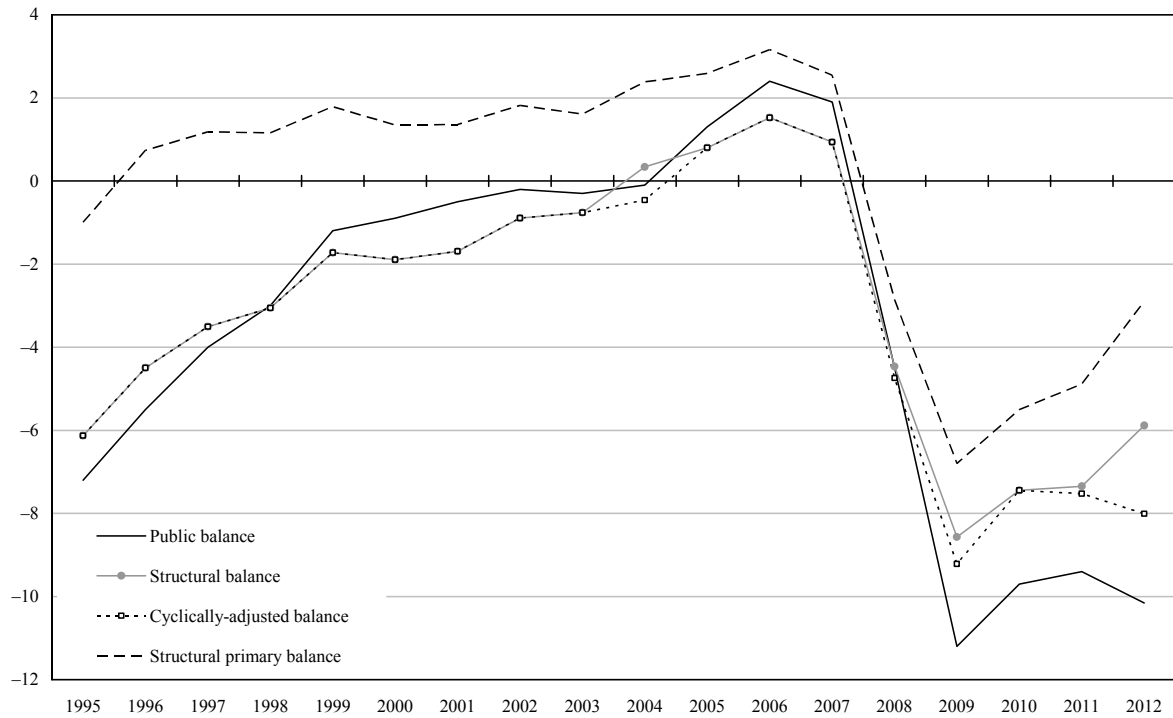
Source: AMECO and Eurostat.

deductibility of mortgage interest payments is concerned. In Spain, like in other developed countries (Andrews *et al.*, 2011), the tax incentives in favour of ownership encouraged households to take on an excessive amount of debt.[1] This fuelled the financial and housing bubbles and could be behind other imbalances, such as the internal and domestic competitiveness loss.

Despite a good performance in structural competitiveness (as evidenced by export market shares), the growth model was taking a heavy toll on price competitiveness. The appreciation of the real effective exchange rates (REER) and the stubborn increases of unit labour costs (ULC) were the most remarkable warning signs of that trend. They were provoked by the abnormal growth of a low-productivity non-tradable sector like construction.

The current account (CA) deserves an in-depth analysis given its connection with all the issues aforementioned. The drag on price competitiveness, the boom in internal absorption and the credit intensity of construction and real estate activities laid the groundwork for the external deficit. Furthermore, some research shows that the fiscal policy stance could have contributed to the external deficit (IMF, 2006), given that primary expenditure outpaced real GDP growth in the 2000s and the increase in revenues was rather cyclical and was not exerting a balancing bias.

Whatever the case may be, the public balance (even if the bias was not countercyclical enough) was actually recording a surplus and therefore alleviating the external financing needs, in a sign of the so-called "twin divergence" (Kim and Roubini, 2008). In principle, this would collide with the observed contribution of the public balance to the current account (Lee *et al.*, 2008; and Salto and Turrini, 2010), which normally tends to co-move in sync with the hypothesis of twin deficits. On the contrary, in the 2000s, Spanish households and firms appeared to behave in a Ricardian manner rather than Keynesian (Cardoso and Doménech, 2010).

One likely explanation for this result would be the role of credit constraints in the optimising behaviour of private agents (Galí *et al.*, 2003). This relaxation of borrowing conditions (linked to the euro adoption, the global liquidity glut and a sound macroeconomic framework) allowed households and firms to smooth their consumption and investment decisions, bringing forward future income. A lower share of credit-constrained households (Bussière *et al.*, 2005) set the basis for a "twin divergence" in Spain. The improvement of public finances in the 2000s should have contributed to the external adjustment, but the actual effect was quite different. Indeed, perhaps fiscal consolidation exacerbated the good expectations, encouraging private agents to assume even more debt.

Since the crisis triggered, the landscape has changed drastically, and the imbalances have begun to unwind. Price competitiveness indicators, such as REERs and ULCs, have partially corrected their eroded position. The weight of construction and real estate in GDP and in employment has adjusted quite abruptly, weighing on the health of public accounts.

Again, the linkages between the current account and the fiscal stance deserve a second thought, and that is why Figure 3 zooms in on the saving-investment balance. This figure illustrates how private demand was affected by financial constraints and precautionary savings amid an environment of high uncertainty and unemployment. The current account started its adjustment, particularly intense in 2009 when commodity prices bottomed out.

Meanwhile, the public sector took an undeniably expansionary role, sparing no effort in its discretionary action. Therefore, the initial quarters of the crisis lived another period of "twin divergence", in this case with an external private-led adjustment and a public balance deterioration.

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[1]   Other drivers of the housing bubble were historically low real interest rates (together with other lax financial conditions, such as lengthening maturities), real disposable income growth, good expectations, immigration flows and increases in population.

Evolution of the Saving (S)-Investment (I) Balance in Spain from 1995
(percent of GDP)
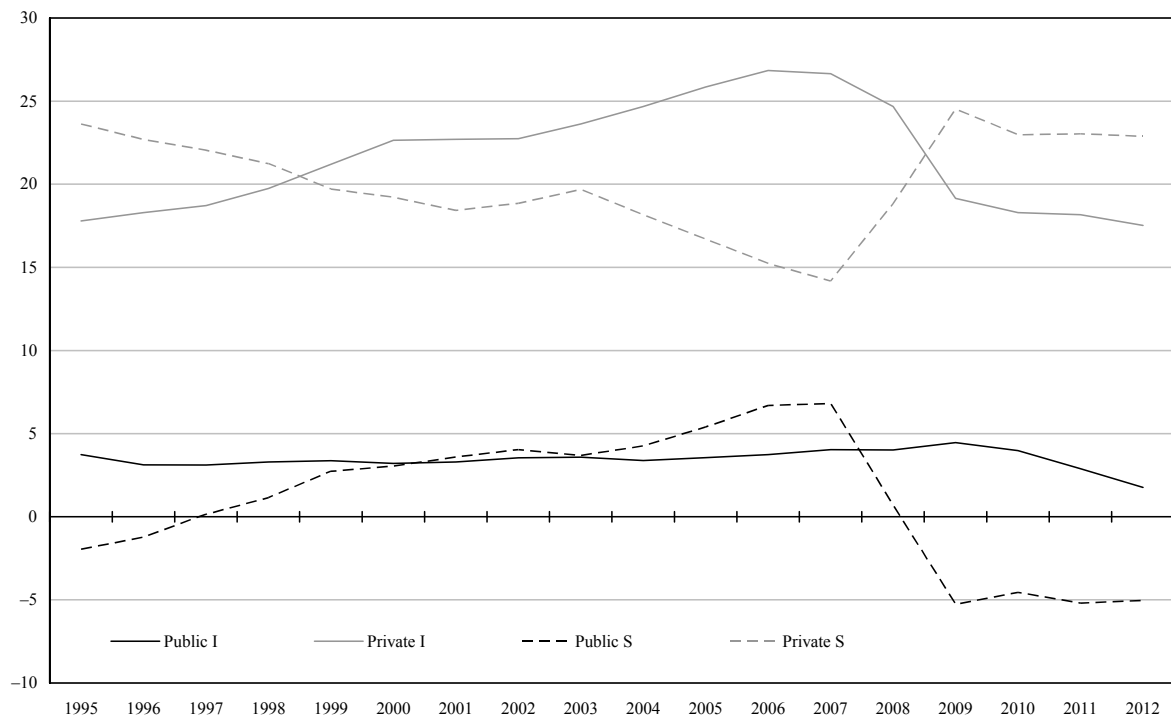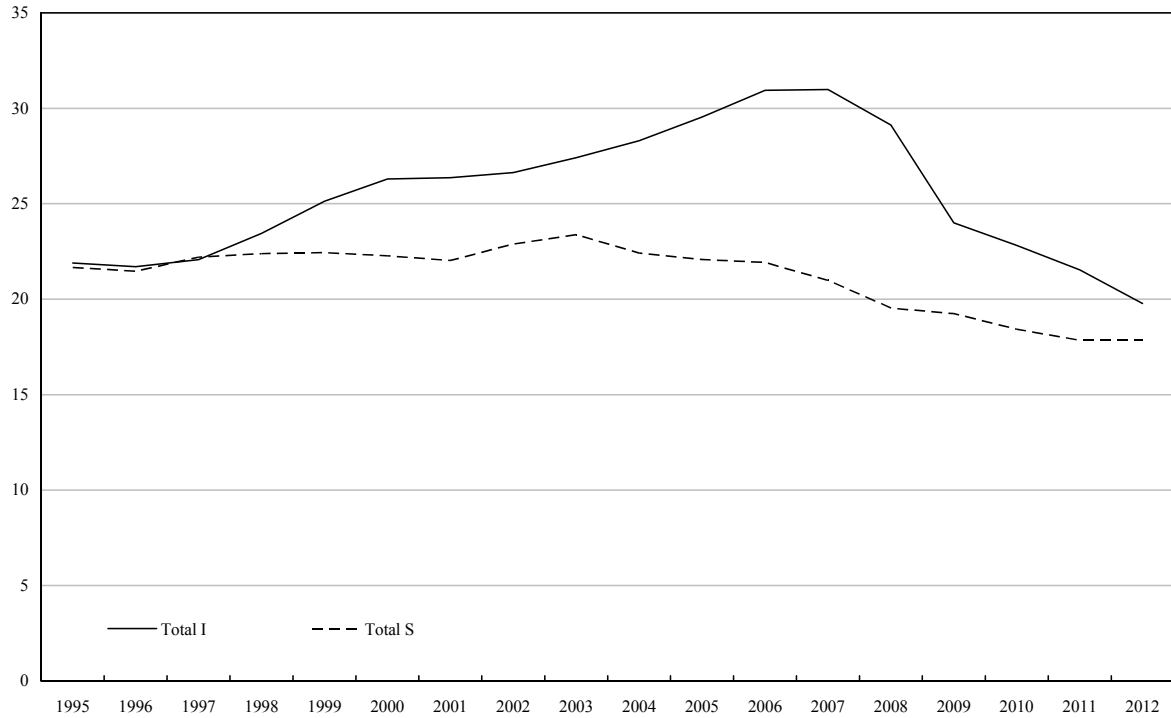
Source: AMECO, Eurostat and Bank of Spain.

