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Fiscal Policy Discretion, Private Spending, and Crisis Episodes

Luca Agnello^{*}

Davide Furceri[†]

Ricardo M. Sousa[§]

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^{*} Banque de France, Service d'Etude des Politiques de Finances Publiques (FIPU), 31 Rue Croix des Petits Champs, 75001 Paris, France. University of Palermo, Department of Economics, Business and Finance, Viale delle Scienze, 90128 Palermo, Italy. Emails: luca.agnello@banque-france.fr, luca.agnello@economia.unipa.it.

[†] International Monetary Fund, 700 19th Street NW, 20431 Washington DC, USA; University of Palermo, Department of Economics, Business and Finance, Viale delle Scienze, 90128 Palermo, Italy. Emails: dfurceri@imf.org, furceri@economia.unipa.it.

[§] London School of Economics, Department of Economics and Financial Markets Group (FMG), Houghton Street, London WC2 2AE, United Kingdom; University of Minho, Department of Economics and Economic Policies Research Unit (NIPE), Campus of Gualtar, 4710-057 - Braga, Portugal. E-mails: rjsousa@alumni.lse.ac.uk, rjsousa@eeg.uminho.pt.

Abstract

In this paper, we assess the impact of fiscal policy *discretion* on economic activity in the short and medium-term. Using a panel of 132 countries from 1960 to 2008, we find that fiscal policy discretion provides a net stimulus to the economy in the short-run and crowding-in effects are amplified once crisis episodes are controlled for – in particular, banking crises - giving a great scope for fiscal policy stimulus packages. However, crowding-out effects take over in the long-run – especially, in the case of debt crises -, in line with the concerns about long-term debt sustainability.

Keywords: Fiscal policy discretion, GDP growth, private consumption, private investment, crowding-in, crowding-out.

JEL: E0, E6.

Résumé

Dans cet article, nous discutons l'effet sur l'activité économique des politiques fiscales discrétionnaires dans le court et moyen terme. En utilisant un panel de 132 pays entre 1960 et 2008, nous trouvons que les politiques fiscales discrétionnaires stimulent l'économie dans le court terme, les effets de crowding-in étant amplifiés si l'on contrôle des périodes de crises dans le modèle – en particulier, les crises bancaires. Toutefois, les effets de crowding-out dominant dans le long terme – en particulier, en cas de crise de la dette -, cohérent avec la problématique de soutenabilité de la dette.

Mots clés: politiques fiscales discrétionnaires, croissance de PIB, consommation privée, investissement privé, crowding-in, crowding-out.

JEL: E0, E6.

“At the onset of the crisis, countries needed to firm up their finances, both to cover the costs of financial restructuring, and depending on the balance of payments situation to reduce their current account deficits, which depend on in part on the budget deficit.”
(Fischer, 1998)

1. Introduction

The occurrence of the recent global crisis became key for assessing the role that economic policy and, in particular, fiscal policy can play on influencing economic activity, particularly during episodes of severe downturns (Castro, 2010; Agnello and Schuknecht, 2011).

Indeed, many countries have actively adopted fiscal expansionary measures - especially, aimed at boosting government spending - in reaction to such an extraordinary event. While there is uncertainty about the magnitude of the effect of these fiscal measures on economic activity (Cimadomo et al., 2010; Cohen et al., 2011), these interventions pose major challenges for policymakers, because they represent a valuable test to the long-term sustainability of public finances as the evidence on current developments in government bond markets shows (Schuknecht et al., 2009). In addition, they may lead to business cycle de-synchronization (Rafiq and Mallick, 2008; Mallick and Mohsin, 2010) and negatively impinge on the nexus between monetary and financial stability (Granville and Mallick, 2009; Sousa, 2010a; Castro, 2011).

Similarly, despite the consensual view on the withdrawal of such stimulus as the recovery materializes and the fact that several developed countries are now facing fiscal sustainability challenges, the effect that fiscal retrenchments may have on economic performance is not clear. In addition, while there seems to be an agreement on the long-term benefits of government debt reductions, there is no unified view on the short-term effects of fiscal austerity (Jansen et al., 2008).

Indeed the argument about the effectiveness of fiscal policy can be dated back to the Keynesian model that predicts that expansionary fiscal policy (i.e. a rise in government spending or a cut in government taxation) boosts disposable income, raises private consumption and partially crowds-out investment via the increase of interest rate. At the empirical level, the evidence seems to confirm the positive short-term effect of fiscal policy on consumption and output (Fatás and Mihov, 2001; Blanchard and Perotti, 2002; Mountford and Uhlig, 2009).

However, other studies suggest the possibility of Non-Keynesian effects associated with fiscal policy measures. The underlying idea is that a permanent reduction of government spending may lead to an increase in output and consumption, because agents will expect an increase of future income due to the cut of future taxation (Feldstein, 1982; Giavazzi and Pagano, 1990). In this case, fiscal contractions can be “expansionary” as a result of the improvement in household and business confidence and cutting budget deficits could stimulate the economy even in the short-term.

More recently and in light of the exceptional economic developments, research has started to focus on the role that fiscal policy can play in times of crisis. In this context, Alesina et al. (2002) argue that initial fiscal conditions play a key role in the response to the crisis responses in both advanced and emerging economies, the reason being linked to the fact that countercyclical fiscal policies are more likely to be adopted when sufficient fiscal space was created prior to the crisis. IMF (2009a) reports that expansionary fiscal policy is particularly effective in shortening the spells of recessions associated with financial crises in advanced economies and boosting recoveries in the aftermath. For emerging markets, the evidence is mixed due to limited credit access, procyclical spending bias and small automatic stabilizers which have constrained the ability of governments to adopt fiscal measures that help counteracting the effects of adverse economic conditions (IMF, 2009b).

Baldacci et al. (2009) assess the effects of fiscal policy responses during episodes of systemic banking crises in advanced and emerging market economies. The authors show that timely countercyclical fiscal responses can shorten the length of crisis episodes. Moreover, when crises are caused by financial sector distress, fiscal expansions increase the likelihood of earlier recovery. Baldacci and Kumar (2010) argue that timely countercyclical fiscal measures contribute to shortening the length of banking crises by stimulating aggregate demand. Hutchison et al. (2010) show that fiscal contraction is significantly correlated with large output losses during sudden-stops and balance of payments crisis in emerging markets and developing countries. Heim (2010a) finds that, calculating the effects for recession and non-recession periods and comparing them to models with average crowding-out and models without crowding-out, one concludes that the magnitude of the crowding-out effects is roughly the same. Spilimbergo et al. (2008) review the historical episodes of financial crises and the fiscal policy conduction during these periods. The authors show that an optimal fiscal package

to mitigate the adverse consequences of financial crises should be collective, contingent, diversified, large, lasting, and sustainable.

However, fiscal policy measures aimed at the crisis resolution generally imply costly government restructuring of private sector's balance sheet and, consequently, a significant increase in public debt. Reinhart and Rogoff (2008a, 2008b, 2009) find that banking crises lead to sharp declines in tax revenues, as well as to significant increases in government spending and, at the end of these episodes, economic growth recovers very slowly. Laeven and Valencia (2008) estimate that the net fiscal costs associated with systemic banking crises – i.e. a situation where a country's corporate and financial sectors experience a large number of defaults and financial institutions face difficulties repaying loans on time – are substantial. Furceri and Zdzienicka (2010) find that banking crises are followed by a medium-term increase in the government gross debt-to-GDP ratio of about 37 percentage points.

From this literature, it emerges that government interventions to boost private sector credit and to stimulate domestic demand may be costly and may increase the risk of high-inflation and lower private investment and GDP growth in the medium term. Therefore, there is a potential conflict between the short-term effects of countercyclical fiscal expansions during downturns and their medium-term growth implications, a feature that we investigate in the current paper.

