

FISCAL POLICY AND ASSET PRICES

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ABSTRACT

We analyse the impact of fiscal policy on asset prices using a panel vector auto-regressive (PVAR) approach and quarterly data for ten industrialized countries. We find that positive fiscal shocks lead to a temporary fall in stock prices and a gradual and persistent decrease in housing prices. The empirical findings also point to: (i) a contractionary effect of fiscal policy on output in line with the existence of crowding-out effects and the deterioration of credit conditions; (ii) a weakening of the effectiveness of fiscal policy in recent times; (iii) a more persistent response of asset prices for countries with a lower degree of openness; (iv) a larger impact of fiscal policy on asset prices for small countries; (v) a close link between the responsiveness of asset prices to fiscal policy and the government's size; (vi) an increase of the sensitivity of asset prices to fiscal policy shocks following the process of financial deregulation and mortgage liberalization; and (vii) significant fiscal multiplier effects in the context of severe housing busts. Finally, the evidence suggests that changes in equity prices may help governments towards consolidation of public finances.

Keywords: asset prices, fiscal policy, panel VAR

JEL classification numbers: E62, H30

I. INTRODUCTION

Since the beginning of the most recent financial turmoil, monetary authorities have quickly and aggressively tried to boost the economy. As economic conditions kept deteriorating as a result of the collapse of asset prices and massive destruction of asset wealth, large fiscal stimulus programmes have become a key additional ingredient of the policy mix.

These extraordinary measures took place in a very rare environment and, despite the challenges they pose in terms of business cycle de-synchronization (Rafiq and Mallick, 2008; Mallick and Mohsin, 2010), the nexus between monetary and financial stability (Granville and Mallick, 2009; Sousa, 2010a), fiscal deficit volatility (Agnello and Sousa, 2009)¹ and long-term

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¹ Agnello and Sousa (2009) argue that the observed differences in the volatility of fiscal deficits across countries can be linked to the fact that politically unstable countries with weak institutions are often vulnerable to shocks. As a result, they hypothesize that political and institutional factors also have a direct impact on deficit volatility that goes beyond the economic sources of fiscal instability.

sustainability of fiscal deficits (Hallett, 2008; Hallett and Lewis, 2008; Schuknecht *et al.*, 2009), they are also embedded in the idea that fiscal policy might be an important tool towards asset markets' stabilization.

As a witness to this, we have assisted to an interesting debate on the role that governments may play at targeting asset markets and avoiding the repetition of similar events. In fact, while some advocate that fiscal expansions may be a waste of resources (and, consequently, ineffective and compromising the future generations), others suggest that further stimulus is necessary to counteract the economic slump. Despite this apparent lack of a unified view on the linkages between fiscal policy and asset markets, it is consensual that this relationship emerged dramatically in the course of the crisis and stock and housing prices play a major role in the likelihood of an expansion and contraction ending (Castro, 2010). Not surprisingly, the topic has received particular attention in recent times (Schuknecht *et al.*, 2009; Sousa, 2010b).

Despite this, both the theoretical reasoning underlying the linkages between fiscal policy and asset markets and the empirical evidence analysing them are far from delivering a clear picture. To that extent, the current work tries to fill this gap, as we assess the impact of fiscal policy shocks on asset prices.

Our empirical approach is innovative in five main aspects. First, we estimate a panel vector auto-regression (PVAR), which has the advantages of treating all variables as endogenous and controlling for unobserved individual heterogeneity. Second, we use high-frequency (quarterly) data instead of relying on annual data and, as a result, can identify with more precision the fiscal policy shock. Third, we account for specific factors such as the degree of openness, the size of the country and the state of public finances. Fourth, we condition the asset price effects generated by fiscal policy on the occurrence of severe housing busts and evaluate whether they have changed over time. Fifth, we emphasize the importance of fiscal policy in affecting credit conditions. All in all, this allows us to better understand the transmission mechanism of fiscal policy to asset prices.

The empirical evidence shows that positive fiscal policy shocks are detrimental for both stock and housing prices. However, while stock prices respond on impact and the effect seems to be of very short duration, housing prices react much more gradually and return much more slowly to their initial levels: at the eight-quarter horizon, stock prices recover in anticipation of the output expansion, while housing prices remain persistently depressed. As a result of unsynchronized response of stock and housing markets to fiscal policy shocks, governments may find it difficult to stabilize both markets by using a single policy instrument. Putting it differently, the attempts of fiscal policy to counteract stock price developments may have a destabilizing effect on housing prices.

While our paper focuses on the role of fiscal policy as a driver of asset price dynamics, one may also question whether asset prices influence fiscal policy. We find that the effects of stock market shocks on fiscal policy are greater in magnitude than the ones associated with housing prices. This, therefore, suggests that, rather than housing market movements, changes in equity prices may decisively contribute to the goal of fiscal consolidation.

Our findings also suggest that fiscal policy has a contractionary (non-Keynesian) effect on output and generates important crowding-out effects. In fact, an unexpected rise in public deficit leads to a strong deterioration of lending conditions, with real credit falling gradually and in a persistent manner. This corroborates the increase in the cost of debt refinancing that emerges after government funding needs boost. As the fiscal policy shock starts eroding, real credit recovers and output increases. In consequence, there seems to be a trade-off between the short-run recessionary effect of fiscal policy and its long-term expansionary impact. This is in line with the work of Heim (2010a), who shows that government deficits crowd out private spending.

The robustness of the results is assessed in several directions. First, we find that the expansionary effect of fiscal policy has somewhat weakened in recent times and, as a result, asset markets have become more sensitive to a deterioration in fiscal stance. Second, the degree of openness of the economy impacts on the effects that fiscal policy has on output, but does not change the reaction of asset prices, which is negative. However, the persistence of the response is larger for countries with a low degree of openness, given the stronger deterioration of credit conditions. Third, the country's size appears to act as a buffer against unexpected fiscal policy shocks: both the magnitude and the persistence of asset price effects are larger for small countries. Fourth, as a result of the negative impact on credit conditions, fiscal policy shocks are particularly detrimental for housing prices in countries where the size of the government is large. The impact on stock prices is larger for countries where the size of the government is small, in accordance with a larger revision of risk premium. Fifth, the process of financial deregulation and mortgage liberalization might have contributed to the change in the degree of effectiveness of fiscal policy, as the competitiveness of the national banking sector became strongly related to the commitment of governments to credible and sound policies. Finally, fiscal policy actions can have significant multiplier effects when undertaken in the outcome of severe housing busts, which gives rise to the importance of the implementation of fiscal stimulus packages.

The rest of the paper is organized as follows. Section II reviews the existing literature on the relationship between fiscal policy and asset prices. Section III presents the estimation methodology. Section IV describes the data. Section V discusses the results, while Section VI assesses the robustness of the findings. Finally, Section VII concludes and summarizes the main policy implications.

II. A BRIEF REVIEW OF THE LITERATURE

Despite the major fiscal developments of recent decades, the attention of academics, central banks and governments has been typically directed towards monetary policy and its linkage with asset markets. For instance, Granville and Mallick (2009) show that monetary stability (characterized by inflation targeting) is conducive to financial stability (proxied by a wide range of variables including the deposit-loan ratio of the banking sector, exchange rates, housing price inflation, the term structure of interest rates and stock prices). Similarly, Sousa (2010a) emphasizes the importance of wealth effects generated by monetary policy. The author shows that while housing wealth effects are strongly persistent, financial wealth effects are temporary. The estimation of the monetary policy rule also suggests that central banks track very closely the behaviour of financial wealth developments.

In light of the recent developments in asset markets, understanding the impact of fiscal policy measures on asset markets also emerges as a central question. In fact, because of the linkages between asset prices and wealth accumulation, assessing the role that governments may play in the process is essential. Moreover, given that the deepening of the recent crisis was driven by the sharp collapse of asset prices and destruction of asset wealth, there is a natural interest in exploring what fiscal policy can do to avoid the repetition of similar episodes and minimize the risk of unconventional interventions.

There are various channels by which fiscal policy can affect stock markets. For instance, Darrat (1990) finds evidence suggesting that fiscal measures affect stock market returns, and Van Aarle *et al.* (2003) highlight the link between fiscal policy and stock prices. Akitoby and Stratman (2008) emphasize that fiscal policy influences financial markets via its impact on sovereign risk spreads. Ardagna (2009) argues that fiscal deterioration driven by rises in government debt has a negative effect on stock prices. Arin *et al.* (2009) look at the impact of

different fiscal shocks and find that labour taxes have a smaller impact on stock returns than indirect taxes.

