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The macroeconomic effects of fiscal policy

António Afonso\textsuperscript{a,b,}\textsuperscript{*} and Ricardo M. Sousa\textsuperscript{c,d}

\textsuperscript{a}Directorate General Economics, European Central Bank, Kaiserstraße 29, Frankfurt am Main D-60311, Germany
\textsuperscript{b}Department of Economics, ISEG/TU Lisbon, Technical University of Lisbon, UECE – Research Unit on Complexity and Economics, R. Miguel Lupi 20, Lisbon 1249-078, Portugal
\textsuperscript{c}Department of Economics and Economic Policies Research Unit (NIPE), University of Minho, Campus of Gualtar, Braga 4710-057, Portugal
\textsuperscript{d}Financial Markets Group (FMG), London School of Economics, Houghton Street, London WC2 2AE, UK

We investigate the macroeconomic effects of fiscal policy using a Bayesian Structural Vector Autoregression (B-SVAR) approach. We identify fiscal policy shocks via a partial identification scheme, but also: (i) include the feedback from government debt; (ii) look at the impact on the composition of output; (iii) assess the effects on asset markets; (iv) use quarterly data; and (v) analyse empirical evidence from the US, the UK, Germany and Italy. The results show that government spending shocks, in general, have a small effect on Gross Domestic Product (GDP); lead to important ‘crowding-out’ effects; have a varied impact on housing prices and generate a quick fall in stock prices. Government revenue shocks generate a mixed effect on housing prices and a small and positive effect on stock prices. The empirical evidence also suggests that it is important to explicitly consider the government debt dynamics in the model.

\textbf{Keywords:} fiscal policy; Bayesian structural VAR; debt dynamics

\textbf{JEL Classification:} C11; C32; E62; H62

\section{I. Introduction}

Compared to the large empirical literature on the effects of monetary policy on economic activity, fiscal policy has received less attention, a feature that contrasts with the public debates on its role. The government deficit and debt limits of the Stability and Growth Pact in the context of the Economic and Monetary Union (EMU), the possibility of independent institutions running fiscal policy, the creation of fiscal policy committees, the influence of regulation in the structure of market incentives, and the Balanced Budget Amendment in the US are based on the assumption that fiscal policy can be an effective tool for stabilizing business cycles.

First, we consider the effects of fiscal policy on the composition of Gross Domestic Product (GDP), namely, by estimating the impact of government spending and government revenue shocks on private consumption and private investment as in
Broadly speaking, the results point to an expansionary effect of fiscal policy in the case of the US and the UK in line with the traditional ‘Keynesian’ model and corroborated by Blanchard and Perotti (2002). As for Italy and Germany, there is some evidence of a ‘Non-Keynesian’ multiplier in accordance with the results of Giavazzi and Pagano (1990, 1996), Giudice et al. (2004) and Afonso (2010).

Interestingly, when one looks at the response of asset prices, the findings suggest that markets tend to interpret expansionary fiscal policies as leading to a deterioration of public finances. Therefore, stock prices react negatively to a rise of government spending and positively when there is fiscal consolidation. Nevertheless, while the reaction of stock prices is relatively quick, the effect on housing prices is, in general, persistent.

When we explicitly take into account the feedback from government debt in our framework, the effects of fiscal policy on (long-term) interest rates and GDP become more persistent and these variables are also more responsive to the shock.

The rest of this article is organized as follows. Section II reviews the related literature. Section III explains the empirical strategy used to identify the effects of fiscal policy shocks, and to take into account the uncertainty regarding the posterior distribution impulse-response functions. Section IV provides the empirical analysis and discusses the results. Section V concludes this article with the main findings and policy implications.