The main goal of this work is to assess the macroeconomic impact of discretionary fiscal policy. We use a two-step approach. In the *first step*, we identify fiscal discretionary shocks by estimating a policy rule for government consumption. This methodology is built on the work of Fatás and Mihov (2003, 2006) - regarding the effects of the volatility of fiscal policy shocks on long-term growth - and Afonso et al. (2010) - in assessing the determinants of spending volatility. In this way, we are able to extract the discretionary component of fiscal policy and, thereby, to quantify the unexpected variation in the policy measure – which would, otherwise, be contaminated by the automatic response of fiscal policy to economic activity –, while dealing with the endogeneity issue. In the *second step*, we assess the impact of fiscal discretion on GDP growth and private sector's demand (more specifically, private consumption and investment growth) over different time horizons. This allows us to look at the size of the crowding-in and crowding-out effects and to analyze whether the potentially expansionary short-term effect is reverted in the medium-term. In this context, our paper is inspired by the works of Heim (2010a) and Furceri and Sousa (2011a).

Using a panel of 132 countries from 1960 to 2008, we show that fiscal policy discretion can provide a net stimulus to the economy in the short-term, i.e. crowding-in effects are likely to dominate over short horizons. However, crowding-out effects are stronger in the long-run, although they are never strong enough to completely offset the overall expansionary impact of government spending. This highlights the importance of timely fiscal responses during economic downturns and the role of fiscal policy as a key stabilizing tool.

In addition, we find that crowding-in effects tend to be stronger and more persistent for OECD countries than for developing countries. As for the crowding-out effects, they seem to affect significantly on the dynamics of investment growth and, to a smaller extent, on private consumption.

Next, we turn to the analysis of the role that fiscal policy can play in times of crisis, drawing on the work by Corsetti et al. (2009). Our findings suggest that, regardless the typology of crisis, crowding-in effects are magnified once these exceptional circumstances are controlled for, and dominate during the first years of the crises. This is consistent with the idea that there is a great scope for fiscal policy stimulus packages in order to boost economic recovery. However, crowding-out effects take over in the long-run and significantly reduce private sector's spending. Interestingly, the crowding-out effects might be so strong that they completely annihilate the previous expansionary effect. In particular, in the case of banking crises, our results show that a discretionary increase in public spending is key for a long-lasting economic recovery and the size of the crowding-in effects make it a very successful tool in such context. As for domestic debt crises, a boost in government spending has a negative effect of real GDP growth which persists over time. This is consistent with rising concerns about the long-term sustainability of public debt, which crowds-out private consumption and investment and exacerbates the crisis. As a result, there is a potential trade-off between the short-term and the medium-term impact of fiscal policy during episodes of debt crises, as these policy measures might have destabilizing effects.

The rest of the paper is organized as following. Section two describes the empirical methodology used to measure fiscal policy discretion and to assess its macroeconomic impact. Section three discusses the results. Section four evaluates the effectiveness of fiscal policy in times of crisis. Finally, Section five concludes with the main findings and major policy implications.

2. Empirical Methodology

2.1 Measuring fiscal policy discretion

Following Fatás and Mihov (2003, 2011), we extract the discretionary component of government spending by estimating, for each country i (with $i = 1, \dots, N$), the following fiscal policy reaction function:

$$\Delta g_{i,t} = \mu_i + \beta_i \Delta y_{i,t} + \gamma_i \Delta g_{i,t-1} + \Gamma_i X_{i,t} + v_{i,t} \quad (1)$$

where g is the logarithm of real government consumption,¹ y is the logarithm of real GDP, and X is a set of controls including inflation, inflation squared, a time trend and the logarithm of real public debt. Inflation is included to ensure that our results are not driven by high inflation episodes in which case the comovement between real government spending and output might be due to monetary instability rather than fiscal policy. Moreover, we also account for the potential nonlinearity between fiscal developments and inflation by including the inflation squared term. We consider a time trend in our specifications, since government spending can have a deterministic time trend in addition to a stochastic one. Finally, the initial level of debt controls for the possibility that discretionary spending might be limited for countries facing heavy debt burden.

In this context, we expect that fiscal policymakers are reluctant to deliberate increases in spending that are financed by borrowing, otherwise they would be running the risks of losing policy credibility and countering the effectiveness of fiscal stimulus.

The estimates of the country-specific coefficients β_i and γ_i , and $v_{i,t}$ in specification (1) represent, respectively, the measures of responsiveness and persistence (Afonso et al., 2010) and a quantitative estimate of discretionary spending. By construction, this latter measure can be interpreted as a *proxy* of spending decisions

¹ Similarly to Fatás and Mihov (2011), we consider government consumption rather than total government spending, because the former is readily comparable across countries and is not being subject to frequent structural breaks or changes in definitions. In addition, as Ilzetki and Vegh (2008) point, for policy purposes, one should look at instruments (such as government consumption) rather than outcomes (such as government spending), as the latter cannot be controlled by policymakers. From an empirical point of view, the consideration of government spending (instead of government consumption) would also be more vulnerable to a lack of precision in the identification of three main characteristics of fiscal policy (responsiveness, persistence and discretion). The reason for this is that government spending includes transfers *and* debt service, and we also include the debt level among the set of control variables. Finally, data for government consumption is available for a larger number of countries and a longer time period. Having said that, we recognize the obvious caveat that government consumption only accounts for a part of fiscal spending and, therefore, cannot be regarded as a comprehensive measure of fiscal policy.

which are taken by the governments for reasons not directly related to economic conditions, i.e. it corresponds to a measure of the fiscal policy shock that is orthogonal to the state of the economy. In addition, given that we account for the initial level of the debt in equation (1), the increase in spending reflects a public spending shock that leaves the level of debt unchanged.

In order to control for potential endogeneity due to the simultaneity in the determination of output and government spending, we estimate equation (1) using an Instrumental Variables – Two-Stage Least Squares (IV-2SLS) method.

2.2 Assessing the macroeconomic impact of fiscal policy discretion

The residuals of regression (1) obtained for each country i are then used in the second-step in order to assess the impact of discretionary government spending on aggregate demand.² To do so, we estimate a dynamic panel growth equation of the following form:

$$\Delta y_{i,t} = \mu_i + \beta \Delta y_{i,t-1} + \sum_{j=1}^4 \delta_j \hat{v}_{i,t-j} + \lambda Z_{i,t} + \tau_i + \varepsilon_{i,t} \quad (2)$$

where y_t denotes the logarithm of real GDP while \hat{v}_t indicates, for each country i , the vector of estimates of discretionary spending.³ Z_t is a vector of control variables that can affect growth in the short-term, such as the log of openness and population growth

² Pagan (1984) argues that when (i) the predetermined variables that appear in the equation of interest are also included in the first-stage regression, (ii) only lagged values of the generated regressors appear as explanatory variables, and (iii) an instrumental variable estimation is used in the second-stage, valid statistical inference can be made with a small loss of efficiency.

³ Including lags allows for a delayed impact of discretionary measures on real activity. From a theoretical point of view, it is commonly accepted that the response of macroeconomic aggregates (such as GDP, consumption, investment) to fiscal policy is lagged, not contemporaneous. For instance, all VAR-based evidence assume that the macroeconomy does not respond on impact (Afonso and Sousa, 2011a, 2011b; Fatás and Mihov, 2001; Blanchard and Perotti, 2002; Giordano et al., 2007; Castro and Cos, 2008; Mountford and Uhlig, 2009). Moreover, in equation (1), we follow Fatás and Mihov (2003, 2006) and, therefore, control for the contemporaneous response of government spending to output changes in the same spirit of Blanchard and Perotti (2002). From an empirical point of view, our strategy also avoids getting biased estimates for the coefficients associated to fiscal discretion in the second stage. In fact, the shock is a function of the dependent variable. Consequently, the inclusion of contemporaneous fiscal discretion in equations (2) to (4) - instead of its lags -, would imply that the coefficient associated with fiscal discretion would be the “sum” of its own explanatory power and its covariance with the dependent variable. Putting it differently, the coefficient would be biased and the shock could not be retrieved or properly identified. Indeed, while tackling the issue of endogeneity and simultaneity in the first-stage, the issue of identification in the second-stage still requires a careful treatment. This is less of a problem when we only add the lags of the shock to the second-stage regressions.

rate. Finally, we include country-fixed effects (μ_i) to account for differences among countries' growth rates and time-fixed effects (τ_i) to control for the occurrence of global shocks and their impact on the (normal) business cycle. Since specification (2) is a dynamic panel and embodies fixed effects, the parameters are estimated by a two-step robust Generalized Method of Moments (GMM) estimator as discussed in Arellano and Bond (1991).⁴ In fact, when Ordinary Least Squares (OLS) are used, the lagged dependent variable will be correlated with the error term, $\omega_{i,t} = \mu_i + \tau_i + \varepsilon_{i,t}$, even if we assume that disturbances are not themselves autocorrelated.⁵ As result, OLS estimates are likely to be biased.