An increase in public deficit can also lead to a deterioration of lending conditions, as the boost in demand for credit pushes the interest rate upwards. Consequently, the present discounted value of the cash-flows generated by stocks falls, a higher risk premium is required and stock prices shrink. In the same line of reasoning, as the access to credit gets constrained, private spending falls and output may contract via the so called 'crowding-out' effects (Heim, 2010b). In particular, Heim (2010c) finds a strong negative relationship between government deficits and private consumer and investment spending, and shows that credit shortages to the private sector are induced by borrowing-financed government deficits. Moreover, by negatively impacting on stock prices, fiscal policy leads to a reduction in households' wealth (Laopodis, 2007). More generally, unsound fiscal policies can prompt a loss in the confidence of home-currency assets and generate a rebalancing of asset portfolio composition away from domestic assets and towards foreign assets (MacLennan *et al.*, 1999).

Fiscal policy can also affect housing markets (Jappelli and Pistaferri, 2007) and numerous instruments are available for governments to influence their dynamics. For example, taxes on housing gains and the imputed rental housing value, fiscal subsidies and VAT on purchases of new houses, and tax deductibility of mortgage payments and housing rents can have an important impact on housing prices via their effects on households' disposable income and the demand of houses. More broadly, the deterioration of the fiscal stance and uncertainty about the long-run sustainability of public finances can impact on long-term interest rates and negatively impinge on the financing conditions for mortgages, pushing housing prices downwards.

III. EMPIRICAL METHODOLOGY

We quantify the relationship between fiscal policy, housing and stock prices and real economic activity by estimating the following PVAR:

$$X_{it} = \Gamma_0 + \Gamma(L)X_{it} + f_i + \varepsilon_{it} \quad (1)$$

where X_{it} is a vector of endogenous variables that includes: (i) the housing price index ($HOUSE_{it}$); (ii) the gross domestic product (GDP_{it}); (iii) the price level (P_{it}); (iv) the primary government deficit (DEF_{it}); (v) the credit aggregate ($CREDIT_{it}$); and (vi) the stock price index (EQ_{it}). Consequently, we can represent X_{it} as $[HOUSE_{it}, GDP_{it}, P_{it}, DEF_{it}, CREDIT_{it}, EQ_{it}]'$. Γ_0 denotes a vector of constants, $\Gamma(L)$ is a matrix polynomial in the lag operator, f_i are fixed effects that track country-specific macroeconomic shocks and ε_{it} corresponds to a vector of error terms.

In what concerns the ordering of the variables in the system, we assume that the GDP and the price level respond to fiscal policy shocks with a lag. This is in accordance with previous studies in the literature on fiscal policy (Fatás and Mihov, 2001; Blanchard and Perotti, 2002; Mountford and Uhlig, 2009). With regard to asset prices, we follow Afonso and Sousa (2011a, 2011b), whereby stock prices are ordered last and housing prices are ordered first. More specifically, we consider that stock prices adjust simultaneously to unexpected variation in fiscal policy and this is justified by the fact that these assets are traded in markets with real-time auctions. Regarding housing prices, our choice is supported by the fact that markets are typically stick and transaction costs are large, and it takes time to build new dwellings and work off inventories as well as to match buyers and sellers. Finally, real credit is allowed to respond simultaneously to fiscal policy, in light of the fact that it captures money market and lending conditions and these adjust instantaneously to the shock via interest rates. However, there are several reasons that justify the

inclusion of real credit rather than the short-term interest rate. From an empirical point of view, Agnello and Schucknecht (2011) find that it is indeed the credit supply that plays a prominent role in determining housing price fluctuations. In particular, the marginal impact of credit on the probabilities of booms and busts in housing prices is about two times greater than the one associated with the interest rate. From a theoretical perspective, there are three major arguments underlying our choice. First, real credit mirrors households' debt financing conditions and the degree of credit-rationing whereas variation in short-term interest rates typically reflects changes in the monetary policy setting and does not necessarily lead to a change in credit conditions. Therefore, it is the increase in credit supply that can generate a fall in interest rates and, consequently, boost the demand for housing and risky assets such as stocks. Similarly, borrowing constraints due to quantitative ceilings can negatively affect housing demand and lead to an upward revision of risk premium. Second, asset prices are defined as the present discounted value of the future stream of income that they generate. This means that, by stimulating current economic activity and improving future prospects, an increase in credit supply can positively affect both housing and stock prices via the expectations of higher income and lower discount rates. Third, it is the degree of access to credit markets due to higher (lower) collateral values and not the interest rate *per se* that can impact on asset prices. As a result, the level of real credit becomes crucial for understanding the transmission of fiscal policy to asset prices.

There are also various advantages associated with the use of the PVAR approach.

First, it allows for unobserved individual heterogeneity as it explores the cross-sectional dimension through the consideration of a panel of countries.

Second, while treating all variables as endogenous (as in the traditional country-level Vector Auto-Regression (VAR)), it increases the efficiency of the statistical inference which would, otherwise, suffer from a small number of degrees of freedom. For instance, Afonso and Sousa (2011 a) investigate the macroeconomic effects of fiscal policy using a Bayesian structural vector auto-regression approach. The authors use a partial recursive identification scheme and data for Germany, Italy, UK and USA, and show that government spending shocks have a small effect on GDP, lead to important 'crowding-out' effects, have a mixed impact on housing prices and generate a quick fall in stock prices. Afonso and Sousa (2011b) use a fully simultaneous system of equations and the same set of countries and find that unexpected variation in fiscal policy can substantially increase the variability of housing and stock prices. While the two abovementioned studies rely on econometric frameworks that are estimated at the country level, these methodologies would be subject to the small-sample bias if one were to implement them for the panel of countries that we use in the current paper.

Third, the PVAR framework makes it possible to compare the effects of fiscal policy on asset prices, while conditioning them on different dimensions such as the degree of openness of the economy, the country's size and the government's size. Therefore, it allows for a better characterization of the impact of fiscal policy, which would not be possible with the use of country-level data.

Fourth, despite the fact that our PVAR approach imposes the same cross-sectional structure for each country, it also allows us to uncover common dynamic relations (Gavin and Theodorou, 2005). While this issue can be tackled by mean-differencing the data and using fixed effects, the potential correlation between the fixed effects and the regressors leads to biased estimates (Holtz-Eakin *et al.*, 1988), especially when the time dimension is small (Nickell, 1981). As a result, we use a forward mean-differencing approach (the 'Helmert procedure') that removes only the mean of all future observations available for each country-year (Arellano and Bover, 1995), and use the lags of the regressors as instruments. We estimate the system by GMM, which keeps the orthogonality between lagged regressors and transformed variables unchanged (Blundell and Bond, 1998). Love and Zicchino (2006) show that the system GMM is equivalent

to a two-stage least squares (2SLS), given that the number of regressors is equal to the number of instruments.

Fifth, in order to compute the impulse-response functions, we impose a triangular identification scheme and transform the system in a 'recursive' VAR (Hamilton, 1994). In contrast with country-level VARs that impose some sort of long-run restrictions (Blanchard and Quah, 1989), sign restrictions (Mountford and Uhlig, 2009) or short-run restrictions (Sims and Zha, 2006), our framework computes the orthogonalized shocks, which cannot be interpreted as reduced-form but rather as structural shocks. However, the PVAR approach is still more appropriate given that the data span is relatively short for some countries, a feature that would bias the statistical inference based on country-level methodologies.

IV. DATA AND SUMMARY STATISTICS

We use quarterly data that is available as follows: 1980:1–2007:3 for Belgium; 1970:1–2007:4 for Finland; 1970:2–2007:2 for France; 1979:1–2007:2 for Germany; 1980:1–2007:3 for Italy; 1977:1–2007:1 for the Netherlands; 1988:1–2007:4 for Portugal; 1985:1–2006:4 for Spain; 1955:2–2007:4 for the UK; and 1967:2–2007:4 for the USA. This choice of countries is dictated by the data availability. In fact, we use a set of quarterly fiscal data taken from national accounts (in the case of the UK and USA) or drawn on the high-frequency (monthly) fiscal cash data (in the case of the other countries). This is also a novelty of the paper, given that the existing literature on fiscal policy typically relies on annual data.²

The main sources are as follows:

- Housing Price Index ($HOUSE_{it}$). Provided by the Bank for International Settlements (BIS) and proxied by the property price index.
- GDP (GDP_{it}). Provided by the Bureau of Economic Analysis (in the case of the USA), the Central Bank of Portugal (for Portugal), the Office for National Statistics (for the UK), and the International Financial Statistics (IFS) of the International Monetary Fund (IMF) (for the remaining countries) and used as a proxy for economic activity and business cycle.
- Price (P_{it}). Provided by the IFS of the IMF and proxied by the GDP deflator.
- Primary Fiscal Deficit (DEF_{it}). Provided by the Bureau of Economic Analysis (in the case of the USA), the Central Bank of Portugal (for Portugal), the Office for National Statistics (for the UK) or disseminated through the monthly publications of the General Accounting Offices, Ministries of Finance, National Central Banks and National Statistical Institutes (for the remaining countries). In the case of the USA, the figures refer to the Federal Government spending and revenue. For the UK, we consider data for the Public Sector. In the case of the euro area countries, we use budgetary cash data, which typically relates to the Central Government (i.e., it excludes local and/or the regional authorities). The latest figures are also available in the Special Data Dissemination Standard (SDDS) section of the IMF website. This variable is used as the fiscal policy instrument in line with the work of Dai and Philippon (2005).
- Credit ($CREDIT_{it}$). Provided by the IFS of the IMF and proxied by claims on the private sector.
- Stock Price Index (EQ_{it}). Provided by the BIS (all countries, except Portugal) and the IFS of the IMF (Portugal) and proxied by the equity price index.