Since 2010, when credit constraints have started affecting both private and public agents, external and public accounts co-move in the traditional sense. The fiscal consolidation is having a direct effect on the external adjustment, which adds to the private deleveraging. Currently, the fiscal stance is, without a shadow of a doubt, very contractionary. Indeed, looking back at Figure 2, we can check how the structural primary adjustment in the last 3 years has been over 3 percentage points of GDP, almost equivalent to the adjustment between 1995 and 2007.

In order to shed light on this paradigmatic and volatile behaviour, we are going to put the focus on the link between fiscal policy and external imbalances. The interaction of fiscal policy with other imbalances will be analysed later.

3   The contribution of the public balance to external accounts

Given the depth and relevance of the interactions between the fiscal stance and the current account, it is worth studying this issue in detail. The methodology herein applied tries to mirror the one used in Brissimis *et al.* (2011), which studies external sustainability and current account determinants for Greece.

The long run determinants of the current account are estimated according to an error correction model (ECM), which follows a two-step approach (Engle and Granger, 1987). First, a long-run equation for the current account is estimated, taking advantage of a cointegration relationship between the current account and other economic variables, provided that they are integrated of order one $I(1)$. Secondly, a short term equation is estimated to explain the variations of the current account in function of the lagged variations of the explanatory variables and the residuals of the long term equation.

For the purpose of our research, we are particularly interested in the ECM for the current account (CA) and, especially, in the role of the public balance. The stepping stone is the identity between the current account and the difference between national savings (S) and investment (I). Furthermore, we divide the saving-investment balance into the private and the public sector[2]. The current account and the saving and investment rates are expressed in terms of nominal GDP (on a per unit basis).

$$CA = S - I = (S_{priv} - I_{priv}) + (S_{pub} - I_{pub}) \qquad (1)$$

These macroeconomic aggregates are interrelated among themselves. For instance, according to the Feldstein-Horioka puzzle, the main effect of an increase in domestic saving is a rise in domestic investment, being the impact on the current account marginal. In the same vein, the public sector could exert an influence on the private balance if agents behaved in a Ricardian manner. In that scenario a worsening (improvement) of the public balance would be followed by an equal improvement (worsening) of the private balance, with no impact on the current account. Therefore, we will estimate a single equation, which will take on board all these interlinkages.

There are other variables which play an important role too. We include the ratio of the stock of credit to the private sector to the GDP (*CREDIT* in logarithms), which will be bound to increase domestic investment and hence worsen the *CA*. It could be argued that the flow of credit could be a better variable to include in the model, since the *CA* reflects a flow, not a stock. However, since the

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[2]   The variable we use to refer to saving-investment balance in the public sector is the net lending/borrowing, although this is not purely correct, because the latter (in contrast to the former) does include the capital account. For those countries, such as Spain, that have received sizeable capital transfers, the difference can amount to 1 per cent of GDP. Nonetheless, the theoretical or empirical impact on our estimation approach is meaningless.

variables to be included in the ECM long-run equation must be $I(1)$, we include the stock of credit instead of the flow, which is integrated of order zero, $I(0)$. With this representation, and if the variable has the expected negative sign, a positive (negative) change in the stock of credit, *i.e.*, positive (negative) flows, will tend to reduce (augment) the *CA*.

In addition, the competitiveness performance of an economy is of utmost importance to determine its external position. We have decided to take an index (on a per unit basis) of unit labour cost (*ULC*) whose increase (decrease) shows an erosion (enhancement) of competitiveness. Hence, this variable is expected to have a negative sign: an augmentation (a reduction) should lead to a lower (higher) *CA*.

We consider as well the unemployment rate (*U*, on a per unit basis) as a key variable that affects agents' decisions directly, as it tends to reduce their spending, and indirectly, as it generates uncertainty and leads households to restrain their consumption and investment even further. This variable is likely to hold a positive sign: an increase (decline) would imply a better (worse) *CA*.

As for the role of the ratio of private investment to the GDP (*GFCF*, on a per unit basis), it should present a negative sign. A higher (lower) ratio will tend to deteriorate (ameliorate) the *CA*, as the country will need, *ceteris paribus*, foreign funds to feed its domestic absorption. If the Feldstein-Horioka hypothesis were to be valid, the coefficient would be zero: higher (lower) domestic investment would only take place if and only if local agents saved more (less), without any effect on the current account.

Finally, the public balance, measured as the net lending (+)/borrowing (–) in terms of GDP (*PB*, on a per unit basis), ought to have a positive sign. A worse (better) health of the governments' accounts is likely to translate into a *CA* reduction (enhancement), resorting to foreign savings to satiate the public financing needs. Should the consumers behave in a totally Ricardian way, the coefficient would be zero: the decrease (increase) in public savings would be followed by an equivalent surge (descent) in private savings.

In theory, it could happen that the elasticity of the *CA* against the *PB* could take negative values. For instance, if the correction in the public accounts generated a wave of positive expectations among private agents, they could end up responding with an increase in demand sufficiently high to more than offset the moderation of the government's expenditure. In the same manner, a serious deterioration in the public deficit could trigger a wave of pessimism and uncertainty that might slash private demand in an amount that increases national saving through the precautionary behaviour of households.

In order to check whether the coefficients have the expected signs we test the following equation.

$$CA = C + \underset{(-)}{\beta_1}\, CREDIT + \underset{(-)}{\beta_2}\, GFCF + \underset{(+)}{\beta_3}\, PB + \underset{(-)}{\beta_4}\, ULC + \underset{(+)}{\beta_5}\, U + \varepsilon_t \tag{2}$$

CA is the current account ratio to the GDP, on a per unit basis, extracted from the Bank of Spain and the Spanish Ministry of Economy and Competitiveness data. *C* is the intercept and β_i are the coefficients with their expected signs.

CREDIT is the stock of private credit ratio to the GDP, in logarithms, obtained from the Bank of Spain data of credit to the non-financial private sector. *GFCF* is the private gross fixed capital formation ratio to the GDP, on a per unit basis, got from Eurostat. *PB* is the public balance ratio to the GDP, on a per unit basis, extracted from BDREMS (see Boscá *et al.*, 2007) and Eurostat. *ULC* is a unit labour cost index from Eurostat, introduced on a per unit basis. *U* is the Labour Force Survey unemployment rate, on a per unit basis, from the Spanish National Statistics Institute.