In order to assess whether discretionary government spending produces crowding-in versus crowding-out effects, we re-estimate equation (2) for private consumption growth ($\Delta c_{i,t}$):

$$\Delta c_{i,t} = \mu_i + \beta \Delta c_{i,t-1} + \sum_{j=1}^4 \delta_j \hat{v}_{i,t-j} + \lambda Z_{i,t} + \tau_i + \varepsilon_{i,t} \quad (3)$$

and investment growth ($\Delta i_{i,t}$):

$$\Delta i_{i,t} = \mu_i + \beta \Delta i_{i,t-1} + \sum_{j=1}^4 \delta_j \hat{v}_{i,t-j} + \lambda Z_{i,t} + \tau_i + \varepsilon_{i,t} \quad (4)$$

where all the right-hand side variables have the usual meanings. The abovementioned questions concerning the estimation issues are still valid for equations (3) and (4) and, therefore, a two-step robust GMM estimator is used.

Crowding-in versus crowding-out effects are explored by estimating the response of consumption and investment growth rates to a discretionary spending shock. Impulse-Response Functions (IRFs), along with the 68% error bands, are obtained via the delta method.^{6, 7} More specifically, IRFs are computed by perturbing the estimated regressor (i.e. fiscal policy discretion), not the shock of the equation.

⁴ Windmeijer's (2005) small-sample correction for two-step standard errors is also implemented.

⁵ See Arellano and Bond (1991) and Baltagi (2001).

⁶ The impulse-response functions are consistent with specifications (2)-(4). In this case, unless we impose some kind of factorization, the response of GDP, consumption and investment to the discretionary fiscal spending component cannot be assessed. In our framework, this can be achieved by including only the

3. Data and Empirical Results

3.1 Data

The data cover 132 countries and are obtained from the World Bank's World Development Indicators for the time period 1960-2008. We consider annual data for GDP, private consumption, private investment and government spending. Due to data availability (both in terms of time and country dimension), we proxy private investment and government spending with gross fixed capital formation and public consumption, respectively. All variables are expressed in real per capita terms, where we use the GDP deflator to convert nominal in real constant terms. Data on public debt are retrieved from the Historical Public Debt Database assembled by the Fiscal Affairs Department of the International Monetary Fund (Abbas et al., 2010). Series dating a variety of financial crisis (banking, currency, domestic and external default or restructuring, and inflation) are provided by Reinhart and Rogoff (2010) and are available at: <http://terconnect.umd.edu/creinhar/Courses.html>.

3.2. Estimates of fiscal policy responsiveness, persistence and discretion

As discussed in section 2.1, discretionary spending measures are constructed based on country-specific regressions summarized by equation (1). It is clear that the lower and less significant the coefficients associated with GDP growth (i.e. fiscal policy responsiveness, β_i) and with lagged spending growth (i.e. fiscal policy persistence, γ_i) are, the larger the discretionary component of government spending will be ($v_{i,t}$). For brevity, in Table 1, we report estimates for different groups of countries.

[INSERT TABLE 1 HERE.]

The positive sign of the coefficient associated with responsiveness is consistent with the empirical literature suggesting that, over the post-World War II period, fiscal authorities in emerging and industrialized countries have responded in a “procyclical”

lags of the shock in the set of explanatory variables of the second-stage regressions. Although we do not estimate a (Bayesian) Vector Auto-Regressive or Maximum Likelihood framework, the underlying mechanism is similar. In addition, if the discretionary component of government spending is thought as a predictive variable and we assess its economic content over different time horizons, then our second-stage framework can be described as a set of forecasting regressions. In this context, predictors and predicted variables need to be evaluated at different moments in time, not contemporaneously.

⁷ For the use of 68% probability bands in the context of monetary policy, see Leeper and Zha (2003), Mackowiak (2006) and Sims and Zha (2006a. b). Afonso and Sousa (2011a, b) also refer to these bands for assessing the impact of fiscal policy shocks.

manner to fluctuations in the economic activity (Alesina et al., 2008; Ilzetki and Vegh, 2008).⁸ This characteristic is particularly relevant for developing countries (the coefficient associated with GDP growth is 0.509 for non-OECD countries, which compares with 0.275 for OECD countries), and gives support to the role of imperfections in credit markets preventing borrowing in bad times (Gavin and Perotti, 1997) or rent-seeking behavior in good times (Tornell and Lane, 1999).

As for the persistence of fiscal policy, our results suggest that it is mainly relevant for Europe and North-America, suggesting some inertia of the budgetary process in these countries and a degree of unstable or erratic fiscal policy behavior in the remaining ones (Agnello and Sousa, 2009).

Interestingly, the empirical findings show a significant response of government consumption to changes in the debt level. This highlights the existence of an important stabilizing effect: when public debt increases, government consumption is cut, thereby, bringing it to a sustainable path.

Table 2 provides a summary of the descriptive statistics for the discretionary component of government consumption across different groups of countries. In line with Afonso et al. (2010), the volatility of discretionary spending is negatively correlated with the level of income. For instance, the standard deviation of the share of discretionary spending in government consumption is almost fifteen times larger for Non-OECD countries than for OECD countries. Consistently with this result, we note that the average size and volatility of discretion is substantially higher for developing countries (notably, African and Latin American countries) than for industrialized countries (such as, in Europe and North-America). All in all, these features corroborate the argument that developing countries typically face more politically unstable regimes and tighter credit access conditions.

[INSERT TABLE 2 HERE.]

3.3 Baseline model

In this section, we discuss the results of our baseline models (2)-(4). Table 3 summarizes the main findings. For each model, columns 1 and 2 show the parameter estimates obtained using different econometric specifications. In column 1, we begin by

⁸ For a survey of the topic, see Cimadomo (2011). Similarly, Agnello and Cimadomo (2011) provide evidence for the European Union.

quantifying the empirical relationship between the variables of interest (GDP, consumption and investment growth rate) and the lagged discretionary part of government spending. We then examine the robustness of our results to the inclusion of additional controls, such as the log of openness and population growth rate (column 2).

[INSERT TABLE 3 HERE.]

We note that GDP growth and investment growth exhibit a reasonable degree of persistence, as the coefficient associated to the lagged dependent variable is statistically significant. This has two main implications. First, from a theoretical point of view, it suggests that it is important to distinguish the effects of discretionary fiscal policy from the ones related to the normal dynamics of aggregate demand and its sub-components. Second, from an empirical perspective, it supports the use of a dynamic panel estimation.

In addition, lags of the dependent variables are found valid instruments in our GMM specification. In fact, we cannot reject the hypothesis of the joint validity of the moment conditions (Hansen's (1982) J -test) and we find no higher order correlation in the idiosyncratic disturbance terms, $\varepsilon_{i,t}$.

In what concerns the effect of discretionary government spending on GDP growth, we can see that it is initially positive and it turns negative after one year. This suggests that discretionary fiscal policy that relies on spending increase has an expansionary effect on domestic demand in the short-term and a contractionary effect afterwards. Interestingly, the similarity of the results obtained from the consumption and the investment equations seems to support the existence of crowding-in in the very short-run and crowding-out afterwards.

Looking at the extended models (column 2), we find that the inclusion of additional control variables, \mathbf{Z} , does not change the results concerning the importance of discretionary fiscal policy.⁹ We find that *Openness* is significantly related to economic developments. In particular, more open economies exhibit a higher level of consumption and investment growth which also translates into a significant increase of GDP growth. Finally, at the aggregate level, population is found, as expected, positively related to growth.

⁹ The IRFs computed from the basic and extended specifications tend to overlap.