² Some studies have also used quarterly or monthly frequency data to test fiscal sustainability. See, for instance, Haug (1995) and Quintos (1995), for the USA; Smith and Zin (1991) for Canada; Baglioni and Cherubini (1993) for Italy; and Hatemi-J (2002) for Sweden. Afonso *et al.* (2011) rely on high-frequency data to assess fiscal policy developments.

TABLE 1
Descriptive statistics

Country	Property price			GDP			Price		
	# Obs.	Mean	SD	# Obs.	Mean	SD	# Obs.	Mean	SD
Belgium	110	0.8082	0.3162	111	10.9307	0.1804	111	4.3933	0.2109
Finland	152	0.5571	0.2036	152	10.1284	0.2927	152	4.0150	0.6260
France	150	0.5616	0.2325	150	12.5815	0.2453	150	4.0817	0.5765
Germany	150	0.3604	0.0728	190	12.7250	0.3757	190	4.0678	0.4759
Italy	112	1.0648	0.1724	111	12.5459	0.1555	112	4.1845	0.4335
Netherlands	123	0.8580	0.3517	123	11.4122	0.2238	123	4.3208	0.2072
Portugal	80	-0.0435	0.0495	120	10.0509	0.3370	120	3.8638	0.8038
Spain	146	1.3278	0.4023	150	11.7332	0.3129	150	3.6489	0.9349
UK	152	0.9059	0.3694	212	12.0062	0.3654	212	3.3459	1.0705
USA	152	0.4866	0.2320	164	8.7642	0.3598	164	4.1517	0.4936
Sample	1327	0.7074	0.4380	1483	11.3303	1.3098	1483	11.3303	1.3098

Country	Primary fiscal deficit			Credit			Equity price		
	# Obs.	Mean	SD	# Obs.	Mean	SD	# Obs.	Mean	SD
Belgium	111	-0.1721	0.3924	111	24.8426	0.3196	111	0.9352	0.5490
Finland	152	0.0116	0.1447	152	21.9406	0.4988	152	1.2462	0.9728
France	150	0.0286	0.0872	150	24.6828	0.5633	150	0.8436	0.6345
Germany	114	0.0549	0.0356	150	24.0490	0.4299	150	0.4425	0.4786
Italy	112	0.2228	0.1596	112	30.2817	0.3239	112	1.1365	0.4414
Netherlands	121	0.0847	0.0790	123	22.6651	0.5930	123	0.7629	0.7192
Portugal	120	0.2866	0.1258	120	25.7695	0.6383	80	-0.4257	0.3233
Spain	88	0.1115	0.1153	150	27.2081	0.5155	150	1.8672	0.7100
UK	212	-0.0150	0.0653	152	22.3303	1.0097	152	0.8932	0.4774
USA	164	0.1186	0.0929	152	24.2738	0.3335	152	0.8965	0.6465
Sample	1344	0.0661	0.1889	1372	24.6640	2.3574	1332	0.9199	0.8108

In the case of data for euro area countries, national currency data for all years prior to the switch to the euro have been transformed using the fixed euro conversion rate to provide comparable series across time. All variables are seasonally adjusted and expressed in natural logarithms of real terms.

A summary of the descriptive statistics of the variables is reported in Table 1.³ It shows that stock prices are much more volatile than housing prices. The sample average of the government deficit (6.6 percent) is almost twice as large as the threshold defined by the Maastricht criteria (3 percent), but one should note that: (i) the time coverage (1970–2007) includes observations from periods that are prior to the adoption of that set of rules; and (ii) the sample also includes the UK and the USA.

V. EMPIRICAL RESULTS

Given that the major goal of the paper is to assess the impact of unexpected variation in fiscal policy on asset prices, we estimate the PVAR represented by system (1).

Table 2 summarizes the parameter estimates. It is interesting to note that all variables included in the system exhibit a relatively strong persistence. This may, therefore, lead to the existence of

³ A detailed description of the data sources and the data construction is available upon request.

TABLE 2
Main results of a six-variable VAR model

Response of	Response to					
	$HOUSE_{t-1}$	GDP_{t-1}	P_{t-1}	$DEFICIT_{t-1}$	$CREDIT_{t-1}$	EQ_{t-1}
$HOUSE_t$	0.9329 [0.0159]***	0.0031 [0.0336]	-0.0263 [0.0139]	-0.0124 [0.0139]	0.0262 [0.0107]***	0.0020 [0.0080]
GDP_t	-0.0069 [0.0061]	0.9582 [0.0119]***	0.0076 [0.0053]	-0.0026 [0.0052]	0.0000 [0.0047]	0.0089 [0.0029]***
P_t	-0.0236 [0.0071]***	0.0556 [0.0151]***	0.9630 [0.0059]***	0.0156 [0.0053]***	0.0125 [0.0046]***	-0.0168 [0.0035]***
$DEFICIT_t$	-0.1060 [0.0595]	0.0930 [0.1231]	-0.103 [0.0526]	0.7181 [0.0496]***	0.1336 [0.0380]***	-0.0836 [0.0277]***
$CREDIT_t$	-0.0479 [0.0157]***	0.0139 [0.0358]	-0.0041 [0.0132]	-0.0329 [0.0127]**	1.0032 [0.0130]***	-0.0054 [0.0078]
EQ_t	0.0378 [0.0572]	-0.1675 [0.1339]	0.0819 [0.0558]	0.0237 [0.0446]	-0.0424 [0.0392]	1.0365 [0.0309]***

Note: Six-variable VAR model is estimated by GMM. Country-time and fixed effects are removed prior to estimation. Reported numbers show the coefficients of regressing the row variables on lags of the column variables. Heteroscedasticity and serial correlation robust standard errors appear in brackets. * Statistically significant at 10% level; ** at 5% level; *** at 1% level.

substantial differences between the short-run and the long-run responses to different shocks. In particular, in the case of fiscal deficit, it can also be explained by some inertia of the budgetary process.

The dynamics of housing prices is positively correlated with credit, revealing the importance of the relationship between monetary policy (in particular, in terms of its effect on credit conditions) and this set of asset prices.

In what concerns fiscal policy, one can see that it negatively impinges on credit in a significant way. This is in line with the studies that find a positive link between deficits and the long-term interest rates (Hoelscher, 1986; Cebula and Rhodd, 1993)⁴ and those that provide evidence of a negative relationship between credit (and money) and interest rates (Gerdesmeier *et al.*, 2010). In addition, fiscal policy seems to be negatively related to housing prices and positively linked to stock prices.

Figure 1 plots the impulse-responses to a positive shock to primary fiscal deficit together with 68 percent bootstrapped confidence bands based on 10,000 draws. It can be seen that the response of asset prices is quite different: the effect on housing prices is negative and significant, but for stock prices we do not find a statistically significant impact. In addition, while the reaction of housing prices is strongly persistent and the trough is reached after ten quarters, the adjustment of stock prices is fast and short-lived.

With regard to credit conditions, they gradually deteriorate after the shock. This is in accordance with the work of Gale and Orszag (2003), who argue that there are two important reasons for why budget deficits may affect credit availability and, therefore, raise interest rates: (i) public deficits reduce aggregate savings when private savings do not increase by the same amount and there are no compensating foreign capital inflows; and (ii) deficits increase the stock of government debt. This stimulates savings in the private sector and 'crowds-out' private spending. In this context, Kiani (2009) examines the effect of federal budget deficits on long-term interest rates and emphasizes the 'crowding-out' hypothesis, whereby fiscal policy can

⁴ In contrast, other authors did not find evidence of a significant relationship between government deficits and interest rates (Barro, 1976; Evans, 1985).