<div align="right">**Table 1**</div>

ECM Long-run Relationship

Dependent Variable: CA

Method: Least Squares

Sample (adjusted): 1980Q1 2011Q4

Included observations: 128 after adjustments

Variable	Coefficient	Std. Error	*t*-Statistic	Prob.
C	0.136582	0.035903	3.804201	0.0002
CREDIT_CORR	−0.022024	0.007394	−2.978715	0.0035
GFCF	−0.664839	0.142689	−4.659357	0.0000
PB	0.270724	0.083337	3.248560	0.0015
U	0.167205	0.076717	2.179488	0.0312
ULC	−0.021907	0.007968	−2.749404	0.0069
R^2	0.883165	Mean dependent var		−0.027361
Adjusted R^2	0.878377	S.D. dependent var		0.030979
S.E. of regression	0.010804	Akaike info criterion		−6.17212
Sum squared resid	0.014240	Schwarz criterion		−6.038432
Log likelihood	401.0157	Hannan–Quinn criter.		−6.117802
F-statistic	184.4420	Durbin–Watson stat		0.34691
Prob(*F*-statistic)	0.000000			

The data are introduced with a quarterly frequency during the period considered from 1980, 1st quarter, to 2011, 4th quarter. All the variables are adjusted for seasonal variations and calendar effects with Tramo-Seats (Gómez and Maravall, 1996; and Bógalo, 2004). After running the pertinent tests (Dickey and Fuller, 1979 and 1981), the variables are found to be $I(1)$. Furthermore, once we estimate the long-run equation, the residuals, ε, are found to be $I(0)$.

Finally, it is important to recall that other variables usually considered in the literature, such as the dependency ratio or the relative income per capita, were not included in the model because of the lack of reliable quarterly data for them and the concerns that would raise a time disaggregation. The REER was as well included in the initial phases of the estimation, although it did not bear satisfactory fruits.

The following table contains the final estimation output. All the explanatory variables have the expected signs and are statistically significant, including the intercept.

The elasticity of the current account with respect to credit is relatively low. Given that credit is introduced as a stock, this is a reasonable result. Changes in the stock of credit would impact the current account only when they are large, *i.e.*, only when flows are elevated.

The influence of the unit labour cost is as well relatively short, although significant. As this is again an index, it is logical to believe that its changes do not have a big effect on the *CA*. Furthermore, competitiveness indicators tend to move slowly and do not induce dramatic changes in the external accounts, even if they do have persistent effects.

On the contrary, the unemployment rate coefficient is much higher and positive. The labour market conditions determine directly the purchasing power of households, so a bad cyclical context will improve the current account because of lower demand. Furthermore, the unemployment rate can be used as a proxy for uncertainty too (Bógalo, 2012), so it exerts an additional influence on domestic absorption.

The coefficient for the private investment rate to the GDP is negative and sizeable. As we said before, the fulfilment of the Feldstein-Horioka puzzle would have required a value of zero. A coefficient of one would mean that the increases in private investment are totally funded by external credit. The value obtained in this long term relationship implies that Spain has been closer to the latter scenario than to the former. An increase in private investment would be funded in two thirds by the external credit and in only one third by domestic savings.

Finally, focusing on the coefficient in which we are mostly interested, the impact of the public balance on the current account is also considerable. Each percentage point of improvement in the government's net lending or borrowing will help to ameliorate the external imbalance in 0.27 percentage points. This coefficient is in line with the results obtained in other exercises applied to panel data for a wide group of countries (Lee *et al.*, 2008; and Salto and Turrini, 2010), so Spain would not be very different in this aspect.

The interpretation of these variables' role is richer when we take into account the error correction model, whose goal is the explanation of the mechanisms by which the *CA* in the short-run goes back to its long term value determined by its fundamentals. In the short term model, the dependent variable is the change in the current account and the explanatory variables are the lagged changes in the current account, the lagged changes in the long-run determinants and the lagged residuals from the long-run equation (RESIDOLS).

As we are dealing with quarterly data, the strategy adopted in this model consisted in including the first four lags in the explanatory variables and then picking those from them which came out to be statistically significant. The estimation output is shown below, with the coefficient for the lagged residuals presenting the expected negative sign.

The second and third lags of the change in the *CA* have virtually offsetting signs, although the positive value of the third lag coefficient is faintly bigger. That would imply that the *CA* has a slight inertial trend.

In the same vein, the second and four lags of the change in the ULCs have very similar values with opposite sign. But, as the third lag is marginally bigger, the negative figure has more influence, indicating than when the ULCs accelerate, the *CA* worsening also accelerates.

As far as credit is concerned, its third lag has an expected negative sign. When the stock of credit accelerates, *i.e.*, the flow of credit increases, the current account tends to worsen.

The sign for private investment changes in the short term relationship, as the third and fourth lags exhibit positive signs. The intuition behind a negative coefficient in the long-run relationship (which describes levels) and positive coefficients in the short-run equation (which describes changes) is that investment does tend to deteriorate the current account although with decreasing returns. This would have the effect of cushioning the elevated coefficient we obtained in the long-run, in the sense that the increase in investment would not lead to an explosive augmentation of the external deficit.

Similarly, the sign for the public balance is different in the short term equation, and the explanation is analogous. The long-run equation points out that when the public accounts worsen, so does the *CA*, but again with decreasing returns.

Table 2

ECM Short-run Dynamics

Dependent Variable: DCA

Method: Least Squares

Sample (adjusted): 1981Q2 2011Q4

Included observations: 123 after adjustments

Variable	Coefficient	Std. Error	*t*-Statistic	Prob.
DCA(–2)	–0.170578	0.080297	–2.124335	0.035800
DCA(–3)	0.184841	0.079114	2.336389	0.021200
DCREDIT	–0.070952	0.029391	–2.414089	0.017400
DGFCF(–3)	0.244129	0.097315	2.508654	0.013500
DGFCF(–4)	0.312974	0.093336	3.353201	0.001100
DPB(–2)	–0.213319	0.069163	–3.084292	0.002600
DU(–1)	0.573001	0.102839	5.571822	0.000000
DULC(–2)	–0.210991	0.094647	–2.229227	0.027800
DULC(–4)	0.199309	0.096426	2.066952	0.041000
RESIDOLS(–1)	–0.108253	0.045875	–2.359749	0.020000
R^2	0.489127	Mean dependent var		–0.000106
Adjusted R^2	0.448438	S.D. dependent var		0.006559
S.E. of regression	0.004871	Akaike info criterion		–7.733082
Sum squared resid	0.002682	Schwarz criterion		–7.504449
Log likelihood	485.5845	Hannan–Quinn criter.		–7.640212
Durbin-Watson stat	1.864632			

The last two ideas have important implications in a period of rebalancing like the one Spain is experiencing now. The reduction in private investment and the fiscal consolidation undoubtedly help to the external rebalancing. Nonetheless, there are decreasing returns, *i.e.*, these two trends are effective up to a certain limit.

In short, in order to consolidate the external account improvement, some additional shocks or measures would be needed. Structural reforms that help to regain and boost price and non-price competitiveness would be essential in this regard.

After examining how the fiscal stance relates to a benchmark indicator of imbalances like the current account, we are going to change the direction of causality and widen the scope. The next section will assess how other imbalances may interact with the public balance.

4   The impact of other imbalances on the public accounts

In the previous section we have studied the interactions between the current account and the public balance in Spain. In this section we estimate a vector autoregressive (VAR) model to look further to the interactions between fiscal policy and macroeconomic imbalances. As it has been

previously argued, the current account summarizes some of the main issues concerning the external imbalances of the Spanish economy. Nevertheless, it is also linked to other domestic macroeconomic imbalances, including some of the determinants of the current account, such as credit to the private sector and the rate of unemployment.

The VAR methodology has been widely applied to study the macroeconomic effects of fiscal policy. Blanchard and Perotti (2002) estimate a VAR for the US economy with three variables: public expenditure, net taxes and GDP and identify the model based on institutional information about tax and expenditure programs. De Castro (2005) applies this approach to study the macroeconomic effect of fiscal policy and the size of fiscal multipliers in Spain.

However, our aim here is different. We do not want to study the dynamic effects of fiscal policy changes (Fatás and Mihov, 2000). We will focus on the interactions between fiscal policy and domestic macroeconomic imbalances. Therefore, the variables included in the VAR model are the public balance, the private sector credit flow, the private sector gross fixed capital formation and the rate of unemployment.