II. Literature

For the US, different approaches have been used in the identification of the fiscal policy shock. Ramey and Shapiro (1998) use a ‘narrative approach’ to isolate political events, and find that, after a brief rise in government spending, nondurable consumption displays a small decline while durables consumption falls. Following the same approach, Edelberg et al. (1999) show that episodes of military build-ups have a significant and positive short-run effect on US output and consumption, and that the sign of the response does not change when anticipation effects are taken into account. Fatas and Mihov (2001) and Favero (2002) use a Cholesky ordering to identify fiscal shocks and show that increases in government expenditures are expansionary, but lead to an increase in private investment that more than compensates for the fall in private consumption. Blanchard and Perotti (2002) use information about the elasticity of fiscal variables to identify the automatic response of fiscal policy, and find that expansionary fiscal shocks increase output, have a positive effect on private consumption and a negative impact on private investment. More recently, using sign restrictions on the impulse-response functions and identifying the unexpected variation in

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government spending by a positive response of expenditure for up to four quarters after the shock. Mountford and Uhlig (2005) find a negative effect in residential and nonresidential investment.1

Regarding other countries, Perotti (2004) investigates the effects of fiscal policy in Australia, Canada, West Germany, US and the UK, and finds a relatively large positive effect on private consumption and no response of private investment. Biau and Girard (2005) find a cumulative multiplier of government spending larger than one, and positive reactions of private consumption and private investment in France. For Spain, Castro and Cos (2008) report that, while there is a positive relationship between government expenditure and output in the short-term, in the medium and long-term expansionary spending shocks only lead to higher inflation and lower output. Heppke-Falk et al. (2006) use cash data for Germany, and find that a positive shock in government spending increases output and private consumption, although the effect is relatively small. Giordano et al. (2007) show that, in Italy, government expenditure has positive and persistent effects on output and on private consumption.

As for the empirical importance of housing over the business cycle, there are only a small number of papers that discuss the empirical link between economic policy and housing prices, the focus has mainly been on the effects of monetary policy. Some examples are McCarthy and Peach (2002) and Chirinko et al. (2004). Iacoviello and Minetti (2003) emphasize the housing market as creating a credit channel for monetary policy. Iacoviello (2005) looks at the monetary policy-house price to consumption channel and finds a significant effect on house prices. Julliard et al. (2008) suggest that monetary policy contractions have a large and significantly negative impact on real housing prices, but the reaction is extremely slow. On the other hand, monetary policy shocks do not seem to cause a significant impact on stock markets.

In what concerns fiscal policy, it can impinge on housing market developments notably via subsidies and tax measures: taxation of the imputed rental value of the house, tax deductibility of interest payments, capital taxes on housing gains and Value Added Tax (VAT) on new houses. Given short-run inelastic housing supply, fiscal subsidies for buying houses may end up pushing up its demand and prices. On the other hand, and as mentioned for Italy by Jappelli and Pistaferri (2007), tax deductibility of interest rates may not have affected much the demand for mortgage debt. In addition, sounder fiscal positions and lower sovereign financing needs allow for lower interest and better financing conditions for mortgage-loans, while higher government indebtedness can crowd-out resources available to would be home-owners (Maclennan et al., 1999).

In the case of stock prices the attention has been normally targeted towards the role played by monetary policy. Rigobon and Sack (2002, 2003) and Craine and Martin (2003) use a heteroscedasticity-based estimator and find a significant response of the stock market to shocks in the interest. Bernanke and Kuttner (2005) show that a hypothetical unanticipated 25-basis-point cut in the Federal funds rate target is associated with about a 1% increase in broad stock indexes. More recently, Ardagna (2009) reports that fiscal adjustments based on expenditure reduction and signalling sounder fiscal behaviour are related with increases in stock market prices. Using a panel of Organization for Economic Co-operation and Development (OECD) countries, the author also shows that fiscal consolidation that lead to a permanent and substantial fall in government debt are linked to a stronger increase in stock market prices.

In terms of interest rates, according to Gale and Orszag (2003) there are two important reasons as to why budget deficits may raise nominal interest rates: (i) they reduce aggregate savings when private savings do not increase by the same amount (no Ricardian equivalence) and if there are no compensating foreign capital inflows, which leads to a decrease in the supply of capital; and (ii) they increase the stock of government debt and, consequently, the outstanding amount of government bonds (relative to other financial assets). In this case, there is a ‘portfolio effect’, as a higher interest rate on government bonds would be required in order to incentive investors to hold the additional bonds.