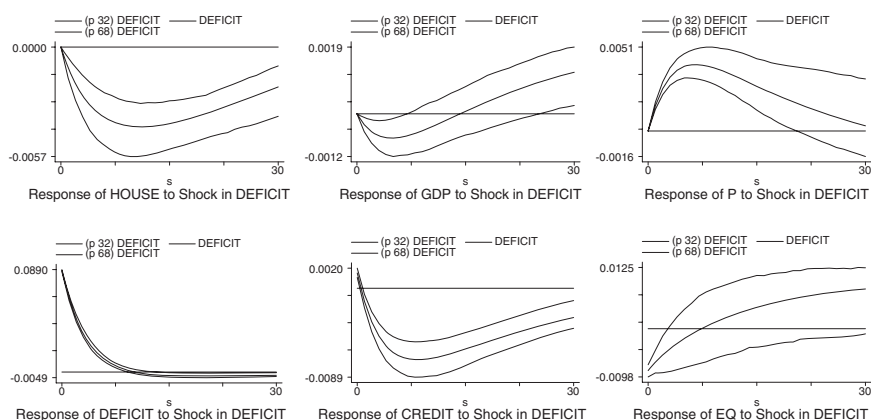


Fig. 1. Impulse-responses to a fiscal policy shock (baseline model).

negatively influence investment expenditures on plant, equipment, research and development and, ultimately, the long-term growth of living standards. Fiscal policy shocks can also influence credit demand via their impact on agents' expectations. For instance, when agents have a Ricardian behaviour (i.e., when they expect that the increase in the budget deficit will lead to a rise in future taxation), then one should observe an increase in current savings and a fall in aggregate demand. Similarly, if large budget deficits are embedded in higher inflation expectations, the increase in risk premium will generate a lower demand for credit. Schuknecht *et al.* (2009) also highlight the importance of the government risk premium in bond markets.

Combining the abovementioned empirical finding and the theoretical reasoning underlying it, we conclude that the credit channel associated with unexpected variation in fiscal policy largely operates via the housing market. In fact, the fall in real credit may lead to a cut in housing demand and contribute to the downward response of housing prices. In what concerns stock prices, the credit channel does not seem to play a relevant role: as the fiscal shock erodes, stock prices start rising in reflex of the expected output expansion.

Indeed, GDP falls significantly for about six quarters, before it recovers in a gradual manner, a feature that corroborates the findings of Perotti (2004). Using a structural vector auto-regression (SVAR) framework to assess the macroeconomic effects of fiscal policy on a set of OECD countries, the author shows that short-term tax multipliers are negative and medium-term multipliers are positive. Similarly, Baldacci *et al.* (2001) argue that, although research generally suggests small and positive spending multipliers and small and negative tax multipliers, there is some evidence for both negative spending multipliers and positive tax multipliers. Giavazzi and Pagano (1990) and Bradley and Whelan (1997) also find an expansionary effect associated with contractionary fiscal policy, in particular, when undertaken in a situation of public accounts distress and coordinated with an adequate exchange rate policy. Non-Keynesian effects may actually emerge when the fiscal consolidation programme is seen as a serious attempt to reduce public sector borrowing requirements. In that case, an induced wealth effect may emerge, leading to an increase in private consumption (Sutherland, 1997). However, if fiscal consolidation is not seen as credible, then a non-Keynesian effect on consumption will prevail.

After the shock, the price level rises significantly, with the peak impact being reached after ten quarters. This gives support to the fiscal theory of the price level that accounts for the interactions between monetary and fiscal policy even when central banks follow an inflation targeting framework (Woodford, 1995).

TABLE 3
Forecast-error variance decomposition

Response of	Response to					
	$HOUSE_{t-1}$	GDP_{t-1}	P_{t-1}	$DEFICIT_{t-1}$	$CREDIT_{t-1}$	EQ_{t-1}
$HOUSE_t$	0.5557	0.0095	0.0379	0.0310	0.0253	0.3406
GDP_t	0.0065	0.2820	0.0050	0.0028	0.0407	0.6630
P_t	0.0441	0.0201	0.1722	0.0092	0.1157	0.6387
$DEFICIT_t$	0.0197	0.0048	0.0160	0.4074	0.1541	0.3980
$CREDIT_t$	0.0210	0.0053	0.0024	0.0344	0.9363	0.0006
EQ_t	0.0059	0.0057	0.0262	0.0023	0.0473	0.9127

Note: Percentage of variation in the row variable (30 quarters ahead) is explained by the column variable.

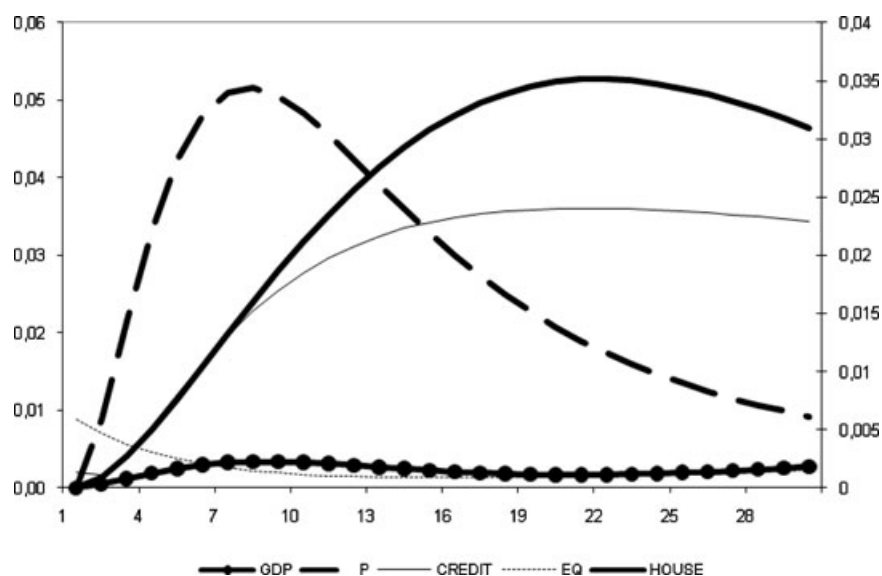


Fig. 2. Forecast-error variance decomposition (shock to fiscal policy).

In Table 3, we report the variance decomposition of the variables included in the PVAR at the horizon of 30 quarters. Similarly, Figure 2 plots the forecast-error variance decomposition to a fiscal policy shock over different time horizons. The evidence corroborates the previous findings: unexpected variation in the fiscal stance explains just a small fraction of the forecast-error variance decomposition of stock prices (dashed line), but it plays an important role in generating the dynamics of housing prices (solid line) even 30 quarters ahead. In addition, fiscal shocks substantially and persistently impact on real credit, which gives echo to the current developments in bond markets, especially, given the difficulties faced by some highly-indebted governments in trying to raise the necessary funds. Finally, the evolution of the forecast-error variance decomposition of GDP suggests that fiscal policy plays a negligible role, which casts some doubts about the effectiveness of the stimulus packages. Note, however, that these results have not been conditioned on the state of the economy, a feature that may be crucial.

In order to assess the robustness of the results from the baseline model, we look at what drives the dynamics of fiscal deficit. Due to the endogenous nature of government revenue (which may

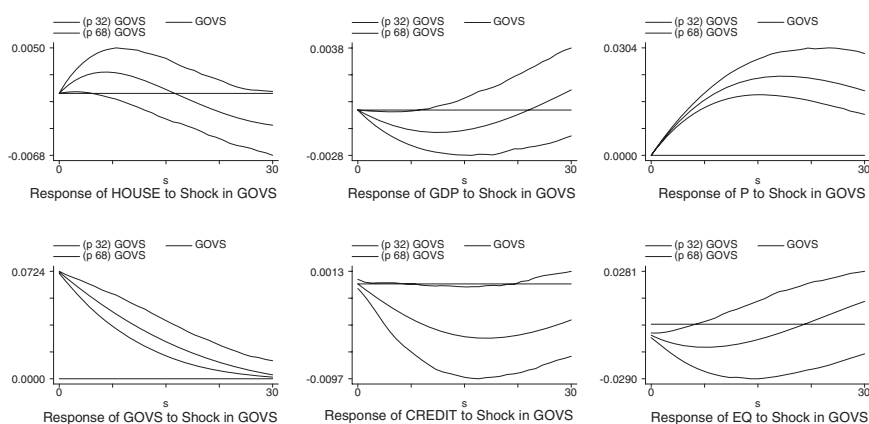


Fig. 3. Impulse-responses to a government spending shock.

reflect the automatic response to the business cycle), we replace the fiscal deficit by government spending ($GOV S_{it}$) as our policy instrument. In addition, while changes in asset prices may influence government revenue (via taxation on equity holdings and financial transactions and property or stamp duty taxes), this is less likely to happen with government spending.

Figure 3 shows that the results are consistent with the ones for the baseline model. A positive shock to government spending leads to a persistent fall in housing prices (despite the very short-lived and not statistically significant positive effect in the very few first quarters) and a quick albeit temporary drop in stock prices. Real credit drops substantially after the shock and recovers only very gradually, which gives rise to the importance of crowding-out effects. This deterioration of lending conditions for the private sector also explains the negative response of housing prices. With regard to asset prices, the empirical findings suggest that there is a rebalancing of the composition of asset portfolios as investors look for a safe haven and reallocate their savings away from risky assets. Output is also negatively impacted by the spending shock, highlighting the existence of non-Keynesian effects. All in all, unexpected changes in government spending seem to be the major driving force of public deficit news.