These variables are considered to be quite representative of the domestic imbalances of the Spanish economy. As Figure 4 shows, private investment increased from a level of 18 per cent of GDP in 1995 to 27 per cent at its peak in 2007 and, at the same time, credit rose almost exponentially. These developments were mainly linked to a boom in construction and were a clear reflection of the build up of imbalances during the growth phase. As it has been explained, the fiscal position improvement was partially due to the windfall revenues from the boom in the construction sector. Therefore, it seems plausible to think that the internal imbalances played a key role in the fiscal developments during the growth phase.

As for unemployment, it was not a major source of concern during the boom. The unemployment rate fell from 22 per cent in 1994 to a historically low of 8 per cent in 2007. However, as the crisis emerged, unemployment started to rise to high levels. As a result, unemployment is currently one of the main imbalances in the Spanish economy and it has a direct influence on the situation of the public accounts, through the payment of unemployment benefits and through lower revenues from social security contributions.

From all this it follows that internal macroeconomic imbalances have direct consequences for the public accounts. On the other hand, the fiscal stance has also an impact on domestic macroeconomic imbalances. From a classical point of view, a surplus in the public balance could crowd-in credit to the private sector, encouraging private investment. Alternatively, from a Keynesian point of view, public expenditure could contribute to reduce unemployment. Therefore, we could expect the VAR model to show that private investment and credit to the private sector tend to increase when the public balance improves, while unemployment tends to fall when public balance deteriorates.

Before describing the VAR model, it should be also noted that all these variables, except for the private sector gross capital formation, are included in the European Union's Macroeconomic Imbalances Procedure Scoreboard. The public sector net lending/borrowing is alluded indirectly through the inclusion of public debt in the MIP.

Some other variables included in the MIP as indicators of internal imbalances, such as the private sector debt and the growth of total financial liabilities, could have also been informative. However, they have not been included in the model due to the lack of long series of reliable quarterly data.
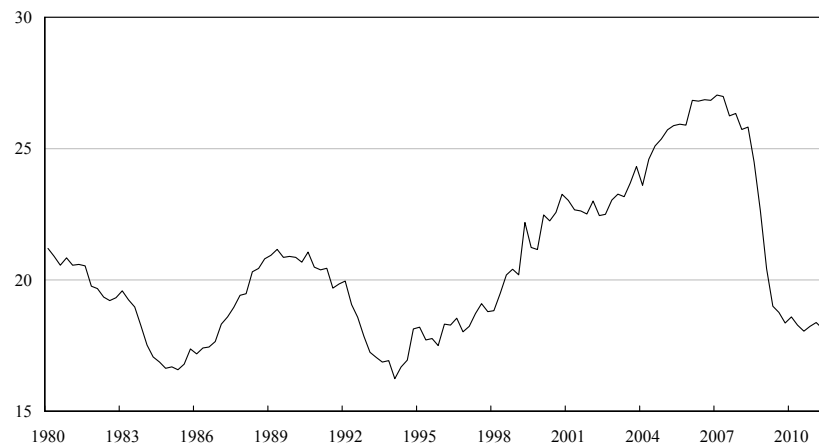
The variables included in the VAR model are defined as in the previous section, except for credit. In this section, we use the flow of credit to the private sector (CREDIT_FLOW) as a percentage of GDP, since in this case, all variables have not to be necessarily $I(1)$.
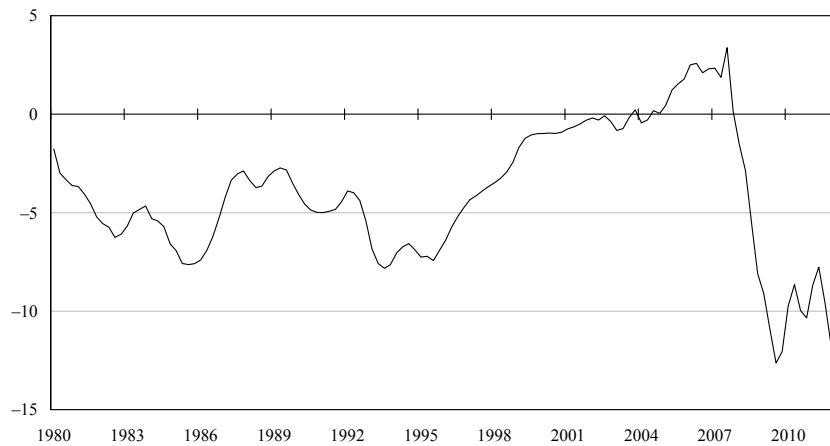
Figure 4

14

Evolution of Public Balance, Private Investment, Private Stock of Credit and Unemployment

Credit Flow to the Private Sector
(percent of GDP)
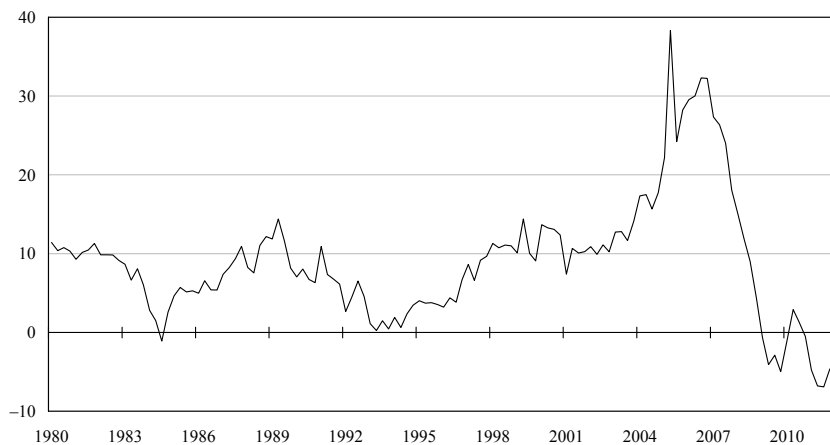
Private Investment
(percent of GDP)

Public Balance
(percent of GDP)

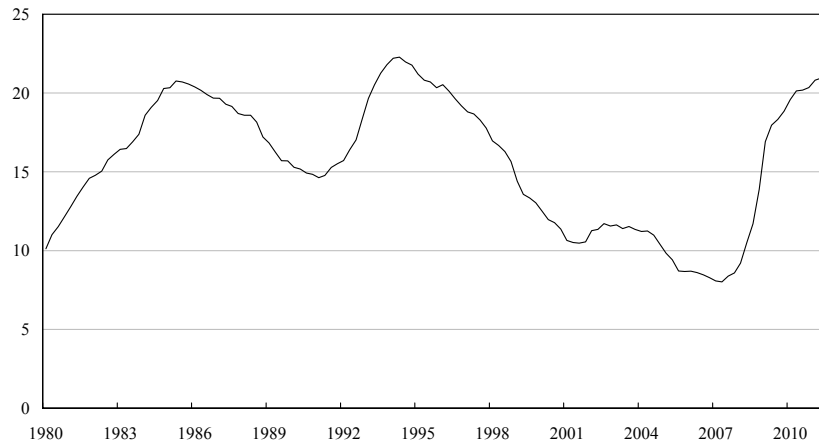**Unemployment Rate**
(percent)

Carlos Herrero García, Pedro Hinojo Gonzáles, Pilar Mas Rodríguez

<div align="right">**Table 3**</div>

<div align="center">**Johansen Test**</div>

Sample: 1980Q1 2011Q4

Included observations: 123

Series: CREDIT_FLOW PB GFCF U

Lags interval: 1 to 4

Selected (0.05 level*) Number of Cointegrating Relations by Model

Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept	Intercept	Intercept	Intercept	Intercept
	No Trend	No Trend	No Trend	Trend	Trend
Trace	0	0	0	0	0
Max-Eig	0	0	0	0	0

*Critical values based on MacKinnon-Haug-Michelis (1999).

In order to estimate the VAR model, firstly, we tested for cointegration relationships between the variables. We perform the Johansen test for variables in levels and for different lag structures. The results show that the hypothesis of cointegration can be rejected according to both the trace test and the eigenvalues test. Since there is not cointegration between the variables and PB, U and GFCF are $I(1)$ we have estimated the VAR model with all the variables in first differences.

Therefore, we estimate the following model:

$$dX_t = C + \sum_{j=1}^{k} B_j dX_{t-j} + E_t \qquad (3)$$

where $dX_t = [dPB_t, dCREDIT\_FLOW_t, dGFCF_t, dU_t]$ is the vector of the endogenous variables in differences, C is is a vector of constants, B_j is the matrix of coefficients for the lag j and E_t is the vector of residuals. The model is estimated by ordinary least squares. The order of the VAR is set at four according to the likelihood ratio tests, the final prediction error and the Akaike information criterion. The Lagrange Multipliers (LM) test shows that it is possible to reject the null hypothesis of correlation in the residuals up to the lag five.

We assume two identification schemes based on different assumptions and assess the sensitivity of the results to these two schemes.