Finally, we investigate the extent to which our previous results are affected by the size of the government. In this context, Baldacci et al. (2009) argue that fiscal policy may be ineffective when initial fiscal conditions are poor, while Corsetti et al. (2011) sustain that fiscal stimulus can be counterproductive when the fiscal stance is weak.

We assess this issue by: (i) dropping from the sample the countries that have been historically characterized by the highest level of government size (as measured by the government spending to GDP ratio); and (ii) re-estimating equations (2) to (4).

More specifically, we exclude France, U.S., and all European countries. The estimates reported in Table 4 confirm the robustness of our previous findings and, therefore, show that the impact of fiscal discretion on private spending is not conditional on government size.

[INSERT TABLE 4 HERE.]

To shed some light on the magnitude and timing of fiscal policy effects, we estimate the average impulse-response functions (IRFs) of output growth and its two main components (consumption and investment) to discretionary spending.

Figure 1 shows that an increase of 1% in discretionary spending typically increases GDP growth by, approximately, 0.047% within the first year, which, given the share of government consumption to GDP, corresponds to a multiplier of about 0.40. It is followed by a decline of about three years when the fall in GDP growth reaches -0.027%. At first glance, the size of such effects might appear small. However, we remark that, in our analysis, discretionary spending refers to changes in government consumption that do not represent any reaction to economic conditions (i.e. automatic stabilizers are previously accounted for). In addition, we need to consider that a large part of the variability in output is directly explained by its own dynamics (which cannot be neglected). For these reasons, we expect these magnitudes for the effects of discretionary policy. That said, the reported estimates are in line with the range of short-term multipliers' estimates of total government spending presented in previous empirical studies and based on structural vector autoregressive (SVAR) models, large multinational macro models (Henry et al., 2008) and DSGE models (Coenen et al., 2011). A visual inspection of Figure 1 also confirms our intuition concerning the relevance of crowding effects. For both private consumption and private investment, crowding-in effects dominate in the short-run, while crowding-out effects are more

powerful in the long-run. However, we find that crowding-out is never strong enough to cancel out the entire expansionary thrust of discretionary spending, that is, some net stimulus to the economy remains.

Interestingly, the strength and timing of crowding effects significantly changes between the two demand components. More specifically, the amplitude of crowding effects is notably higher for private investment than for consumption. In addition, the duration of the crowding-in effect is shorter (around one year) for investment. In contrast, discretionary spending crowds-out consumption for a relatively shorter time. This piece of evidence is in line with the works of Heim (2010b, 2010c), who shows that government deficits crowd-out both private consumption and investment. However, while government spending deficits are associated with a complete crowding-out effect (i.e. no net stimulus impact), tax cut deficits lead to net negative economic effects.

In brief, we conclude that an increase of discretionary spending temporarily stimulates economic activity, mainly by speeding up gross capital formation and growth. However, as the economy expands, the crowding-out effect takes over: more government borrowing will force some private borrowers out, discouraged by the higher interest rates. This process will reduce investment spending and cancel out some of the expansionary effects of higher government spending. As a result, capital stock and GDP grow slower and consumer's demand declines.

[INSERT FIGURE 1 HERE.]

3.3 Evidence for OECD versus Non-OECD countries

The analysis presented so far has shown evidence on the existence of crowding-in and crowding-out effects. But are these effects similar for among groups of countries? To answer this question, we replicate the estimation of equations (2)-(4) for developed (OECD) and developing (Non-OECD) countries. In principle, one could be interested in considering more specific geographic areas. Unfortunately, the limited number of countries belonging to each sub-sample (such as Africa, Asia and Pacific, Europe, North America and so on) makes it impossible to get plausible estimates from the dynamic panel model using instrumental variables.

In fact, the GMM estimators can generate moment conditions prolifically, with the instruments proliferating in the time dimension of the panel, T . This can cause several econometric problems in finite samples, the most important consequence being

that standard errors are downward biased. This does not allow us to use two-step “GMM-style” estimates for inference purposes (Arellano and Bond, 1991). Moreover, the Hansen-test becomes weaker, generating implausible p -values of 1.000 (Andersen and Sorensen, 1996).

Even considering two sub-samples like OECD and Non-OECD, their dimension is rather small in a GMM framework and candidate instruments outnumber countries. Therefore, in order to avoid instrument “over-proliferation” and the problems discussed above, we estimate, for each sub-sample, models (2)-(4) using a more parsimonious IV-2SLS estimator where only the second and third lags of the dependent variables are used as instruments. Results are reported in Table 5, while IRFs are plotted in Figure 2.

We find that the effect of discretionary spending varies substantially between the two groups of countries. With regards to the effects on consumption growth, we note that crowding-in effects are strongly magnified in OECD countries. In fact, an increase of 1% in discretionary spending typically boosts consumption growth by 0.17% (within the first year). Such effect is limited to 0.05% in the case of developing countries (which is close to the estimate for the benchmark model). Both the size and the persistence of crowding-out effects are higher for developing countries (-0.03%) than for OECD economies. Turning to the impact on investment, we can see that crowding-in effects are more persistent in OECD countries than in developing countries. This leads to a long-lasting (almost two years) increase of the GDP growth rate. In the long-run, however, crowding-out effects prevail and their negative impact on private investment is sizeable (-0.26%), being almost two times larger than in non-OECD countries (-0.14%). As a result, on the investment side, the impact of discretionary government spending is more detrimental for the OECD group. This contrasting evidence for OECD and non-OECD countries gives support to the argument that poor capacity of implementation and larger macroeconomic risks explain the limited scope for fiscal policy in developing countries (Botman and Kumar, 2006).

A last remark should be brought to the discussion: the results are robust to the inclusion of additional control variables (column 2).

[INSERT TABLE 5 HERE.]

[INSERT FIGURE 2 HERE.]

4. Fiscal Policy in Times of Crisis

4.1 Evaluating the impact of fiscal policy during crisis episodes

Financial crises can be contagious and damaging as they typically lead economies into recessions and sharp current account imbalances. Among their causes, one can refer to: (i) credit booms; (ii) currency and maturity mismatches; (iii) large capital inflows; and (iv) unsustainable macroeconomic policies.

A key concern is what policymakers can do both to reduce the economic consequences of such events and to prevent their occurrence in the future. Similarly, a crucial question is how macroeconomic activity is affected in the short and medium term, and, in particular, how it responds to expansionary fiscal policy interventions.

In order to assess whether the size and timing of crowding-in and crowding-out effects change in time of crises, we look at the effects of discretionary spending shocks on the private sector conditioning them on the occurrence of several typology of crises. In detail, for each crisis, we enlarge our baseline specifications (2)-(4) and include an additional set of regressors which are obtained by interacting the discretionary component of spending ($\hat{v}_{i,t}$) with a dummy (*Crisis*) that takes the value of one when a crisis occurs and zero otherwise. In accordance with the definition and identification of crises for a set of 70 countries as provided by Reinharth and Rogoff (2011), we consider the following episodes: a) banking crises; b) currency crises; c) domestic debt default (or restructuring); d) external debt default (or restructuring) and e) inflation crises. Then, we estimate, for each typology of crisis, k , the equations:

$$\Delta Y_{i,t} = c_i + \beta \Delta Y_{i,t-1} + \sum_{j=1}^4 \delta_j \hat{v}_{i,t-j} + \sum_{j=1}^4 \varphi_j (Crisis_i^k \times \hat{v}_i)_{t-j} + \sum_{j=1}^4 \rho_j Crisis_{i,t-j}^k + \lambda Z_{i,t} + \tau_i + \varepsilon_{i,t}, \quad (5)$$

$$\Delta C_{i,t} = c_i + \beta \Delta C_{i,t-1} + \sum_{j=1}^4 \delta_j \hat{v}_{i,t-j} + \sum_{j=1}^4 \varphi_j (Crisis_i^k \times \hat{v}_i)_{t-j} + \sum_{j=1}^4 \rho_j Crisis_{i,t-j}^k + \lambda Z_{i,t} + \tau_i + \varepsilon_{i,t}, \quad (6)$$

$$\Delta I_{i,t} = c_i + \beta \Delta I_{i,t-1} + \sum_{j=1}^4 \delta_j \hat{v}_{i,t-j} + \sum_{j=1}^4 \varphi_j (Crisis_i^k \times \hat{v}_i)_{t-j} + \sum_{j=1}^4 \rho_j Crisis_{i,t-j}^k + \lambda Z_{i,t} + \tau_i + \varepsilon_{i,t}, \quad (7)$$

where all the variables have the usual meanings. The higher the statistical significance of the parameter φ , the more important is the role played by the crisis in determining the size and persistence of crowding-in and crowding-out effects.