An important question remains: do asset prices influence the dynamics of fiscal policy? As discussed in Section I, there is very limited evidence on whether fiscal policy responds and/or is affected by asset price movements. From a theoretical perspective, Schuknecht and Eschenbach (2002) show that asset prices can influence government budget balances through a series of channels: (i) directly, via related taxes on capital gains/losses; and (ii) indirectly, via a feedback effect from asset prices to the economy. A positive shock in asset prices may, therefore, have a counter-cyclical effect on the budget balance, as the additional government revenue would translate into a lower deficit (or a higher surplus). Alternatively (i.e., in the case of indirect effects), higher asset prices can boost consumer confidence, via the wealth effect, and lead to a rise in consumption. This, in turn, induces an increase in taxes, thereby reducing government deficit.

In order to investigate the potential multidirectional linkage between fiscal policy and asset prices, Figure 4 displays the impulse-response functions of public deficit to, respectively, a shock in housing prices and a shock in stock prices. The evidence suggests that unexpected variations of asset price have a persistent and significant impact on fiscal policy and contribute to long-term fiscal consolidation. In particular, the reduction of government deficit seems larger in magnitude in the case of stock price shocks (a 6.1 percent fall in government deficit) than for

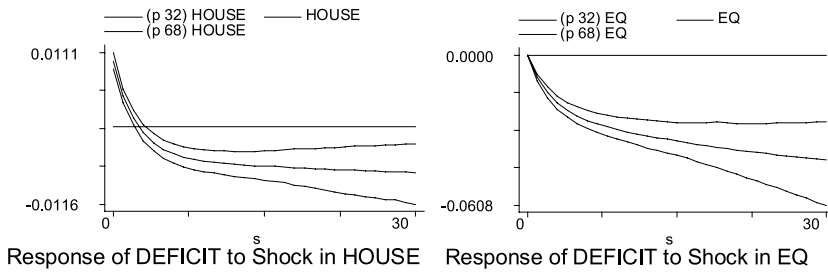


Fig. 4. Impulse-responses of $DEFICIT_{i,t}$ to, respectively, a housing price ($HOUSE_{i,t}$) and an equity price ($EQ_{i,t}$) shock.

housing price shocks (a 1.2 percent reduction in government deficit). This suggests that changes in stock prices (rather than housing market movements) can play a prominent role towards the achievement of a sounder and more sustainable fiscal stance.

VI. SENSITIVITY ANALYSIS

We now assess the robustness of the previous results in several directions. First, we investigate if the effectiveness of fiscal policy has changed over time. Second, we look at the importance of the countries' trade openness in shaping the effectiveness of fiscal policy. Third, we analyse whether the size of a country acts as a buffer against unexpected variation in fiscal policy. Fourth, we examine the extent to which the government's size impacts on the effects of fiscal policy. Fifth, we investigate the role of fiscal deregulation and the process of mortgage liberalization. Finally, we ask whether the fiscal stimulus packages help boost the recovery.

VI.1 Have asset markets become more sensitive to fiscal policy?

This section examines whether the impact of fiscal policy on asset prices (and economic activity) has changed over time. To that end, we estimate the PVAR model specified in (1) over two sub-periods: 1970:1–1984:4 and 1985:1–2007:4.

Figure 5 plots the impulse-response functions of asset prices and output to a shock in the fiscal stance. In the first sub-sample period (1970:1–1984:4), the impact of fiscal policy on economic activity is slightly positive, but not statistically significant. In response to the expansionary effect on output, the demand for financial assets increases and stock prices rise. In what concerns housing prices, our analysis suggests that the effects of fiscal policy are persistently negative, but small in magnitude.

With regard to the second sub-sample period (1985:1–2007:4), the results displayed in Figure 6 show that fiscal policy effects are dramatically different. The pattern of the response of GDP suggests that, after the mid-1980s, the fiscal multiplier has become significantly negative, providing evidence of a 'non-Keynesian' effect of fiscal policy. This result is consistent with the common wisdom that fiscal policy effects have substantially weakened over the last 20 years (Perotti, 2004). We also find that the size of the effects and the persistence of the impact of fiscal shocks on housing prices are larger than in the first sub-sample period. With regard to the reaction of stock markets, we note that the impact of unexpected variation in fiscal policy is negative but still not statistically significant. A possible explanation for the heterogeneous response of output and housing prices across the two sub-samples may lay in the fact that

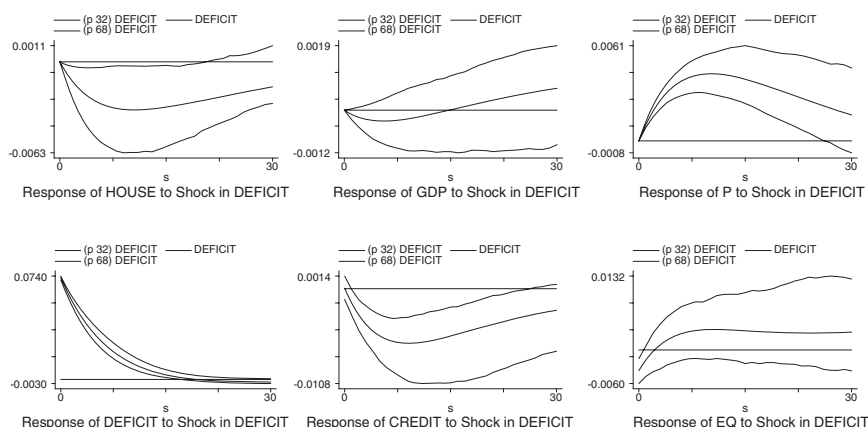


Fig. 5. Impulse-response functions to a fiscal policy shock (sub-sample 1970:1–1984:4).

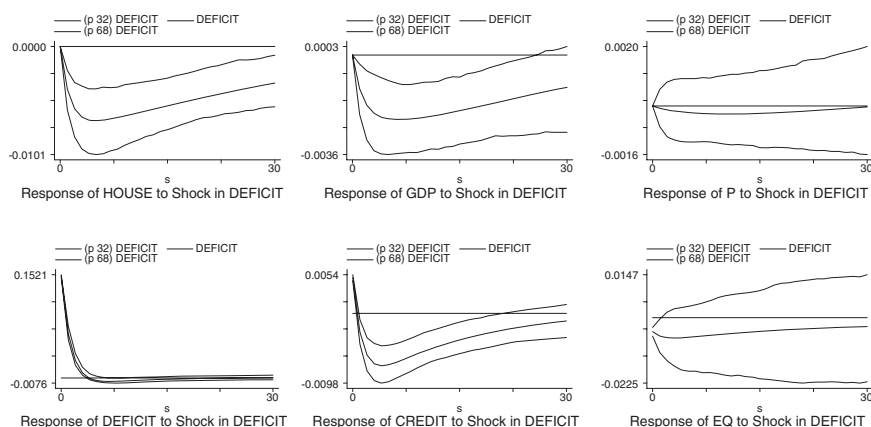


Fig. 6. Impulse-response functions to a fiscal policy shock (sub-sample 1985:1–2007:4).

financial deregulation has progressively changed the degree of effectiveness of fiscal policy, as well as the way it is perceived by markets' participants.

VI.2 How important is the degree of openness?

We now assess the importance of the countries' trade openness in shaping the effectiveness of fiscal policy. Rodrick (1998) argues that, if open economies are typically exposed to external shocks, it may be important for the government to facilitate private consumption smoothing via the implementation of countercyclical fiscal policies. However, a greater degree of integration of global financial markets may also increase the countries' ability to absorb trade shocks through risk sharing. In this case, there is less scope for fiscal measures aimed at counteracting external shocks. In addition, one should bear in mind that expansionary fiscal policy tends to generate a Keynesian expansionary effect in countries that look closer to the case of a closed economy. In contrast, for countries that resemble small open economies under a flexible exchange rate, an expansion of the fiscal stance may lead to important crowding-out effects via its impact on the exchange rate (and, therefore, on external demand).

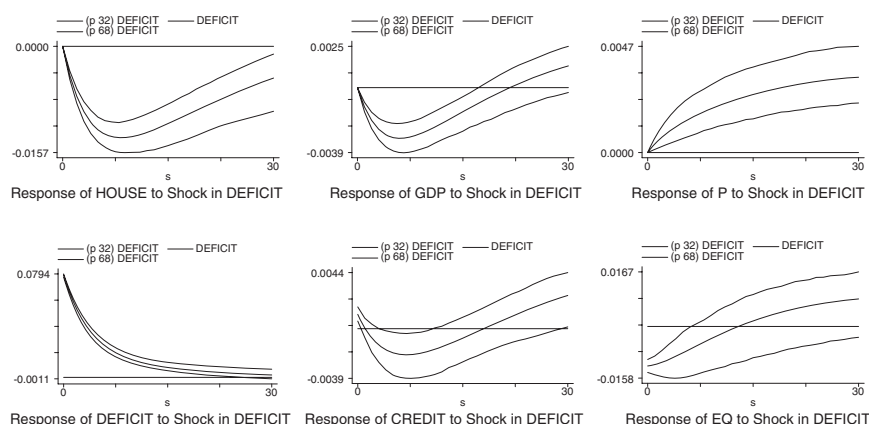


Fig. 7. Impulse-response functions to a fiscal policy shock (high degree of openness).