Our first specification is based on the assumption that credit is the most exogenous variable and it is not affected by the contemporaneous shocks of other domestic variables. As some analysis point out (European Commission, 2012) the international conditions, such as the global liquidity glut and the low international interest rates pushed capital flows towards Spain. These global factors would have been behind the large accumulation of credit and debt by the private sector.

Then, we assume that credit holds sway over private investment. The lax financial conditions and the low real interest rates boosted private investment, mainly in the construction sector, as has been already mentioned. Given that this sector is labour-intensive, we consider that unemployment responded to the increase in private investment.

Finally, as stated above, the public balance is defined as the most endogenous variable in the model. In this way, we capture the idea that good financial and employment conditions could be improving the public balance.

Figure 5 shows the accumulated impulse response functions with this set of assumptions. The public balance is very sensitive to the labour market conditions, so that an increase in unemployment leads to a persistent deterioration in public finances. The effect of credit is very remarkable, especially if we bear in mind that we are dealing with credit flows. Positive changes in credit flows lead again to a substantial improvement of the public balances. The effect of private investment growth on the public accounts, although positive, is much more modest than expected.

Figure 6 tries to depict the role of fiscal policy, finding evidence of non-Keynesian effects. The improvement in public accounts tends to foster real investment and employment creation in the short and the medium term. This could be due to the more traditional thesis of the crowding-out or to more modern considerations related to expectations. As for the former effect, fiscal consolidation would in this case crowd-in private investment, paving the way for unemployment reduction. Regarding the latter effect, the soundness of public accounts generates good expectations among private agents.

The evidence of these two channels of non-Keynesian effects is confirmed by the behaviour of credit. Be it because of the crowding-in effect, because of expectations or because of both, private credit responds positively and persistently to a fiscal contraction. This facilitates a permanent improvement in public finances, as the positive effects on unemployment, investment and credit add to the initial consolidation effort.

From all this, there are some lessons and some caveats. The first idea would be that the orientation of fiscal policy in the boom periods has been adequate in essence. Given that budgetary consolidation tends to generate credit and private investment imbalances (driven by good expectations), one should not draw the conclusion that the best contribution of public policy to tame private imbalances ought to be registering an actual deficit.

On the contrary, this exercise should serve to guide the implementation of fiscal policy according to a precautionary basis. When private expectations are good, a credit-fuelled boom in investment and employment can take place. As a consequence, the running of fiscal policy should be more prudent, because revenues would rise and expenditure would fall automatically owing to the play of automatic stabilizers. Furthermore, credit booms have a particular positive impact on public accounts and could lead to an overestimation of structural balances (De Castro et al., 2008; and Borio et al., 2013).

In order to widen the scope of the analysis and also as a robustness check, we try an alternative specification, which considers the public balance as the most exogenous variable. This would suggest that it is an aggregate under an almost perfect control by the authorities, which could be accurate according to the behaviour of public expenditure, but not so much given the factors behind revenue collection (Fatás and Mihov, 2000; Blanchard and Perotti, 2002; Perotti, 2002; and De Castro, 2005).

Then, we assume that private credit is the variable which responds next, as financial aggregates are likely to move quicker. Afterwards, private investment responds to credit conditions. Finally, unemployment is the most endogenous, responding again to the demand environment.

With this set of assumptions, the first aspect worth analysing is the macroeconomic effect of fiscal policy, depicted in Figure 7. We obtain again non-Keynesian effects similar to those of the previous specification (Figure 6) or even more powerful, especially in the case of credit flows. The
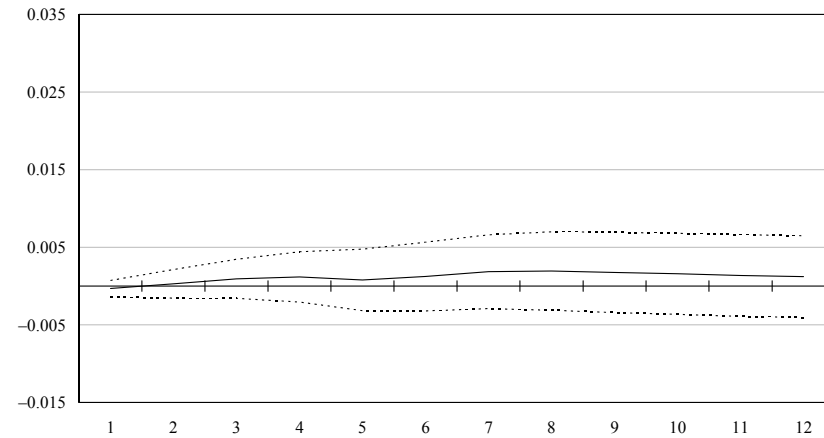
Figure 5

Response of the PB to Different Shocks in the Model Specification Where It Is the Most Endogenous
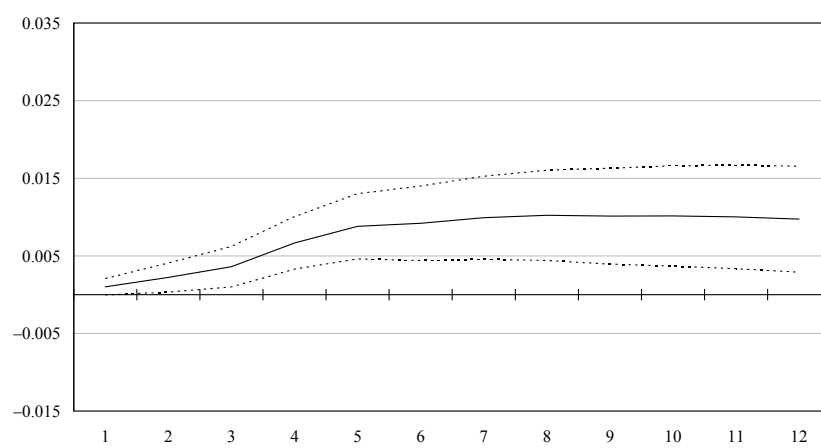*(12 quarters, accumulated response to Cholesky One S.D. Innovations ±2 S.E.)*

Accumulated Response of DPB to DU
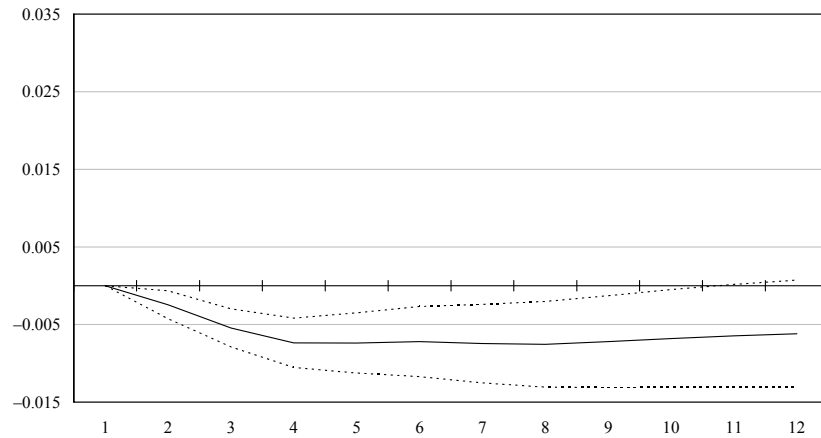
Accumulated Response of DPB to DGFCF