4.2 Banking crises

Table 6 summarizes the evidence for banking crises. The results suggest that once episodes of banking crises are controlled for, (unconditional) discretionary shocks in public spending have a larger effect than the one presented in the baseline. In particular, we find that a 1 percent shock in the discretionary component of fiscal spending boosts GDP growth by about 0.06% over the first year, which corresponds to a multiplier of 0.5. Similarly, this crowding-in effect emerges for both consumption and investment growth, although it tends to be larger for the later (0.16% versus 0.21-0.26%, respectively). Note, however, that the impact on investment seems to be less persistent, as crowding-out effects emerge after 3 years. In addition, although the occurrence of a banking crisis does not seem to affect the impact of fiscal policy on private consumption and private investment, there is some evidence suggesting that the effectiveness of fiscal policy discretion may be weaker after 3 years. Finally, in line with previous empirical evidence (Kaminsky and Reinhart, 1999; Cerra and Saxena, 2008; Furceri and Zdienicka 2011) the occurrence of a banking crisis severely affects GDP growth and private investment.

[INSERT TABLE 6 HERE.]

4.3 Currency crises

Table 7 describes the results for currency crises. Kaminsky and Reinhart (1999) suggest that banking crises precede currency crashes. As a result, the collapsing value of the domestic currency that takes place after the banking crisis may undermine the solvency of private and sovereign borrowers who hold large amounts of foreign currency debts.

The empirical findings show that (unconditional) fiscal policy discretion shocks can help boosting economic growth in the short-run even when we control for the occurrence of currency crises: a 1% shock in government spending raises GDP, private consumption and private investment by 0.05%, 0.10% and 0.22%, respectively. As in the case of a banking crisis, the impact on investment does not last long, as crowding-out effects emerge after 3 years. Similarly, the occurrence of a currency crisis does not seem to dramatically affect the relationship between fiscal policy discretion and economic activity. Nevertheless, there is weak evidence suggesting that in such circumstances, fiscal policy stimuli may lead to an amplification of the crowding-out

effects in private consumption and investment. Moreover, although the size of crowding-out effects is not strong enough to revert the initial crowding-in effects in the case of investment, for consumption the crowding-out effects may overtake the crowding-in impact. Finally, it can be seen that the occurrence of a currency crisis has a substantial impact on the average consumption growth.

[INSERT TABLE 7 HERE.]

4.4 Domestic debt crises

Reinhart and Rogoff (2008b) sustain that domestic debt crises are typically characterized by four features. First, they occur when economic conditions are worse than the average external default. Second, they do not typically involve external creditors. Third, suspension of payments on domestic debt does not often occur. Fourth, domestic debt crisis involving deposit freezes or forcible conversion of foreign currency deposits into local currency can take place during banking crises, hyperinflations, or both.

Our results show that when we control for debt crises the (unconditional) positive effects of fiscal policy stimulus are mainly confined to the short-term, where a 1% increase in fiscal policy discretion can raise private consumption growth and private investment growth by 0.14% and 0.22%, respectively. As before, the effects on private investment are of shorter duration given that the initial positive impact erodes and even becomes negative after 3 years. Most importantly, these medium-term crowding-out effects (about -0.23%) are stronger than the short-term crowding-in effects. In addition, it is possible to observe that the effect of fiscal policy discretion during periods of debt crises tends to be detrimental for the overall economy even in the short-run (where GDP growth falls by 0.11%). This suggests that higher spending that is financed by borrowing tends to reduce policy credibility and exacerbate the debt crisis. Moreover, it may induce a credit shortage that leads to a fall in private consumption and investment spending (Heim, 2010d).

Rising concerns about debt sustainability also crowds-out private investment. This is in line with the idea that high public debt levels limit the scope for fiscal stimulus due to the perception of the markets of a higher risk premium associated with larger deficits (Ardagna, 2009). In addition, it is consistent with the argument that the

effectiveness of fiscal policy may be small when initial fiscal conditions are poor (Baldacci et al., 2009).

[INSERT TABLE 8 HERE.]

4.5 External debt crises

We now turn to the analysis of external debt crises. These typically involve outright *default* on payment of debt obligations incurred under foreign legal jurisdiction, *repudiation*, or the *restructuring* of debt into terms less favorable to the lender than in the original. While the time of default is accurately classified as a crisis year, there are a large number of cases where the final resolution with the creditors (if it ever did take place) seems interminable. As a result, Reinhart and Rogoff (2010) construct dummy variables where only the first year of default enters as a crisis, in to the country-specific dummy variables that cover the entire episode.

In developing and transitional economies, an external debt crisis often takes place together with a currency crisis. It mainly occurs when there is an excessive accumulation of foreign currency debt relative to domestic currency debt. Thus, in the presence of a large capital outflow, the country's economy is hardly hit by the burst of asset prices bubble and the subsequent depreciation of domestic currency.

The results obtained when external debt crises are considered (Table 9) suggest that under normal circumstances – i.e. in the absence of external debt crises -, a 1% shock in fiscal discretion: a) boosts private consumption in the short-term (a 0.09% increase); b) crowds-out private investment in the medium-term (a 0.17% reduction); and c) does not have a statistically significant impact on GDP growth. However, under exceptional circumstances – i.e. conditioning the effect of fiscal discretion on the occurrence of an external debt crisis, one can observe a negative impact on GDP growth over the medium-term (-0.06% at the 3-year horizon) that is largely explained by the crowding-out effect over private consumption (-0.16%). As in the case of currency crises, episodes of instability in the external accounts can severely impact on the average consumption growth rate.

[INSERT TABLE 9 HERE.]

4.6 Inflation crises

In Table 10, we assess the role of inflation crises. These episodes are typically chronic as they last for many years. Reinhart and Rogoff (2004) used a twelve-month inflation threshold of 40% or higher percent to define a “freely falling” episode. More recently Reinhart and Rogoff (2010) define an inflation crisis using a threshold of 20% per annum.

Controlling for the occurrence of inflation crises, we find that a 1% positive (unconditional) shock to fiscal spending stimulates GDP growth (0.07%) in the short-term (within 1 year), but crowds-out private investment (-0.27%) in the medium-term (3 years ahead). Taking into account the share of government consumption to GDP, this translates into a short-run multiplier of 0.6.

In addition, while crowding-in effects are quantitatively unchanged, crowding-out effects are magnified for private consumption and, to a less extent, for private investment. Putting it differently, this implies that a tightening of fiscal policy (i.e. a negative spending shock) is expected to have a negative impact on aggregate demand, thereby reducing the price level in the short-term. However, in the long-run, private consumption is boosted as a result of the increase of confidence on the sustainability of the fiscal stance.

[INSERT TABLE 10 HERE.]

4.7 Quantifying the size of crowding-in and crowding-out effects

The whole evidence for fiscal policy during times of crisis is summarized in Table 11 and Figure 3. More specifically, Table 11 describes the size of crowding-in and crowding-out effects by type of crisis, while Figure 3 displays the impulse-response functions (IRFs) to a positive shock to fiscal policy discretion for each type of crisis.

We find that, regardless the typology of crisis, crowding-in effects dominate during the first years of the crises. Compared to the baseline (benchmark) scenario, the size of crowding-in effects is magnified during crisis periods, which suggests that there is a great scope for fiscal policy stimuli packages under such exceptional circumstances. However, in the long-run, crowding-out effects take over and significantly reduce private investment growth and, to a small extent, private consumption growth.

Interestingly, under the crises scenario, the crowding-out effects might be strong enough to cancel out the entire expansionary thrust of government spending.