While some studies find that interest rates tend to increase after a rise in the deficit, others do not (Engen and Hubbard, 2004). The empirical findings seem to depend on whether expected or current budget deficits are used as explanatory variables (Brook, 2003; Upper and Worms, 2003; Laubach, 2009), and also on whether yield differentials in Europe with respect to Germany (Codogno et al., 2003) or interest

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1 Giavazzi and Pagano (1990) and Alesina and Ardagna (1998) have uncovered the presence of ‘non-Keynesian effects’ (i.e. negative spending multipliers) during large fiscal consolidations, with output rising significantly despite large cuts in government spending. Perotti (1999) also obtains such findings, but only in circumstances of ‘fiscal stress’ (usually high debt-to-GDP ratios). In addition, Afonso (2010) finds some evidence of expansionary fiscal consolidations, for a few budgetary items (general government final consumption, social transfers and taxes).
rate swap spreads are used as the dependent variable (Goodhart and Lemmen, 1999; Afonso and Strauch, 2007).

For Europe, the existing evidence points either to a significant (although small) effect (Bernoth et al., 2003; Codogno et al., 2003; Faini, 2006; Afonso and Strauch, 2007), or to the absence of impact (Heppke-Falk and Hufner, 2004). For the US, the effect seems to be substantially larger (Gale and Orszag, 2002). For OECD countries, Ardagna (2009) shows that long-term government bond rates fall in periods of budget consolidation and rise when the fiscal position deteriorates.

### III. Modelling Strategy

The modelling strategy adopted consists in the estimation of the following Structural VAR (SVAR)

\[
\Gamma(L) X_t + \gamma d_{t-1} = \Gamma_0 X_t + \Gamma_1 X_{t-1} + \cdots + \gamma d_{t-1} = c + \epsilon_t
\]

\[d_t = \frac{(1+i)}{(1+\pi t)(1+\mu t)} d_{t-1} + (g_t - t) \]

\[v_t = \Gamma_0^{-1} \epsilon_t\]

where \(\epsilon_t \mid X_s, s < t \sim N(0, \Lambda), \Gamma(L)\) is a matrix valued polynomial in positive powers of the lag operator \(L\), \(n\) the number of variables in the system, \(\epsilon_t\) the fundamental economic shocks that span the space of innovations to \(X_t\) and \(v_t\) the VAR innovation, \(d_t := B_j/(P_t Y_t), \quad d_{t-1} := B_{t-1}/(P_{t-1} Y_{t-1}), \quad g_t := G_j/(P_t Y_t)\) and \(v_t := T_t/(P_t Y_t)\).

Equation 2 refers to the government’s intertemporal budget constraint, and \(i_t, G_t, T_t, \pi_t, Y_t, P_t, \mu_t\) and \(d_t\) represent, respectively, the interest rate (or the average cost of debt refinancing), government primary expenditures and government revenues, inflation, GDP, price level, real growth rate of GDP and the debt-to-GDP ratio at the beginning of the period \(t\).

Following Favero and Giavazzi (2008), this specification includes the feedback from government debt, an assumption that is potentially important in the determination of the effects of fiscal policy shocks for a number of reasons. First, when fiscal authorities care about the stabilization of debt, government revenue and government spending need to adjust accordingly. Second, the debt dynamics may influence interest rates as they depend on future expected monetary policy and the risk premium. Third, debt may not be neutral and have an impact on inflation and output (Barro, 1974; Kormendi, 1983; Canzoneri et al., 2001; Afonso, 2008). Therefore, it is important to allow for the fact that government revenues, government spending, real GDP growth, inflation and the interest rate are linked by the government intertemporal budget constraint.

Fiscal policy is characterized as follows:

\[G_t = f(\Omega_t) + \epsilon_t^G\]

\[T_t = g(\Omega_t) + \epsilon_t^T\]

where \(G_t\) is the government spending, \(T_t\) the government revenue, \(f\) and \(g\) the linear functions, \(\Omega_t\) the information set and \(\epsilon_t^G\) and \(\epsilon_t^T\), respectively, the government spending shock and the government revenue shock. The shocks \(\epsilon_t^G\) and \(\epsilon_t^T\) are orthogonal to the elements in \(\Omega_t\).