Accumulated Response of DPB to DCREDIT_FLOW
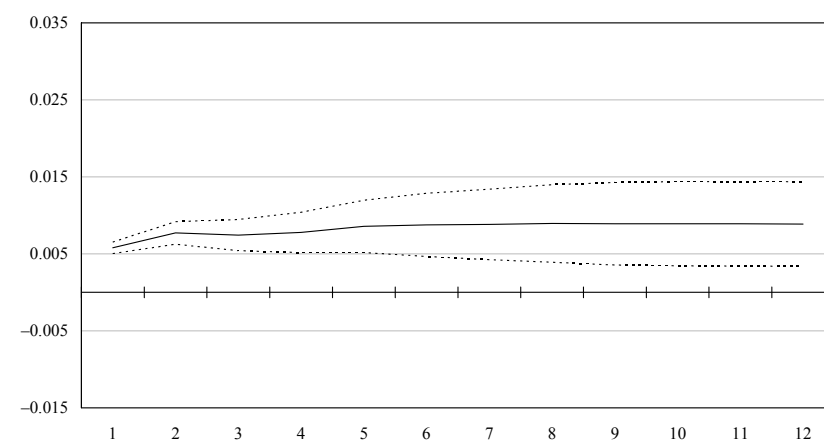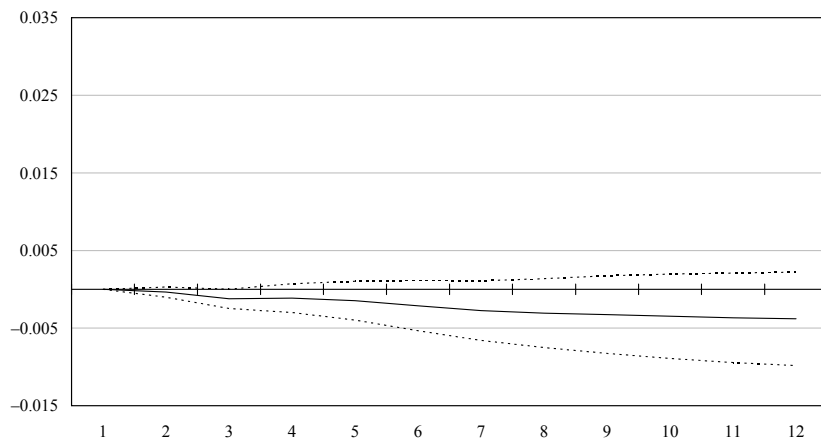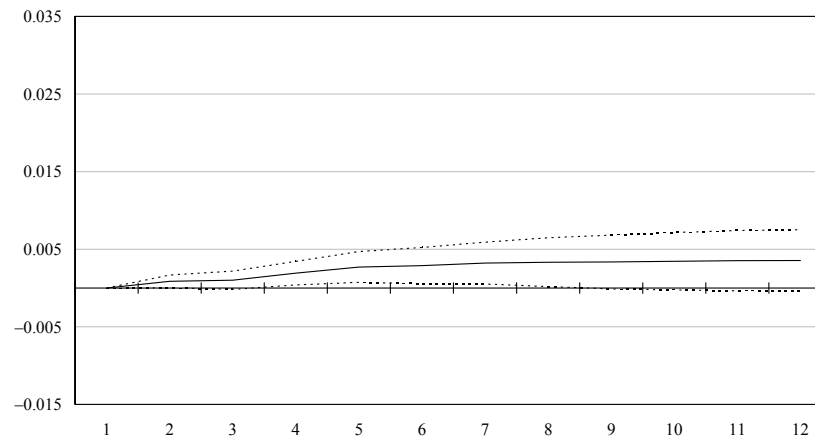
Accumulated Response of DPB to DPB

Figure 6

Response of the Different Variables to a PB Shock in the Model Specification Where It Is the Most Endogenous
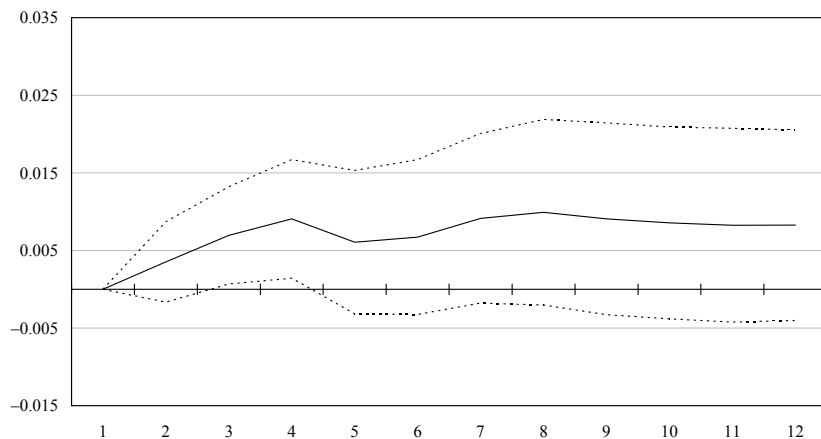*(12 quarters, accumulated response to Cholesky One S.D. Innovations ±2 S.E.)*
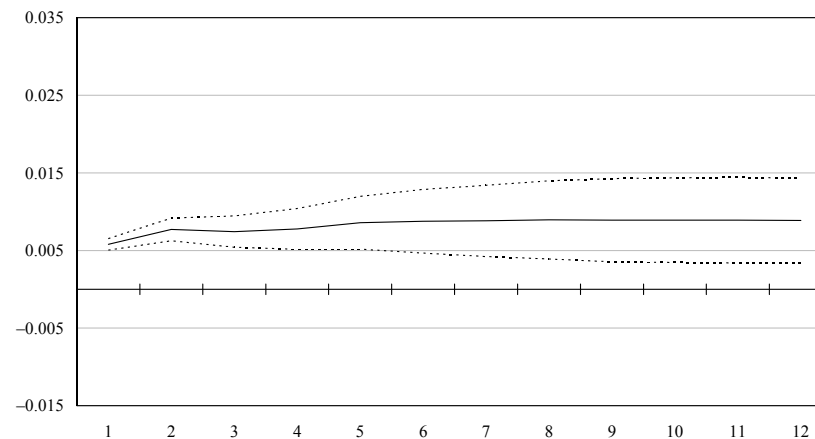
Accumulated Response of DU to DPB

Accumulated Response of DGFCF to DPB

Accumulated Response of DCREDIT_FLOW to DPB

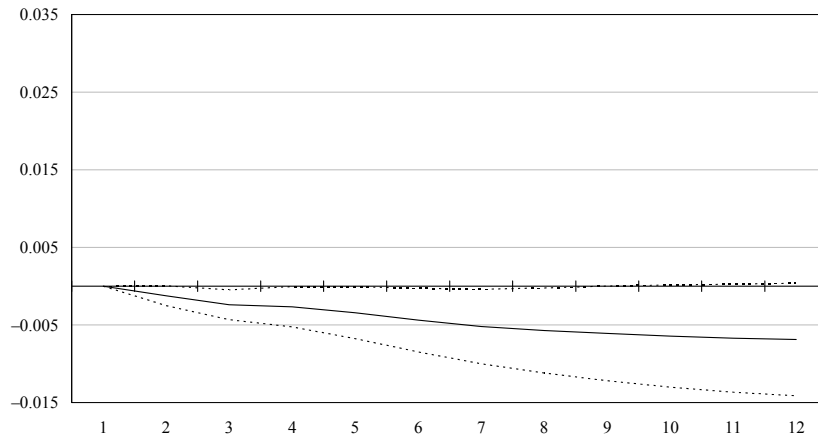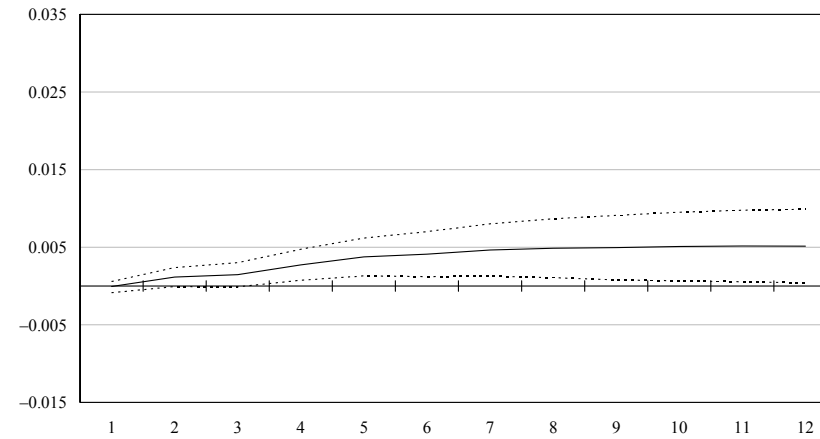**Accumulated Response of DPB to DPB**

Figure 7

Response of the Different Variables to a PB Shock in the Model Specification Where It Is the Most Exogenous
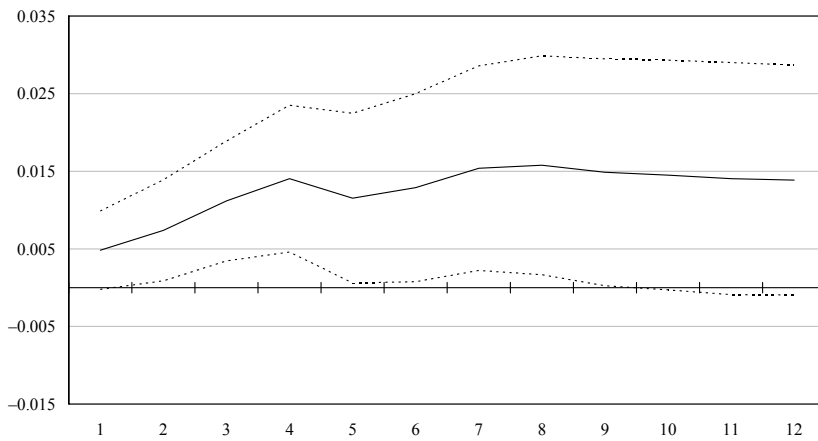*(12 quarters, accumulated response to Cholesky One S.D. Innovations ±2 S.E.)*