Consequently, the unconventional policy measures undertaken by governments during crises might have destabilizing long-run effects. As a result, extraordinarily expansionary fiscal measures may need to be withdrawn in a timely manner. This result is in line with the works by Claessens et al. (2004) and Cerra et al. (2009) and the recommendations of international institutions (IMF, 2009a; OECD, 2009).

[INSERT TABLE 11 HERE.]

[INSERT FIGURE 3a HERE.]

[INSERT FIGURE 3b HERE.]

5. Conclusions

In this paper, we assess the dynamic macroeconomic impact of fiscal policy discretion. In particular, we look at the size of the crowding-in and crowding-out effects and check whether there is a trade-off between the short-term impact and the medium-term implications of a positive fiscal policy shock. We do this by analysing a panel of 132 countries from 1960 to 2008.

The results show that fiscal policy discretion can provide a net stimulus to the economy in the short-run, but crowding-out effects emerge in the long-run. However, , in general, these are not strong enough to cancel out the expansionary path of government spending and, as a result, fiscal policy is a key stabilizing tool during economic downturns.

We also find that crowding-in effects are of larger magnitude and more persistent for OECD countries, while crowding-out effects seem to be more detrimental for private investment than for private consumption.

Looking at the role of fiscal policy in times of crisis, our findings suggest that crowding-in effects are amplified once such exceptional circumstances are controlled for – in particular, banking crises - and dominate in the short-run, a feature that corroborates the idea of a great scope for fiscal policy stimulus packages. However, crowding-out effects take over in the long-run and negatively impinge on private sector's spending. For instance, in the case of debt crises, a boost in government spending has a negative and persistent effect of real GDP growth, in line with the rising concerns about the long-term sustainability of the debt path.

Summing up, our research suggests that there is a trade-off between the short-term and the medium-term impact of fiscal policy. In particular, in the outcome of a crisis episode, fiscal measures should be withdrawn in a timely manner and a well-conceived austerity plan may need to be adopted in order to guarantee a sustainable growth path and avoid destabilizing market tensions. As a result, ensuring a stable macroeconomic environment and the adopting sound fiscal policies in normal times seems to be crucial to enhance the effectiveness of fiscal policy when economies are hit by extraordinary shocks (Tavares and Valkanov, 2001) and to shorten the length of such episodes (Baldacci et al., 2009; Spilimbergo et al., 2009).

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List of Tables

Table 1: Fiscal policy responsiveness and persistence.

	Major sub-samples						Income level						Region									
	OECD	Non-OECD	Low	Lower-middle	Upper-middle	Asia and West Pacific	South America and Indies	Middle East	Africa	Europe	North-America	OECD	Non-OECD	Low	Lower-middle	Upper-middle	Asia and West Pacific	South America and Indies	Middle East	Africa	Europe	North-America
Real GDP growth	0.275*** [0.044]	0.509*** [0.092]	0.477*** [0.158]	0.419*** [0.097]	0.625*** [0.089]	0.457*** [0.115]	0.443*** [0.116]	0.277* [0.153]	0.541*** [0.145]	0.554*** [0.088]	0.365*** [0.125]	0.275*** [0.044]	0.509*** [0.092]	0.477*** [0.158]	0.419*** [0.097]	0.625*** [0.089]	0.457*** [0.115]	0.443*** [0.116]	0.277* [0.153]	0.541*** [0.145]	0.554*** [0.088]	0.365*** [0.125]
Lagged spending growth	0.102 [0.070]	-0.042 [0.028]	-0.069* [0.038]	0.003 [0.045]	-0.091 [0.056]	-0.092 [0.075]	0.038 [0.050]	0.063 [0.087]	-0.087** [0.038]	0.223*** [0.078]	0.382*** [0.095]	0.102 [0.070]	-0.042 [0.028]	-0.069* [0.038]	0.003 [0.045]	-0.091 [0.056]	-0.092 [0.075]	0.038 [0.050]	0.063 [0.087]	-0.087** [0.038]	0.223*** [0.078]	0.382*** [0.095]
Inflation	-0.006 [0.033]	-0.015 [0.025]	-0.061 [0.044]	-0.003 [0.027]	0.038 [0.027]	-0.214 [0.143]	0.034 [0.026]	0.008 [0.131]	-0.062 [0.055]	-0.004 [0.039]	-0.086 [0.093]	-0.006 [0.033]	-0.015 [0.025]	-0.061 [0.044]	-0.003 [0.027]	0.038 [0.027]	-0.214 [0.143]	0.034 [0.026]	0.008 [0.131]	-0.062 [0.055]	-0.004 [0.039]	-0.086 [0.093]
Inflation squared	0.000 [0.001]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.001 [0.001]	0.000 [0.000]	-0.005 [0.007]	0.000 [0.000]	0.000 [0.000]	0.001 [0.001]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.001 [0.001]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.001 [0.001]
Public debt	-0.590*** [0.190]	-1.458** [0.584]	-0.934 [1.007]	-2.531*** [0.897]	-1.195 [0.875]	-0.124 [0.505]	-3.003*** [1.129]	-4.584** [2.075]	-1.149 [1.059]	-1.066*** [0.327]	-1.024 [0.957]	-0.590*** [0.190]	-1.458** [0.584]	-0.934 [1.007]	-2.531*** [0.897]	-1.195 [0.875]	-0.124 [0.505]	-3.003*** [1.129]	-4.584** [2.075]	-1.149 [1.059]	-1.066*** [0.327]	-1.024 [0.957]
Constant	17.562*** [5.261]	40.785*** [13.404]	33.132 [23.711]	61.740*** [20.192]	37.626** [18.535]	12.85 [13.129]	59.325** [23.548]	112.054** [48.563]	29.258 [25.383]	27.069*** [7.974]	31.637 [25.264]	17.562*** [5.261]	40.785*** [13.404]	33.132 [23.711]	61.740*** [20.192]	37.626** [18.535]	12.85 [13.129]	59.325** [23.548]	112.054** [48.563]	29.258 [25.383]	27.069*** [7.974]	31.637 [25.264]
Total Observations	1114	2817	1234	1074	600	641	745	270	1130	1012	133	1114	2817	1234	1074	600	641	745	270	1130	1012	133
Number of countries	30	128	52	46	29	31	26	14	44	40	3	30	128	52	46	29	31	26	14	44	40	3
R-square	0.296	0.094	0.120	0.106	0.213	0.155	0.137	0.268	0.114	0.250	0.734	0.296	0.094	0.120	0.213	0.155	0.137	0.268	0.114	0.250	0.734	

Note: Robust standard errors in square brackets. . . *, **, *** statistically significant at 10%, 5% and 1% level, respectively. For brevity, time-effects estimates are not reported.

Table 2: Share of discretionary spending in government consumption (v_{st}/g_{st}).

Sample	Average	Std. Dev.	Min	Max
OECD	0.13%	0.11%	-0.43%	0.62%
Non-OECD	0.18%	1.53%	-25.73%	33.67%
Low income	0.22%	2.23%	-25.73%	33.67%
Lower-middle income	0.14%	0.39%	-7.42%	2.08%
Upper-middle income	0.15%	0.31%	-1.76%	2.15%
Asia and Pacific	0.17%	0.28%	-0.77%	3.83%
South America and West Indies	0.13%	0.44%	-7.42%	1.56%
Middle East	0.18%	0.23%	-0.61%	1.09%
Africa	0.22%	2.32%	-25.73%	33.67%
Europe	0.13%	0.20%	-1.57%	2.08%
North-America	0.11%	0.11%	-0.18%	0.45%

Table 3: Dynamic panel estimation (Baseline model).