We follow a recursive identification scheme and assume that the variables in \(X_t\) can be separated into three groups: (i) a subset of \(n_1\) variables, \(X_{1t}\), whose contemporaneous values appear in the policy function and do not respond contemporaneously to the fiscal policy shocks; (ii) a subset of \(n_2\) variables, \(X_{2t}\), that respond contemporaneously to the fiscal policy shocks and whose values appear in the policy function only with a lag; and (iii) the policy variables in the form of government expenditure, \(G_t\), and/or government revenue, \(T_t\).

The recursive assumptions can be summarized by \(X_t = [X_{1t}, G_t, T_t, X_{2t}]\) and

\[
\Gamma_0 = \begin{bmatrix}
\gamma_{11} & 0 & 0 \\
\gamma_{21} & \gamma_{22} & 0 \\
\gamma_{31} & \gamma_{32} & \gamma_{33}
\end{bmatrix}
\]

The two upper blocks of zeros correspond, respectively, to the assumptions that the variables in \(X_{1t}\) do not respond to the fiscal policy shock either directly or indirectly. This approach delivers a correct identification of the fiscal policy shock but not of the other shocks in the system. In practice, we include in our system the same variables as in

\[\gamma_{11} \begin{bmatrix}
0 \\
1 \\
0
\end{bmatrix}_{n_1 \times n_1}
\]

\[\gamma_{21} \begin{bmatrix}
1 \\
0 \\
0
\end{bmatrix}_{2 \times n_1}
\]

\[\gamma_{31} \begin{bmatrix}
0 \\
0 \\
1
\end{bmatrix}_{n_2 \times n_1}
\]

\[\gamma_{22} \begin{bmatrix}
1 \\
1 \\
0
\end{bmatrix}_{2 \times 2}
\]

\[\gamma_{32} \begin{bmatrix}
0 \\
0 \\
1
\end{bmatrix}_{2 \times 2}
\]

\[\gamma_{33} \begin{bmatrix}
0 \\
0 \\
1
\end{bmatrix}_{n_2 \times n_2}
\]
Christiano et al. (2005), but also add housing price among the \( X_{1t} \) variables, that is, we allow the policy authority to react contemporaneously to changes in the housing market. We also include the stock market index and the exchange rate in \( X_{2t} \).

The identification procedure adopted in this article is closer in spirit to Fatás and Mihov (2001), who use a Cholesky ordering to capture the unexpected variation in fiscal policy. In contrast, Afonso and Sousa (2011) identify the potential impact of fiscal policy on asset prices, by using a Fully Simultaneous System approach in a Bayesian framework. Nevertheless, the empirical findings deliver qualitatively similar results, which allows one to be confident on their robustness. Finally, we assess the posterior uncertainty about the impulse-response functions using a Monte Carlo Markov-Chain (MCMC) algorithm.

### IV. Empirical Analysis

**Building the data set**

We use quarterly data for four countries: US, UK, Germany and Italy. All the variables are in natural logarithms unless stated otherwise.

For the identification of the fiscal policy shocks, the variables in \( X_{1t} \) – the ones predetermined with respect to fiscal policy innovations – are GDP, private consumption, GDP deflator and private investment. To these variables, we add: the housing price index (or the median sales price of new houses sold, in the case of the US), the housing starts (only for the US), and the average cost of government debt financing (or the yield to maturity of long-term government bonds). The variables in \( X_{2t} \) – the ones allowed to react contemporaneously to fiscal policy shocks – are the S&P500 Index (for the US), the FTSE-A11 Shares Index (for the UK), and the MSCI index (for Germany and Italy). As measure of the fiscal policy instruments we use either the government expenditures (in which case, the government revenues are included in \( X_{1t} \)) or the government revenues (in which case, the government expenditures are included in \( X_{1t} \)). We include a constant (or quarterly seasonal dummies), and the government debt-to-GDP ratio in the set of exogenous variables. For Germany, we also consider two dummies: (i) one dummy for 1991:Q1, corresponding to the German reunification; and (ii) another dummy for 2000:Q3, to capture the spike in government revenue due to the sale of Universal Mobile Telecommunications System (UMTS) licenses.

Due to limitations of the data, housing starts are included only in the US, and among the set of variables included in the SVAR, the average government debt cost servicing deserves a special attention. Therefore, we obtain the average implicit interest rate by dividing the net interest payments by the government debt at time \( t - 1 \).