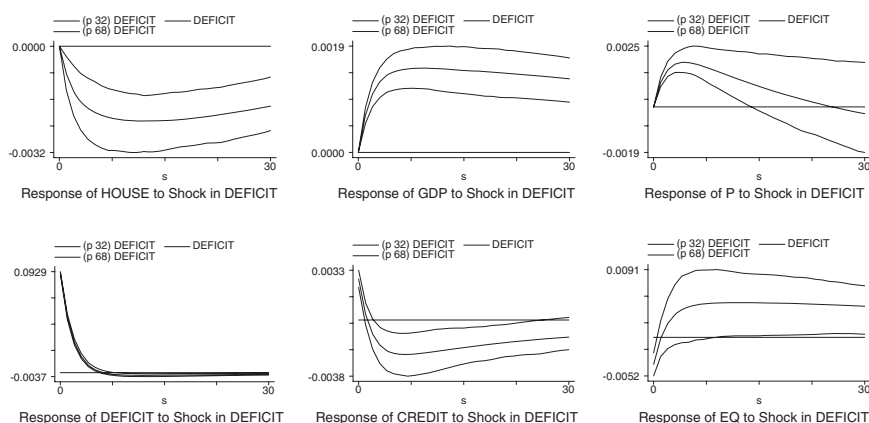


Fig. 8. Impulse-response functions to a fiscal policy shock (low degree of openness).

In this context, we estimate our baseline model for two sub-samples. The first one includes the countries with the highest degree of openness (i.e., Belgium, Finland, Germany and the Netherlands), while the second one considers only the countries with the lowest degree of openness. We use the openness to trade taken from the Penn World Table (PWT) Version 7.0.⁵

Figures 7 and 8 plot the impulse-response functions to a fiscal deficit shock in the two sub-samples. The results are in line with those found for the baseline scenario: a positive shock to fiscal balance has a negative and persistent effect on the housing price index and a negative and temporary impact on the stock price index. The main difference emerges in the response of GDP, which is negative for countries with a high degree of openness and positive for countries with a low degree of openness. This highlights the dichotomy of the effects of fiscal policy on output in the closed versus the open economy and corroborates the findings of Corsetti *et al.* (2010), who argue that the effectiveness of fiscal stimulus decreases with the degree of openness. One can also see that the persistence of asset price effects from fiscal policy measures is larger in the case of countries with low degree of openness. This suggests that the deterioration of credit conditions is stronger for these countries. This is in line with the existence of important

⁵ See Heston *et al.* (2011).

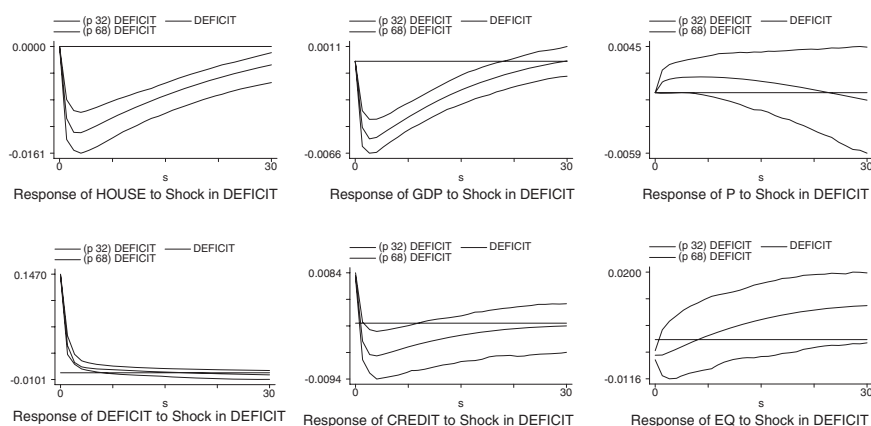


Fig. 9. Impulse-response functions to a fiscal policy shock (small countries).

crowding-out effects: the increase of the fiscal deficit acts as a shock for the demand of funds in the financial markets which pushes funding costs upwards and partially crowds out private spending. In fact, the response of credit to the fiscal policy shock appears to be more persistent for countries with a low degree of openness.

VI.3 Are small countries less prone to absorb fiscal policy shocks?

This section analyses whether the size of a country acts as a buffer against unexpected variation that is driven by fiscal policy. According to Agnello and Sousa (2009), country size and government spending volatility are negatively related because of two major reasons. First, the size of a country acts as an insurance against idiosyncratic shocks. This, in turn, leads to a less volatile government spending. Second, large countries are more able to spread the cost of financing government spending over taxpayers. Therefore, there are increasing returns to scale that allow governments to provide public goods in a less volatile way.

In order to understand the importance of the country's size in shaping the response of asset prices to a fiscal deficit shock, we estimate the baseline model for a sample that excludes the USA. This is due to the fact that the USA is by far the largest country in the set of countries considered in the paper. As is standard in the literature, the size of a country is proxied by its population and the data comes from the World Development Indicators (WDI) of the World Bank.

Figure 9 summarizes the results of the impulse-response functions to a shock in the fiscal stance in small countries. While being qualitatively similar to the baseline model – i.e., a positive shock in government deficit leads to a fall in asset prices and has a non-Keynesian effect on output – the empirical evidence suggests some interesting differences. First, the negative effect on asset prices is larger in magnitude. Indeed, in the baseline model, a 1 percent shock to fiscal deficit generates a fall of about 0.3 percent in housing prices and of 0.5 percent in stock prices; in the sample that only includes small countries, the fall in housing and stock prices is 1.6 percent and 0.6 percent, respectively. Second, the lag in the response of asset prices is substantially smaller. In fact, while in the baseline model the trough in housing prices is reached after six quarters and the response of stock prices erodes after eight quarters, in the subset of countries excluding the USA, the trough in the housing price index can be assigned to the six-quarter horizon and the effect on stock prices disappears after four quarters. Put differently, asset markets in small countries are hit more strongly and more quickly, making them less immune to unexpected variation in fiscal policy.

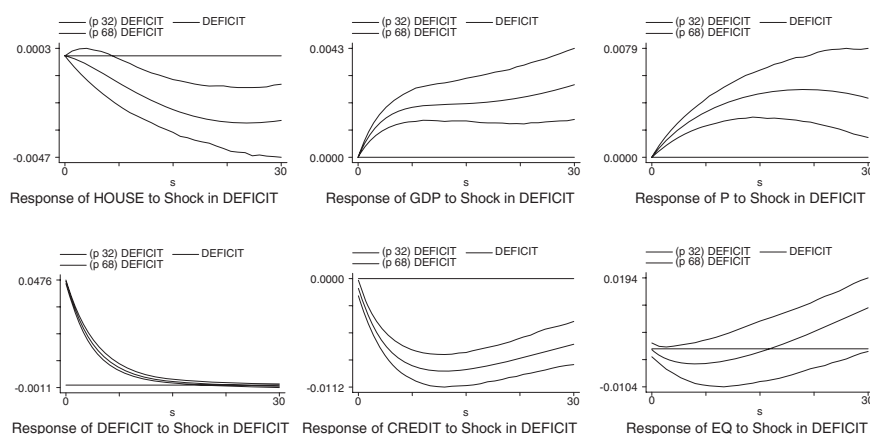


Fig. 10. Impulse-response functions to a fiscal policy shock (large government size).

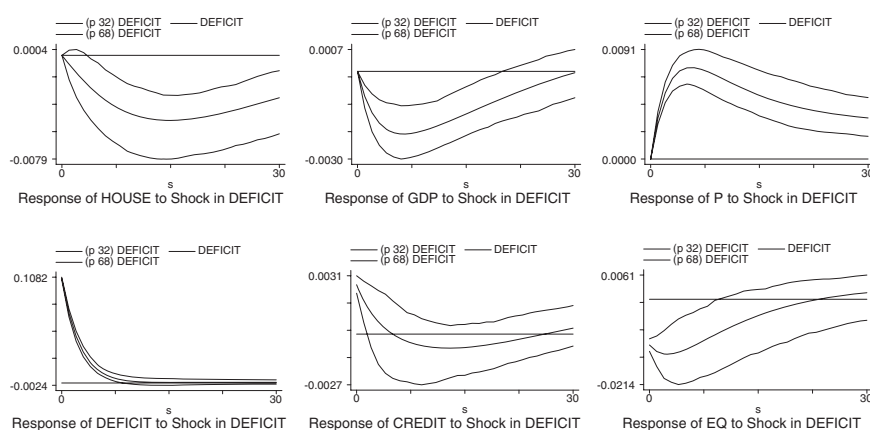


Fig. 11. Impulse-response functions to a fiscal policy shock (small government size).