	GDP growth		Consumption growth		Investment growth	
	(1)	(2)	(1)	(2)	(1)	(2)
Lagged dependent variable	0.194*** [0.044]	0.184*** [0.052]	-0.020 [0.039]	-0.015 [0.035]	0.109** [0.043]	0.095** [0.046]
$v_{i,t-1}$	0.045** [0.020]	0.047** [0.021]	0.063** [0.031]	0.061** [0.031]	0.145* [0.078]	0.149* [0.078]
$v_{i,t-2}$	-0.012 [0.013]	-0.015 [0.013]	0.039 [0.030]	0.034 [0.029]	-0.087 [0.058]	-0.103* [0.058]
$v_{i,t-3}$	-0.017 [0.012]	-0.015 [0.012]	-0.031 [0.029]	-0.031 [0.026]	-0.087* [0.054]	-0.114** [0.053]
$v_{i,t-4}$	-0.025** [0.011]	-0.024** [0.011]	-0.034 [0.024]	-0.036 [0.023]	-0.020 [0.058]	-0.020 [0.057]
Population growth	-	0.544** [0.275]	-	0.361 [0.323]	-	0.957 [0.719]
Openness	-	0.014** [0.007]	-	0.025*** [0.009]	-	0.041** [0.017]
Total Observations	3085	3023	3016	2954	2835	2773
Number of countries	132	130	131	129	130	128
AR(1) test statistic	-4.10	-4.02	-5.30	-5.49	-4.43	-4.35
p-value	0.00	0.00	0.00	0.00	0.00	0.00
AR(2) test statistic	-0.62	-0.60	-0.82	-0.75	-0.91	-1.00
p-value	0.54	0.55	0.41	0.45	0.36	0.32
Hansen Statistic	40.36	41.13	49.06	43.95	70.87	74.94
p-value	0.41	0.38	0.13	0.27	0.73	0.61

Note: Dynamic panel-data estimation (two-step Difference GMM). Robust standard errors in square brackets. *, **, *** statistically significant at 10%, 5% and 1% level, respectively. Parameter estimates associated to time effects are not reported for sake of space.

Table 4: Dynamic panel estimation (Robustness check).

Lagged dependent variable	GDP growth			Consumption growth			Investment growth		
	Excl. FRA	Excl. US	Excl. EUR	Excl. FRA	Excl. US	Excl. EUR	Excl. FRA	Excl. US	Excl. EUR
	0.183*** [0.051]	0.182*** [0.053]	0.171*** [0.056]	-0.015 [0.035]	-0.016 [0.035]	-0.024 [0.034]	0.097** [0.045]	0.096** [0.046]	0.133*** [0.049]
$V_{i,t-1}$	0.046** [0.021]	0.047** [0.021]	0.043** [0.021]	0.061** [0.031]	0.060* [0.031]	0.059* [0.031]	0.146* [0.079]	0.145* [0.077]	0.099 [0.078]
$V_{i,t-2}$	-0.015 [0.013]	-0.015 [0.013]	-0.016 [0.013]	0.033 [0.029]	0.034 [0.029]	0.036 [0.031]	-0.103* [0.057]	-0.100* [0.057]	-0.071 [0.051]
$V_{i,t-3}$	-0.015 [0.012]	-0.016 [0.012]	-0.013 [0.012]	-0.031 [0.026]	-0.031 [0.026]	-0.037 [0.027]	-0.114** [0.053]	-0.112** [0.053]	-0.122** [0.048]
$V_{i,t-4}$	-0.024** [0.011]	-0.024** [0.011]	-0.021* [0.012]	-0.036 [0.023]	-0.036 [0.023]	-0.023 [0.021]	-0.013 [0.056]	-0.014 [0.056]	0.027 [0.049]
Population growth	0.558** [0.278]	0.547* [0.281]	0.810*** [0.293]	0.353 [0.327]	0.348 [0.325]	0.504 [0.357]	0.963 [0.702]	0.937 [0.734]	0.829 [0.769]
Openness	0.013** [0.007]	0.014** [0.007]	0.016* [0.009]	0.025*** [0.010]	0.025** [0.010]	0.029** [0.012]	0.039** [0.017]	0.040** [0.017]	0.058** [0.024]
Total Observations	2983	2983	2231	2914	2915	2166	2739	2734	2042
Hansen Statistic	41.54	40.35	32.26	43.81	43.63	34.44	73.64	74.63	33.73
p-value	0.36	0.41	0.77	0.28	0.28	0.68	0.65	0.62	0.71

Note: Dynamic panel-data estimation (two-step Difference GMM). Robust standard errors in square brackets. *, **, *** statistically significant at 10%, 5% and 1% level, respectively. For brevity, parameter estimates associated with time-effects are not reported.

Table 5: IV Panel estimation (Country sub-samples).

Lagged dependent variable	OECD countries				Non-OECD countries					
	GDP growth		Investment growth		GDP growth		Consumption growth		Investment growth	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
	0.326*** [0.104]	0.309*** [0.106]	0.183* [0.112]	0.184* [0.118]	0.16 [0.128]	0.001 [0.188]	-0.182 [0.227]	0.196 [0.173]	-0.031 [0.185]	0.059 [0.185]
$V_{i,t-1}$	0.036 [0.073]	0.044 [0.075]	0.168** [0.072]	0.172** [0.073]	0.221 [0.214]	0.080** [0.035]	0.104*** [0.040]	0.054** [0.023]	0.200* [0.107]	0.135 [0.104]
$V_{i,t-2}$	0.080* [0.046]	0.076* [0.047]	-0.028 [0.053]	-0.026 [0.053]	0.201 [0.153]	-0.001 [0.017]	0.000 [0.017]	0.022 [0.026]	-0.065 [0.057]	-0.096* [0.055]
$V_{i,t-3}$	0.037 [0.046]	0.038 [0.046]	-0.011 [0.052]	-0.001 [0.053]	-0.126 [0.151]	-0.011 [0.013]	-0.016 [0.013]	-0.037 [0.023]	-0.139** [0.056]	-0.141** [0.057]
$V_{i,t-4}$	-0.013 [0.041]	-0.009 [0.042]	0.062 [0.046]	0.072 [0.047]	-0.271* [0.146]	-0.023* [0.012]	-0.029** [0.013]	-0.015 [0.020]	-0.038 [0.053]	-0.027 [0.053]
Population growth	-	0.008* [0.004]	-	0.009* [0.005]	-	-	0.041*** [0.009]	0.045*** [0.012]	-	0.095*** [0.026]
Openness	-	0.015 [0.194]	-	-0.188 [0.236]	-	-	1.131*** [0.261]	0.384 [0.242]	-	1.424** [0.618]
Total Observations	991	983	984	976	896	2233	2176	2112	2019	1962
Number of countries	30	30	30	30	30	102	100	99	100	98
Hansen Statistic	2.516	2.249	0.36	0.492	12.85	1.003	0.273	2.853	16.69	22
p-value	0.113	0.134	0.548	0.483	0.000	0.317	0.601	0.0912	0.0000	0.0000

Note: IV-2SLS panel-data estimation (second and third lags of the dependent variables used as instruments). Robust standard errors in square brackets. . *, **, *** statistically significant at 10%, 5% and 1% level, respectively.

Table 6: Dynamic panel estimation (Banking crisis).