The quarterly fiscal data refers to the Federal Government spending and revenue in the case of the US, and the Public Sector spending and revenue in the case of the UK. In both cases, quarterly fiscal data is available directly from national accounts. As for Germany and Italy, we compute the quarterly series of government spending and revenue using budgetary cash data, which is published monthly by the fiscal authorities of both countries. In this case, data for government spending and revenue refer to the Central Government and are available in a cash basis.


Figures 1–4 provide a comparison of the annual values of such quarterly fiscal data with the annual national accounts data provided by the European Commission (Ameco database). It is interesting to observe that the patterns of both series are rather similar. Moreover, in most of the cases, the levels themselves are also close.

Finally, Fig. 5 plots the observed government debt-to-GDP ratio and the implicit debt-to-GDP ratio, that is, the one that would emerge by including the feedback from government debt. It shows that, despite some small discrepancies in the case of Italy, the implicit series for the debt-to-GDP ratio tracks pretty well the actual series.

#### Results

The starting point is the estimation of a B-SVAR that does not include the feedback from government debt, that is, where Equation 2 is not considered. Then, we compare the results with the ones that emerge from estimating specifications (1–3).

Figures 6–9 show the impulse-response functions to a fiscal policy shock. The solid line refers to the median response when the VAR is estimated without including the debt feedback, and the dashed lines are,
respectively, the median response and the 68% posterior probability intervals from the VAR estimated by imposing the government budget constraint. The confidence bands are constructed using a MCMC algorithm based on 50,000 draws.

US. Figure 6(a) displays the impulse-response functions of all variables in $X_t$ to a shock in government spending in the US. In the case we do not include the debt feedback, it can be seen that the effects on GDP are positive,
sizeable and reach a peak at after eight quarters. The impact on private consumption and private investment is also positive, therefore, supporting the idea that government spending has an expansionary ‘Keynesian’ effect in the economy and that there is no ‘crowding-out’. In addition, there is a positive effect on the average cost of debt and the price level. In what concerns the reaction of asset markets, the

5 Fatas and Mihov (2001), when looking at the response to changes in different components of government expenditures, find that increases in government consumption are always expansionary, while increases in public investment do not have a significant impact on output. Here, we cannot analyse some of these policy experiments because we have not made explicit the role of different components of government spending.
empirical evidence suggests that while there is a positive effect on housing prices that persists for almost 20 quarters, the reaction of stock prices is rather small and negative.

When we include the debt dynamics in the model, the effects of a government spending shock on GDP become somewhat smaller. The effects on private consumption and private investment also remain positive although smaller. In addition, the effect on the average cost of refinancing the debt is negligible. The reaction of asset markets is similar to the model without the government constraint: there is a positive (although smaller) and persistent effect on housing prices, while the reaction of stock prices is still small due to the debt dynamics and the portfolio reallocation.

Figure 6(b) shows the impulse-response functions to a shock in government revenue. The results suggest that government revenue declines steadily following the shock which erodes after eight quarters. Contrary to a shock in government spending, the effects on GDP are negative, very persistent and the trough is reached at after 12 quarters. They also reveal a change in the composition of GDP’s major components: while private consumption is negatively impacted by a positive shock in government revenues, the effect on private investment is positive but quickly erodes after eight quarters. That is, in this case, the ‘crowding-out’ effect works mainly through the consumption channel. In what concerns the reaction of asset markets, the empirical evidence suggests that the effects of revenue shocks tend to be negative for housing prices and slightly positive for stock prices.

UK. The impulse-response functions to a shock in government spending in the UK are shown in Fig. 7(a).