VI.4 Does weak fiscal stance impact on policy effectiveness?

We also investigate the extent to which the size of the government impacts on the effectiveness of fiscal policy. Balduzzi *et al.* (1997), Uribe (2006) and Ardagna (2009) argue that a high public debt level limits the scope for fiscal stimulus. This is due to the markets' perception of a higher risk premium associated with a weaker fiscal stance. In the same line of reasoning, Baldacci *et al.* (2009) sustain that the effectiveness of fiscal policy may be small when initial fiscal conditions are poor. Corsetti *et al.* (2010) show that fiscal policy stimulus is counterproductive when public finances are weak.

In Figures 10 and 11, we plot the impulse-response functions to a fiscal shock by considering two groups of countries ranked according to the government size. The sub-sample with countries that exhibit large government size includes the USA, the UK and Portugal, while the group with small government size includes the remaining countries. Government size data comes from the PWT 7.0.

The results corroborate the main findings of the baseline model. In particular, for both countries with a large and a small government size, a fiscal shock negatively impinges on asset prices. Similarly, while the response of housing prices is gradual, the reaction of stock

prices is fast. Interestingly, housing prices fall much more persistently in countries with a large government size, a feature that can be linked with the strong drop in the availability of credit. This is in accordance with the findings of Heim (2010c), who shows that borrowing-financed government deficits generate a credit shortage that forces private consumption and investment spending to go down.

With regard to stock prices, the magnitude of the response is larger for countries with a small government size (−1.3 percent, which compares with a fall of 0.5 percent in countries with a large government size) and the effects are also more persistent. This suggests that in countries where the fiscal stance has been sound over time, an unexpected increase in public deficit leads to an immediate reassessment of the risk premium associated with stocks and, therefore, generates a fall in their prices. In contrast, for countries where fiscal stance has been weak in the past, the fiscal policy shock will also produce a fall in the stock price index, but the effects are smaller because the upward revision of the risk premium is not large. Put differently, most of the lack of policy credibility has already been incorporated into a higher risk premium.

VI.5 Does financial deregulation matter?

Until the early 1980s, mortgage markets were, in general, highly regulated. Interest rate ceilings and quantitative limits on credit and repayment periods often led to chronic or temporary credit rationing. This made it difficult for households to access credit and increased the sensitivity of demand to shocks in disposable income (Girouard and Blöndal, 2001). In this context, one would expect that the positive effect on private income due to an expansionary fiscal policy also generates a rise in the demand of asset markets and, consequently, asset prices.

In contrast, when the deregulation process started, credit constraints on households and firms became more relaxed and access to mortgage credit broadened (Diamond and Lea, 1992). Because of the enhanced opportunities to smooth consumption vis-à-vis temporary fluctuations in income, and to hedge against unfavourable labour income shocks, households' demands may have become less dependent on current income. Similarly, the incidence of mortgage market deregulation may significantly affect the probability of extreme variations in asset prices (Agnello and Schuknecht, 2011). These features could partially explain the high degree of uncertainty regarding the size of the effect of fiscal shocks on GDP in the post-1984 sub-sample.

In addition, the asymmetric response of asset prices that one observes for the two sub-samples may be linked to the increase of competition in the banking sector. In fact, in the context of a high degree of liberalization and market integration, the competitiveness of the banking sector becomes strongly dependent on the quality of national policy's formulation and implementation, and on the credibility of government's commitment to such policies. As a result, an expansionary fiscal policy might be interpreted by markets as signalling a deterioration of public finances (Ardagna, 2009) or a lack of fiscal discipline (Hallett and Lewis, 2008). This, in turn, may induce the private sector to dramatically increase savings and persistently reduce investment in housing and stock markets.

In order to uncover the dynamics behind the patterns of the impulse-response functions across different sub-samples and support our predictions regarding the role played by the financial deregulation, we re-estimate the model specified by (1), namely, by accounting for the liberalization process of the mortgage market in each country. Specifically, we estimate a dummy-augmented PVAR model of the form:

$$X_{it} = \Gamma_0 + \Gamma_{BL}(L)X_{it} \times D_{it}^{BL} + \Gamma_{AL}(L)X_{it} \times D_{it}^{AL} + f_i + \varepsilon_{it}, \quad (2)$$

where X_{it} is the same vector of endogenous variables defined above, and D_{it}^{BL} and D_{it}^{AL} are dummy variables that capture the process of deregulation in the mortgage markets. In particular,

TABLE 4
Selected financial deregulation measures affecting the housing market

Country	Date	Type of measurement
Belgium	1992	Introduction of variable interest rate loans and reduction of the maximum early repayment fee
Germany	1967	Deregulation of interest rates
Finland	1986	Lifting of quantitative credit controls Funding quotas from the Central Bank to commercial banks eliminated
France	1987	Lifting of credit controls Bank specialization requirement reduced
Italy	1988	Permanent lifting of quantitative credit controls (credit ceilings eliminated)*
Netherlands	1980	Deregulation of interest rates
Portugal	1992	Deregulation of interest rates
Spain	1987	Deregulation of interest rates
United Kingdom	1986	Authorization granted to building societies to extend their activity to mortgage loans
United States	1984	Removal of Regulation Q and elimination of portfolio restrictions for thrifts

Note: Data are provided by Mehrez and Kaufmann (1999), Girouard and Blöndal (2001), ECB (2003) and Debelles (2004). * Although credit ceilings were officially eliminated in Italy in 1983, they were temporarily reimposed in the period 1986–87.

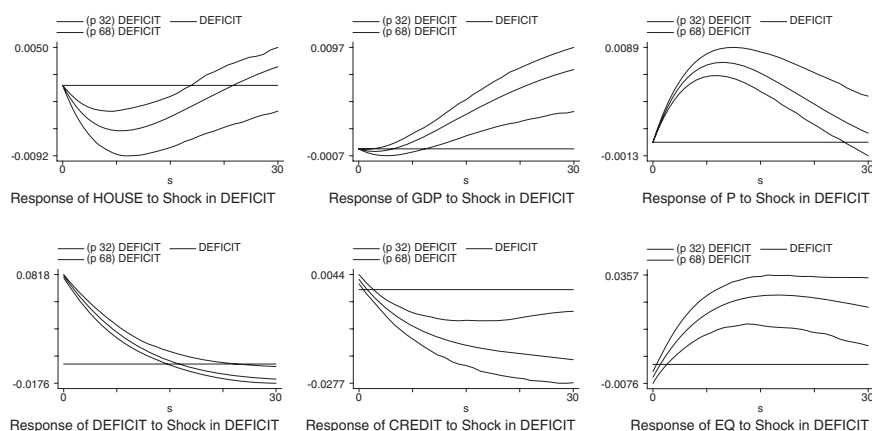


Fig. 12. Impulse-responses to a fiscal policy shock (before deregulation).

for each country i , D_{it}^{BL} takes the value of one before the deregulation process started, and zero once it is in place. Similarly, D_{it}^{AL} takes the value of one after the deregulation process has taken place, and zero otherwise.

Table 4 summarizes the starting dates of the most relevant financial deregulation measures affecting the housing markets in the countries included in the sample. In the majority of countries, the process of liberalization consisted of a deregulation of interest rates (Germany, Netherlands, Portugal and Spain) or a lifting of credit controls (Finland, France and Italy).

Figures 12 and 13 plot the impulse-response functions to a shock to fiscal policy, respectively, before and after the deregulation process. The results corroborate our previous findings and

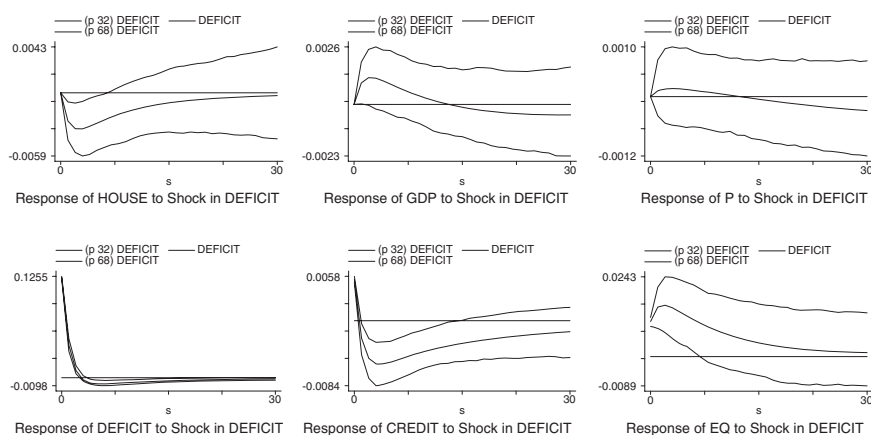


Fig. 13. Impulse-responses to a fiscal policy shock (after deregulation).

conjectures. In particular, one can see that in a context of highly deregulated markets, fiscal policy may be particularly ineffective. In fact, while in the period before deregulation fiscal policy seems to have an expansionary effect on output and impact positively on stock prices, when we consider the period after deregulation we can see that: (i) the response of output is negligible; (ii) the positive reaction of stock prices is much more short-lived; and (iii) housing prices are still negatively affected. Most importantly, the expansionary fiscal policy seems to increase the vulnerability of real estate and financial markets. Indeed, market participants immediately interpret the measure as signalling a deterioration of the fiscal stance and a threat to long-term sustainability of public finances (Hallett and Lewis, 2008).