Accumulated Response of DU to DPB

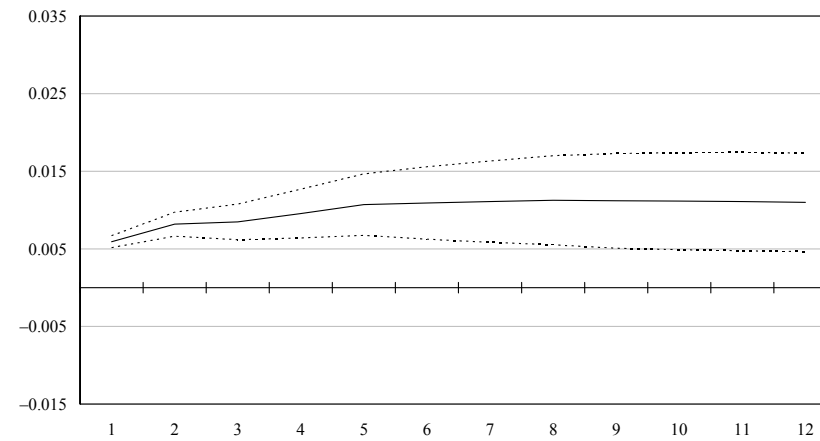### Accumulated Response of DGFCF to DPB

Accumulated Response of DCREDIT_FLOW to DPB

Accumulated Response of DPB to DPB

improvement in public accounts tends to foster credit, investment and employment thanks to better expectations and/or crowding-in effects.

Figure 8 shows the impact of internal imbalances on the public accounts. Obviously, the increase in credit flows and investment and the reduction in unemployment contribute to enhance public finances. The estimated effects are similar to the previous specification (Figure 5), with a slightly milder response of public balance to unemployment.

The consistency of the results obtained from the two especifications is a solid robustness check. Furthermore, it helps to draw coherent conclusions from the interaction between fiscal and other macroeconomic imbalances.

The immediate implication is that internal imbalances, represented by positive dynamics of credit that lead to investment and employment-rich growth impact positively on the fiscal balance. At the same time, the good health of the public accounts may exacerbate the good expectations that foster credit flows, private investment and unemployment reduction.

As we have said before, one should not take the flawed lesson that fiscal deficits would be the solution to domestic imbalances. On the contrary, the management of public accounts has to be even more prudent, given the positive impact that those imbalances have on budgetary positions.

Therefore, the underlying lesson may be that a cautious macroeconomic management may not be enough to address other macroeconomic imbalances. Consequentially, it would be the time to tweak the microeconomic framework of fiscal policy. On the one hand, a growth-friendly tax system is needed to attain a more competitive and sustainable pattern of development, imposing a lower tax burden on employment creation and removing harmful incentives, such as those which encourage households and firms to take on excessive debt. On the other, the public expenditure should target drivers of growth and competitiveness, such as R&D and human capital.

After having seen how fiscal policy interacts with external and internal imbalances, it is time to assess the most essential contribution of fiscal policy to macroeconomic stability, which is its sustainability.

5   An empirical assessment of public finance sustainability

We have analyzed the impact of fiscal policy, measured by the public balance, on external and internal macroeconomic imbalances. As mentioned above, the European Union's Macroeconomic Imbalances Procedure Scoreboard refers indirectly to the public balance, by including sovereign debt as an indicator of internal macroeconomic imbalances, since a large and persistent a deficit also constitutes a macroeconomic imbalance itself. In a situation of sluggish economic growth and increasing interest rates, a persistent deficit could give rise to sustainability concerns of the public debt.

The standard framework to assess public debt sustainability defines different projections for interest rates, GDP growth and primary balance and verifies if the ratio of debt to GDP stabilizes under these projections. For instance, the European Central Bank (2012) has recently applied this approach to Spain and had concluded that there are not sustainability risks.

In this section we address the issue of sustainability from an econometric point of view. The econometric approach tries to identify the conditions that guarantee that the government intertemporal constraint is fulfilled and test empirically if these conditions are met. Trehan and Walsh (1991) derive sufficient and necessary conditions for the government intertemporal constraint to be satisfied. They show that cointegration of the primary balance and the real stock of debt and stationarity of the primary balance are sufficient and necessary conditions for sustainability.
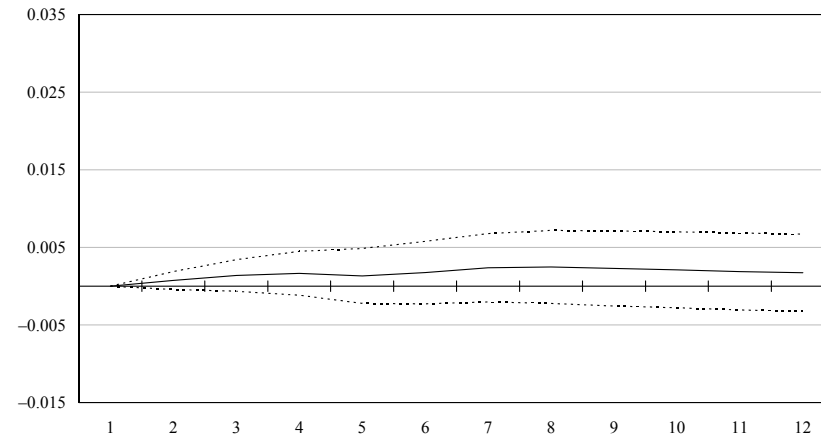
Figure 8

Response of the PB to Different Shocks in the Model Specification Where It Is the Most Exogenous
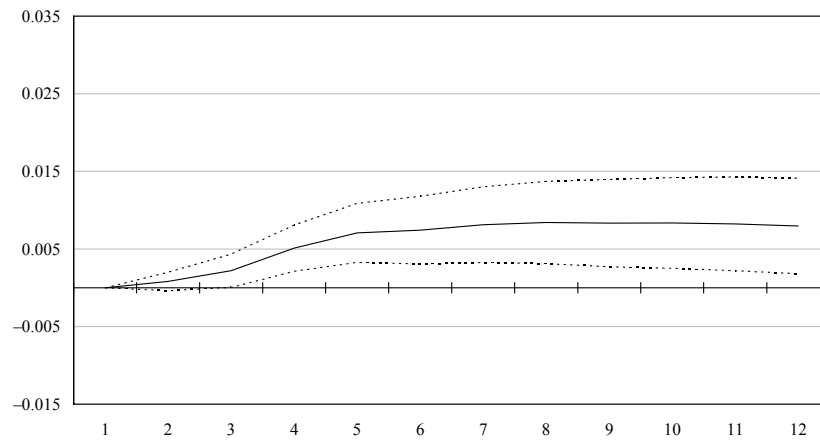*(12 quarters, accumulated response to Cholesky One S.D. Innovations ±2 S.E.)*
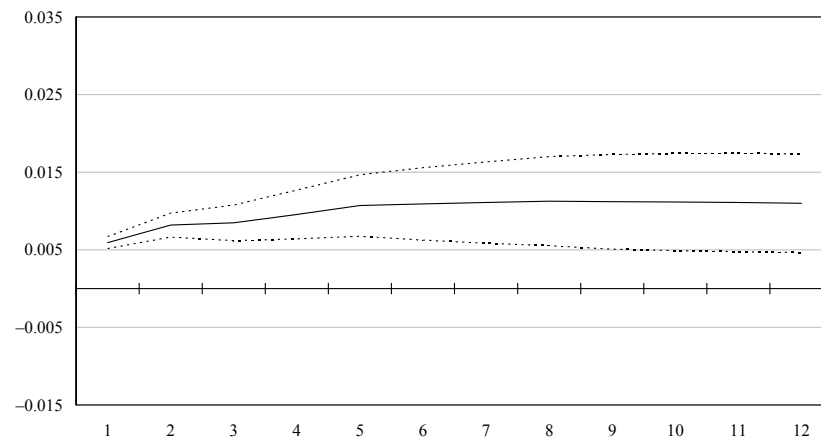
Accumulated Response of DPB to DU
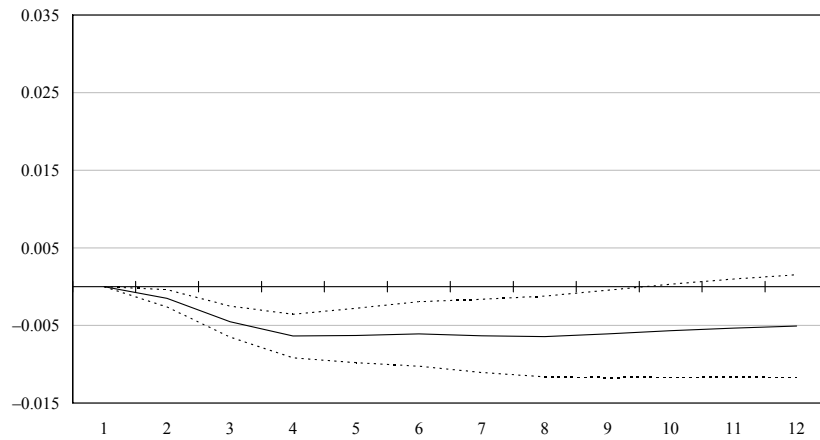
Accumulated Response of DPB to DGFCF

Accumulated Response of DPB to DCREDIT_FLOW

Accumulated Response of DPB to DPB

Hakkio and Rush (1991) focus on cointegration between public revenues and total public expenditures. If public revenues and expenditures are not stationary, cointegration will be a necessary condition for the government to fulfill its intertemporal budget constraint. Therefore, in the following equation:

$$R_t = c + bGG_t + \varepsilon_t \tag{4}$$

where R_t stands for public revenues and GG_t for total public expenditure (including current spending and interest payments), they test the null hypothesis that $b = 1$ and ε_t is stationary. They explain that $b = 1$ is not a strict necessary condition for sustainability, because the government intertemporal budget constraint could also be satisfied with $0 < b < 1$. However, the fact that $0 < b < 1$ may be inconsistent with the requirement that the ratio of debt to GDP must be finite.