The results show that an increase in government spending has a positive effect on GDP in accordance with the predictions of the standard IS-LM model. As for the US, there is evidence of a change in its composition: private consumption increases but the
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Fig. 6. Impulse-response functions, U.S.: (a) Spending shock and (b) Revenue shock.
Fig. 7. Impulse-response functions, UK: (a) Spending shock and (b) Revenue shock.
Fig. 8. Impulse-response functions, Germany: (a) Spending shock and (b) Revenue shock
Fig. 9. Impulse-response functions, Italy: (a) Spending shock and (b) Revenue shock
effects on private investment are negative, suggesting the idea of a ‘crowding-out’ effect via investment (see, e.g. Blanchard and Perotti (2002)). In what concerns the reaction of asset markets, the empirical evidence suggests that both housing and stock prices fall after the spending shock but the effect on housing markets is much more persistent. That is, markets seem to interpret the expansion of government spending as signalling a deterioration of public finances (Ardagna, 2009). In contrast, the effects on the price level and on the average cost of financing the debt are positive. When the debt dynamics is included in the model, the impulse-response functions do not change significantly.

Figure 7(b) shows the impulse-response functions to a shock in government revenue. They support the idea of a ‘crowding-in’ effect: private investment reacts positively to the shock; private consumption falls in the first eight quarters after the shock but then recovers and the effect becomes positive. The effects on housing prices are also positive, but the reaction takes place with a lag of around eight quarters. By their turn, stock prices react positively to the shock but the effect reaches a peak at around after eight quarters. Finally, the effects on the price level and the interest rate are negative and the impact is maximum at after 8 to 12 quarters.

When we include the feedback from the government debt in the model, the effects on the majority of the variables included in the model become smaller.

Germany. We now look at the impulse-response functions a shock in government spending for Germany (Fig. 8(a)). The effects on GDP are negative, reflecting the fall in both private consumption and private investment, and providing evidence of a ‘Non-Keynesian’ effect (see, for instance, Giavazzi and Pagano (1990, 1996), Giudice et al. (2004) and Afonso (2010)). There is, therefore, evidence of a ‘crowding-out’ effect. Nevertheless, the magnitude of the impact is small and, in this respect, it corroborates the findings of Heppke-Falk et al. (2006). Government spending shocks also have a negative and persistent effect on the price level and the average cost of financing debt. Finally, housing prices seem to increase after the shock while stock prices fall immediately after the shock, possibly, reflecting the deterioration of fiscal policy.

These findings do not change significantly when the debt dynamics is included in the model.

Figure 8(b) plots the impulse-response functions to a shock in government revenue. Similar to the US, the results show that government revenue declines quickly after the shock, eroding after two quarters.6 The effects on GDP are positive and support the idea of a ‘crowding-in’ effect as both private consumption and private investment react positively to the shock. Revenue shocks tend to be significant and positive only for housing prices.

Italy. We look at the effects of a fiscal policy shock in Italy. Figure 9(a) displays the impulse-response functions to a shock in government spending. Despite a very small positive effect in the first quarters, GDP, private consumption, private investment, the price level, the interest rate and the government debt become smaller. This gives rise to the importance of considering the debt dynamics in the model.

Figure 9(b) shows the impulse-response functions to a shock in government revenue. The effects on GDP, private consumption and private investment are negative in the first quarters, but the impacts are not persistent as they vanish after four to six quarters and even become positive after that. Looking at the reaction of asset markets, one can see that the effects of government revenue shocks tend to be positive for stock prices and negative for housing prices. This suggests that while the credit-channel (i.e. the fall in interest rates) impacts positively in stock markets, for housing markets that channel is annihilated by the ‘crowding-out’ effects. Moreover, it is in accordance with the argument that the effects of fiscal consolidation on stock prices are particularly strong in countries which typically run higher levels of government deficit (Ardagna, 2009).

6 Afonso and Claeys (2008) mention that large revenue reductions unmatched by expenditure cuts have pushed the deficit beyond the 3% threshold in Germany in 2002, putting the country in an excessive deficit situation within the EU fiscal framework.
We now consider the potential debt feedback and estimate the following structural VAR:

$$\Gamma_0 X_t + \Gamma_1 X_{t-1} + \cdots + \gamma_i (d_{t-1} - d^*) = c + \epsilon_t$$  \hspace{1cm} (7)

$$d_t = \frac{(1 + i_t)}{(1 + \pi_t)(1 + \mu_t)} d_{t-1} + (g_t - i_t)$$  \hspace{1cm} (8)

The specification of Equation 7 is suggested by the empirical findings in Bohn (1998), who estimates a fiscal reaction function in which $d^*$ is the unconditional mean of the debt ratio and allows us to take into account the debt feedback. Following Bohn (1998) and Favero and Giavazzi (2008), we model the target level of the debt as a constant on the basis of the evidence of stationarity of $d$. In addition, we impose the government’s intertemporal budget constraint as described by Equation 8.