VI.6 Do fiscal stimuli help economic recovery?

While there are several causes of financial crises (such as credit booms, currency and maturity mismatches, large global imbalances and unsound macroeconomic policies), the recent turmoil has witnessed that they may lead to deep recessions and can be extremely contagious.

Asset prices play an important role on the nexus between monetary and financial stability (Rafiq and Mallick, 2008; Sousa, 2010a). Moreover, significant corrections in asset prices can impact dramatically on households' wealth and lead to substantial downward macroeconomic fluctuations (Granville and Mallick, 2009). Similarly, the economic costs associated with episodes of busts in asset prices can be dramatic (Jaeger and Schuknecht, 2007; Agnello and Schuknecht, 2011).

The largest financial crises (such as the Great Depression, the banking crisis of Japan in 1997 and the most recent financial turmoil) also led to downturns in the global economy and highlighted the limited effectiveness of monetary policy taken isolatedly in light of such exceptional circumstances. Coherently, actions of central banks have been complemented and coordinated with massive fiscal stimulus which have broadly transferred wealth from taxpayers to banks. The order of magnitude of the fiscal stimulus packages announced by governments for the period 2009–10 is impressive: using the figures in Gallagher (2009), the amount involved accounts for a total of \$1094.5bn.⁶

⁶ The fiscal stimulus packages implemented in the ten countries covered in our study are, according to Gallagher (2009), as follows: Belgium – \$2.5bn (0.6 percent of GDP); Germany – \$103.3bn (1.6 percent of GDP); Finland – \$2.6bn (1.7 percent of GDP); France – \$33.0bn (1.3 percent GDP); Italy – \$6.3bn

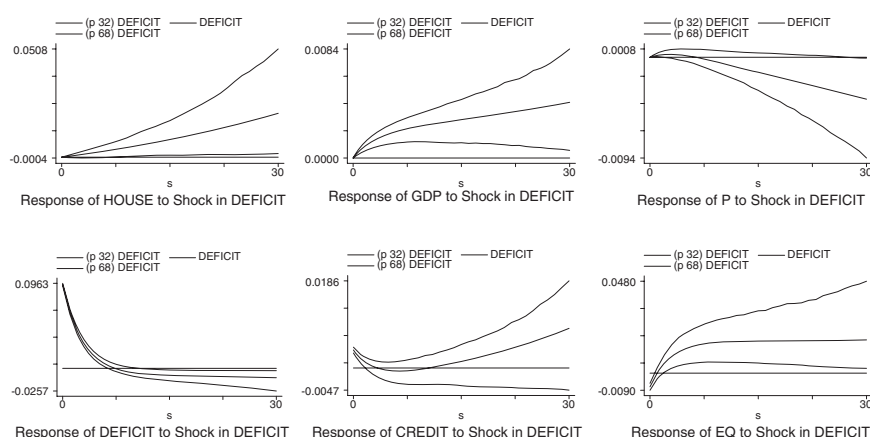


Fig. 14. Impulse-response function to a fiscal policy shock (housing price busts).

Ahearne *et al.* (2005) examine periods of pronounced rises and falls of real housing prices since 1970 in 18 major industrial countries. The authors find that housing price booms are typically preceded by a period of easing monetary policy, but then diminishing slack and rising inflation lead monetary authorities to tighten policy before housing prices peak. Similarly, Agnello and Schuknecht (2011) show that recent real estate price booms have been quite persistent and can be largely explained by credit developments, liquidity conditions and monetary policies.

In order to understand the effectiveness of fiscal stimulus during periods of busts in housing prices, we estimate the following dummy-augmented version of the PVAR specified in (1):

$$X_{it} = \Gamma_0 + \Gamma_B(L) X_{it} \times D_{it}^B + \Gamma_{NB}(L) X_{it} \times D_{it}^{NB} + f_i + \varepsilon_{it}, \quad (3)$$

where X_{it} is the vector of endogenous variables defined before, D_{it}^B is a dummy variable that equals one in the outcome of a housing price bust in period t in country i , and zero otherwise. Similarly, D_{it}^{NB} denotes a dummy variable that takes the value of one in the absence of a housing price bust in period t in country i , and zero otherwise. Housing price busts are identified with the use of a non-parametric approach. In particular, a bust corresponds to a downward and persistent deviation of the housing price index from its trend computed by a one-sided Hodrick–Prescott (HP) filter with a smoothing parameter of 100,000. Put differently, it denotes a negative and persistent (at least 12 quarters) deviation of housing prices from the trend.

Figure 14 plots the impulse-response functions to a fiscal shock during housing price busts. We can see that asset prices are positively and persistently affected by unexpected (positive) variation in public deficit. However, while stock prices rise on impact, the response of housing prices is much more gradual. The expansionary fiscal policy also delivers important Keynesian effects, which are corroborated by the persistently positive impact on GDP. This comes as a result of the ‘direct’ effects of policy measures – i.e., by stimulating aggregate demand (via public consumption and investment), fiscal policy can contribute to the economic recovery and revive asset markets. In addition, one should also take into account the ‘indirect’ effects of fiscal policy associated with the ease of credit conditions: by restoring the agents’ confidence

(0.3 percent of GDP); Netherlands – \$7.5bn (1.0 percent of GDP); Portugal – \$2.7bn (1.3 percent of GDP); Spain – \$113.3bn (6.7 percent of GDP); U.K. – \$36.3bn (0.9 percent of GDP); and U.S. – \$787.0bn (5.5 percent of GDP).

about future prospects and boosting economic growth, governments' actions help to stabilize money markets and facilitate the access to credit. This, in turn, amplifies the multiplier effect and suggests that there is great scope for fiscal stimulus during housing price busts with small costs in terms of crowding out of private spending.

VII. CONCLUSION

The recent financial turmoil has documented the strong linkages between the housing sector and the banking sector and how they may dramatically impact on the nexus between monetary stability and financial stability (Granville and Mallick, 2009; Sousa, 2010a) and/or affect business cycle (de)synchronization (Mallick and Mohsin, 2010). Moreover, its sudden occurrence as well as persistent effects highlighted the importance of boom–bust asset price phases (Jaeger and Schuknecht, 2007) as well as the role that asset prices may have on business cycles' expansion and contraction ending (Castro, 2010).

In light of the abovementioned developments, central banks adopted very aggressive monetary policies and governments implemented massive fiscal stimulus packages with the aim of restoring economic growth and boosting asset markets. Despite the active policy debate, the research about the topic has somewhat lagged behind and a good understanding of the impact of fiscal policy on asset prices still lacks supportive empirical evidence, which we try to provide with the current paper.

We use quarterly data for ten industrialized countries and a panel VAR framework to uncover such effects and show that unexpected (positive) variation in fiscal deficit leads to a fall in asset prices. However, while stock prices shrink on impact and the effect can be labelled as temporary, housing prices display more persistence and remain below their initial levels for long periods of time. Consequently, stabilizing both markets at the same time may be a difficult task for governments if they rely on a single policy instrument.

The sensitivity of the results is analysed across different dimensions. First, we find that the asset markets have become more sensitive to unsound fiscal policies in recent times. Second, the lower the degree of openness, the more persistent is the response of asset prices to a positive deficit shock as a result of the stronger deterioration of credit conditions. Third, for small countries, the magnitude and persistence of the (negative) response of asset prices to fiscal shocks is larger. Fourth, fiscal policy is more detrimental for housing prices in countries where the government's size is large and for stock prices in countries where the government's size is small. This is explained by the negative effect on credit conditions for the first set of countries and the upward revision of risk premium for the second group. Fifth, financial deregulation has made asset markets more vulnerable to changes in the fiscal stance. Finally, policy measures implemented by governments during housing busts can be particularly effective.

While our paper focuses on the role that fiscal policy plays in leading asset price dynamics, one may also question whether asset prices influence fiscal policy. We find that stock price shocks impact more on fiscal policy than housing price shocks. As a result, they may contribute more decisively to the goal of fiscal consolidation.

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