Quintos (1995) extends the Hakkio and Rush analysis to introduce the concepts of strong and weak sustainability. If R_t and GG_t are $I(1)$ series, she proposes to test the null hypothesis that $b = 0$ against the alternative that $b > 0$. If the null is accepted, public debt will be unsustainable. If the null is rejected, she states that the null hypothesis that $b = 1$ should be tested against the alternative that $0 < b < 1$. If this null hypothesis is rejected, the public debt would be weakly sustainable. If the null is accepted and R_t and GG_t are cointegrated, (that is to say, if ε_t is $I(0)$), public debt will be strongly sustainable. Were R_t and GG_t not to be cointegrated, public debt would be weakly sustainable, even if $b = 1$.

De Castro *et al.* (2005) follow Quinto's methodology to study public finance sustainability in Spain from 1964 to 1998. They find that public deficit was sustainable for this period in a weaker form since $0 < b < 1$. Bajo *et al.* (2010) asses Spain public debt sustainability from 1850 to 2000 and conclude that fiscal policy would have been strongly sustainable over this time span.

Our analysis focuses on the recent developments of public finance in Spain from 1980 to 2011. While Quintos (1995) uses real variables in levels, De Castro *et al.* (2001) point out that any sustainability analysis should be performed using variables as a percentage of GDP, in order to take into account the size of the economy and, therefore, the burden that public debt imposes on the whole economy. Therefore, we perform our tests, with variables defined as a percentage of GDP. We take quarterly data of government net borrowing/lending, total public revenues and total public expenditure from BDREMS (see Boscá *et al.*, 2007). Data for GDP were obtained from Eurostat National Accounts and price deflators have been taken from the Spanish Statistics Institute (INE).

In order to assess public debt sustainability, we first apply the Augmented Dickey and Fuller test to real revenues and to real total expenditure as a percentage of real GDP (defined as current expenditure plus interest payments) and find that they are $I(1)$. Since they are $I(1)$ we can estimate equation (4) and test for public debt sustainability. The results, that are summarized in Table 4, show that the estimated coefficient $\hat{b} = 0.588$ is statistically different from 0 and 1. From this result, according to Quintos' methodology, it follows that public debt would have been weakly sustainable between 1980 and 2011. Moreover, the null hypothesis of presence of a unit root in the residuals is accepted. Therefore the residuals are not $I(0)$ and public revenues and expenditures are not cointegrated.

Quintos (1995) proposes to complement the public debt assessment testing for structural breaks in the long-run relationship. De Castro *et al.* (2001) and Bajo *et al.* (2010) test for structural breaks and find that there is no support for the null hypothesis of the existence of structural breaks in the long-term relationship. Here, we are interested in testing if the result of weak public debt

Table 4

Public Debt Sustainability, 1980-2011

Dependent Variable: Real Revenues *(percent of real GDP)*

Method: Least Squares

Sample: 1980Q1 2011Q4

Included observations: 68

Variable	Coefficient	Std. Error	*t*-Statistic	Prob.
Real Total Expenditure *(percent of GDP)*	0.588740	0.069458	8.476203	0.000000
C	0.123514	0.027482	4.494363	0.000000

Wald test

Null Hypothesis b=1

Test Statistic	Value	df	Probability	
t-statistic	−5.9209800	66.000000	0.000000	
F-statistic	35.058000	(1, 66)	0.000000	
Chi-square	35.058000	1.000000	0.000000	

Augmented Dickey-Fuller Test

Null Hypothesis: Real GDP Residual has a unit root

Exogenous: None

Lag Length: 1 (Automatic – based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		−1.547324	0.506500
Test critical values:	1% level	−3.482879	
	5% level	−2.884477	
	10% level	−2.579080	

* MacKinnon (1996) one-sided *p*-values.

sustainability depends on the economic crisis impact on public accounts at the end of the sample. We follow a much simpler approach and introduce a slope dummy variable that is 1 from 2007 to 2011 and zero in the rest of the sample:

$$R_t = c + b_1 GG_t + b_2 \cdot D \cdot GG_t + \varepsilon_t \tag{5}$$

where D is the dummy variable. The results, that are shown in Table 5, imply that the result of weak public debt sustainability does not depend on the effect of the crisis at the end of the sample.

The estimated coefficient is $\hat{b}_1 = 0.76$, higher than in the previous case, but still significantly different from 1. Again, according to Quintos' test, public debt would have been weakly sustainable between 1980 and 2007.

Table 5

Public Debt Sustainability, 1980-2011
(with a dummy)

Dependent Variable: Real Revenues *(percent of GDP)*
Method: Least Squares
Sample: 1980Q1 2011Q4
Included observations: 68

Variable	Coefficient	Std. Error	*t*-Statistic	Prob.
Real Total Expenditure *(percent of GDP)*	0.767992	0.075651	10.15178	0.000000
D*Real Total Expenditure *(percent of GDP)*	−0.086156	0.018931	−4.551079	0.000000
C	0.057979	0.000000	1.976579	0.050300

Wald test
Null Hypothesis $b1=1$

Test Statistic	Value	df	Probability
t-statistic	−3.066820	66	0.0027
F-statistic	9.405382	(1, 66)	0.0027
Chi-square	9.405382	1	0.0022

The result of weak public debt sustainability from 1980 to 2011 shows that even if the government intertemporal budget constraint is fulfilled, the situation of the public accounts could constitute a domestic imbalance itself. The weak sustainability implies that the government could have increasing difficulty in marketing its debt and it could have to pay higher interest rates. It also shows that, despite the increase in public revenues and the improvement of the public balance during the boom years, fiscal policy did not become strongly sustainable.

6   **Concluding remarks**

We have analysed the interaction between fiscal policy and other macroeconomic imbalances in Spain during a relatively long time span. This has allowed us to examine periods with different underlying economic conditions and to draw meaningful conclusions and economic policy lessons.

As obtained in the mainstream literature, public balance tends to co-move with the current account, so fiscal consolidation contributes positively to reshape external imbalances. At the same time, the ECM model showed that there are decreasing returns in this contribution.

An important lesson should be extracted from this and can actually be applied to the ongoing period of rebalancing that Spain is experiencing now. Fiscal consolidation undeniably helps to improve the external position, but up to a limit.

That is why some additional measures could be needed to ensure that the improvement of the current account is permanent. These would include structural reforms in goods, services and factors markets, in order to foster price and non-price competitiveness and to reallocate resources towards more productive and export-oriented sectors.

As far as fiscal policy is concerned, the measures should consider a tax system friendly to external competitiveness and smart public expenditure. Further research could be directed at studying the contribution of the above-mentioned measures to address external imbalances.

Fiscal policy also relates to macroeconomic imbalances beyond the current account. Periods of low unemployment driven by private investment and credit improve the public balance. In this juncture, revenues would rise and expenditure would fall automatically owing to the play of automatic stabilizers. Actually, credit booms have a particular positive impact on public accounts. Therefore, the management of fiscal accounts has to be prudent in order not to overestimate the structural positions.

Besides, a contractionary fiscal stance seems to be a necessary but not a sufficient condition to correct these private imbalances. Therefore, there are more issues to mull over, mainly within the microeconomic dimension of fiscal policy. The tax system should facilitate a competitive and sustainable pattern of development, reducing the tax burden on productive factors and removing harmful incentives that encourage an excessive build-up of debt. As for public expenditure, it should spot sources of growth and competitiveness, such as R&D and human capital.

Finally, we have concluded that Spanish fiscal position has been weakly sustainable. This shows that, even an apparently sound fiscal stance, such as the one previous to the crisis, is not enough to ensure strong sustainability.

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