Table 1 reports the estimated coefficients on $(d_{t-1} - d^*)$ in the structural equations of the SVAR (government spending and government revenue). We report the coefficients (and the SEs in brackets) taken from the estimation for the full sample and the sub-samples. In the case of the US, we consider two sub-samples: 1970:Q3 to 1987:Q4, corresponding to the pre-Greenspan era; and 1988:Q1 to 2007:Q4, after Greenspan. In the case of the Germany, we also split the sample in two periods: 1980:Q3 to 1990:Q4, that is, before the reunification; and 1991:Q1 to 2006:Q4, that is, after the reunification. For the UK and Italy, each sub-sample is built by splitting the entire sample into roughly two sub-samples of similar size.

For the US, the results show a significant response of revenue and primary spending to deviations of the debt-to-GDP ratio from its sample average only for the full sample. Indeed, one sees that when the debt-to-GDP ratio is above its historical mean, government primary spending decreases (the coefficient associated to $(d_{t-1} - d^*)$ in the government spending equation is negative and significant ($-0.180$)), while in the government revenue equation is positive and significant ($0.187$)).

For the UK, the results are similar. They show a stabilizing effect of the debt level on the primary surplus that works through the response of both government revenue and government spending to deviations of the debt from the target level. This is, particularly, the case of the full sample. It is also the case of the second sub-sample (1985:Q1 to 2007:Q4) but only for government revenue. Therefore, when the debt ratio is above its sample mean, it is possible to observe an increase in government revenue (0.120, in the full sample; 0.143, for the second sub-sample).

In the case of Germany, there is evidence of a small stabilizing effect of the debt level on the primary surplus that works through the government revenue (0.211). In addition, the results of the estimation of the model in the first sub-sample (1980:Q3 to 1990:Q4) suggest that government spending tends to decrease ($-1.087$) when the debt-to-GDP ratio is above its sample mean.

Finally, for Italy, one can see that when the debt ratio is above average, government spending strongly falls ($-4.125$). Additionally, in the period 1995:Q1 to 2004:Q4, there is evidence supporting a stabilizing effect of government debt on the primary surplus that works through the government revenue: the coefficient associated to $(d_{t-1} - d^*)$ is positive and large in magnitude (4.353). This is in line with the increase of
fiscal policy discipline imposed by the Maastricht Treaty.

V. Conclusion

This article provides a detailed evaluation of the macroeconomic effects of fiscal policy. It, therefore, also deals with a relevant policy question, in particular, given the expansionary fiscal policies adopted by governments in industrialized countries in the attempt to stabilize the economies after the burst of the financial crisis in 2008.

We identify fiscal policy shocks using a recursive partial identification, and estimate a B-SVAR, therefore, accounting for the posterior uncertainty of the impulse-response functions. In addition, we explicitly include the feedback from government debt in our framework.

The empirical evidence suggests that government spending shocks: (i) have, in general, a small but positive effect on GDP; (ii) have a varied effect on private consumption and on private investment; (iii) have a positive effect on housing prices; (iv) lead to a quick fall in stock prices; and (v) in general, impact positively on the price level and the average cost of refinancing the debt. In addition, government revenue shocks: (i) have a positive effect on GDP and private investment; (ii) have a varied effect on private consumption; (iii) a varied impact on housing prices and a positive effect on stock prices; and (iv) in general, do not impact on the price level, but have a mixed effect on the interest rate.

When the debt dynamics is explicitly taken into account, (long-term) interest rates and GDP become more responsive and the effects of fiscal policy on these variables also become more persistent.

Finally, the results support the existence of a stabilizing effect of the debt level on the primary budget balance that works through both government spending and revenue in the case of the US and the UK, through government revenue in the case of Germany, and through government spending in the case of Italy. This signals that governments tend to adjust their fiscal imbalances in response to government debt developments.

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References