Lagged dependent variable	GDP growth		Consumption growth		Investment growth	
	(1)	(2)	(1)	(2)	(1)	(2)
	0.273*** [0.056]	0.289*** [0.048]	0.028 [0.043]	0.049 [0.043]	0.220*** [0.047]	0.221*** [0.049]
$v_{i,t-1}$	0.061** [0.029]	0.058** [0.028]	0.162*** [0.030]	0.155*** [0.029]	0.213** [0.096]	0.257** [0.101]
$v_{i,t-2}$	0.000 [0.021]	-0.001 [0.020]	0.008 [0.032]	0.014 [0.033]	-0.099 [0.076]	-0.115 [0.086]
$v_{i,t-3}$	0.006 [0.019]	0.007 [0.019]	-0.041 [0.034]	-0.046 [0.032]	-0.190** [0.074]	-0.191** [0.084]
$v_{i,t-4}$	-0.01 [0.018]	-0.003 [0.016]	0.011 [0.031]	0.015 [0.032]	0.034 [0.049]	0.021 [0.054]
$(Crisis_i \times v_i)_{t-1}$	-0.056 [0.036]	-0.046 [0.035]	-0.092 [0.076]	-0.105 [0.076]	0.093 [0.153]	-0.015 [0.149]
$(Crisis_i \times v_i)_{t-2}$	-0.006 [0.040]	-0.013 [0.041]	0.000 [0.072]	-0.012 [0.072]	0.044 [0.190]	0.071 [0.199]
$(Crisis_i \times v_i)_{t-3}$	-0.099** [0.040]	-0.101** [0.045]	-0.129 [0.101]	-0.11 [0.102]	-0.24 [0.198]	-0.264 [0.221]
$(Crisis_i \times v_i)_{t-4}$	-0.031 [0.037]	-0.034 [0.036]	-0.015 [0.060]	-0.017 [0.060]	-0.077 [0.150]	-0.064 [0.154]
$Crisis_{i,t-1}$	-0.758* [0.446]	-0.452 [0.442]	-0.684 [0.669]	-0.553 [0.686]	-3.058** [1.450]	-2.995* [1.677]
$Crisis_{i,t-2}$	0.443 [0.454]	0.491 [0.436]	0.459 [0.676]	0.502 [0.753]	0.899 [1.872]	1.207 [2.116]
$Crisis_{i,t-3}$	0.218 [0.381]	0.147 [0.374]	0.417 [0.466]	0.366 [0.514]	1.980 [1.516]	1.972 [1.592]
$Crisis_{i,t-4}$	0.053 [0.324]	0.033 [0.315]	0.125 [0.347]	0.165 [0.351]	0.347 [1.241]	0.559 [1.237]
Population growth		0.081 [0.168]		0.222 [0.216]		0.288 [0.647]
Openness		0.019*** [0.006]		0.019** [0.007]		0.036*** [0.013]
Total Observations	1943	1920	1924	1901	1838	1815
Number of countries	64	64	64	64	64	64
AR(1) test statistic	-4.54	-4.60	-3.69	-3.76	-3.70	-3.73
p-value	0.00	0.00	0.00	0.00	0.00	0.00
AR(2) test statistic	-1.32	-1.21	-0.77	-0.57	-1.56	-1.54
p-value	0.19	0.23	0.44	0.57	0.12	0.12
Hansen Statistic	50.37	50.21	50.14	51.43	43.72	49.54
p-value	0.11	0.11	0.11	0.09	0.28	0.12

Note: Dynamic panel-data estimation (two-step Difference GMM). Robust standard errors in square brackets. *, **, *** statistically significant at 10%, 5% and 1% level, respectively.

Table 7: Dynamic panel estimation (Currency crisis).

Lagged dependent variable	GDP growth		Consumption growth		Investment growth	
	(1)	(2)	(1)	(2)	(1)	(2)
	0.284*** [0.053]	0.298*** [0.048]	0.041 [0.042]	0.056 [0.043]	0.223*** [0.045]	0.223*** [0.044]
$v_{i,t-1}$	0.057** [0.029]	0.049* [0.028]	0.101** [0.039]	0.094** [0.038]	0.225** [0.114]	0.224** [0.109]
$v_{i,t-2}$	0.027 [0.029]	0.021 [0.028]	0.012 [0.046]	0.011 [0.048]	0.071 [0.112]	0.076 [0.106]
$v_{i,t-3}$	-0.02 [0.030]	-0.019 [0.031]	0.006 [0.039]	0.015 [0.038]	-0.419*** [0.121]	-0.433*** [0.124]
$v_{i,t-4}$	-0.008 [0.021]	-0.002 [0.018]	0.024 [0.025]	0.023 [0.023]	0.132 [0.122]	0.142 [0.111]
$(Crisis_i \times v_i)_{t-1}$	-0.026 [0.033]	-0.021 [0.035]	0.03 [0.063]	0.03 [0.063]	-0.006 [0.140]	0.010 [0.154]
$(Crisis_i \times v_i)_{t-2}$	-0.053* [0.031]	-0.044 [0.030]	-0.007 [0.047]	-0.003 [0.045]	-0.256** [0.132]	-0.279** [0.130]
$(Crisis_i \times v_i)_{t-3}$	-0.003 [0.038]	-0.001 [0.039]	-0.142** [0.057]	-0.147** [0.060]	0.326* [0.192]	0.354* [0.185]
$(Crisis_i \times v_i)_{t-4}$	-0.007 [0.028]	-0.009 [0.025]	-0.044 [0.052]	-0.032 [0.049]	-0.254 [0.173]	-0.272* [0.157]
$Crisis_{i,t-1}$	-0.216 [0.317]	-0.092 [0.305]	-1.598*** [0.397]	-1.462*** [0.391]	-1.180 [1.086]	-1.123 [1.159]
$Crisis_{i,t-2}$	0.45 [0.308]	0.474 [0.296]	0.462 [0.346]	0.524 [0.364]	2.760*** [0.789]	3.055*** [0.926]
$Crisis_{i,t-3}$	-0.204 [0.311]	-0.181 [0.302]	0.968** [0.426]	1.052** [0.433]	-0.825 [0.986]	-0.695 [1.026]
$Crisis_{i,t-4}$	-0.080 [0.181]	-0.106 [0.172]	-0.089 [0.338]	-0.106 [0.328]	1.580 [1.335]	1.745 [1.314]
Population growth		0.088 [0.157]		0.240 [0.220]		0.203 [0.643]
Openness		0.017*** [0.005]		0.019*** [0.007]		0.041*** [0.014]
Total Observations	1938	1915	1919	1896	1833	1810
Number of countries	64	64	64	64	64	64
AR(1) test statistic	-4.49	-4.53	-3.78	-3.79	-3.82	-3.92
p-value	0.00	0.00	0.00	0.00	0.00	0.00
AR(2) test statistic	-1.23	-1.14	-0.35	-0.16	-1.55	-1.51
p-value	0.22	0.25	0.73	0.88	0.12	0.13
Hansen Statistic	51.84	50.67	45.75	46.55	42.27	46.86
p-value	0.08	0.10	0.21	0.19	0.33	0.18

Note: Dynamic panel-data estimation (two-step Difference GMM). Robust standard errors in square brackets. *, **, *** statistically significant at 10%, 5% and 1% level, respectively.

Table 8: Dynamic panel estimation (Domestic debt crisis).

Lagged dependent variable	GDP growth		Consumption growth		Investment growth	
	(1)	(2)	(1)	(2)	(1)	(2)
	0.284***	0.305***	0.039	0.055	0.234***	0.230***
	[0.056]	[0.047]	[0.040]	[0.040]	[0.049]	[0.047]
$v_{i,t-1}$	0.061*	0.059*	0.156***	0.144***	0.227**	0.215**
	[0.033]	[0.033]	[0.032]	[0.033]	[0.101]	[0.100]
$v_{i,t-2}$	0.010	0.004	0.024	0.022	-0.052	-0.055
	[0.025]	[0.023]	[0.028]	[0.030]	[0.094]	[0.095]
$v_{i,t-3}$	-0.003	-0.004	-0.04	-0.034	-0.242***	-0.234***
	[0.017]	[0.015]	[0.043]	[0.042]	[0.066]	[0.066]
$v_{i,t-4}$	-0.01	-0.004	-0.012	-0.007	0.03	0.037
	[0.018]	[0.016]	[0.026]	[0.026]	[0.072]	[0.071]
$(Crisis_i \times v_i)_{t-1}$	-0.113**	-0.116**	-0.115	-0.111	0.056	0.063
	[0.047]	[0.047]	[0.081]	[0.078]	[0.225]	[0.228]
$(Crisis_i \times v_i)_{t-2}$	-0.089	-0.087	-0.038	-0.029	-0.121	-0.123
	[0.061]	[0.059]	[0.086]	[0.086]	[0.200]	[0.218]
$(Crisis_i \times v_i)_{t-3}$	-0.100	-0.090	-0.155	-0.155	-0.192	-0.205
	[0.071]	[0.069]	[0.101]	[0.107]	[0.249]	[0.278]
$(Crisis_i \times v_i)_{t-4}$	0.004	-0.006	0.039	0.035	-0.075	-0.089
	[0.028]	[0.027]	[0.027]	[0.027]	[0.076]	[0.074]
$Crisis_{i,t-1}$	-0.742	-0.594	-0.99	-0.725	-5.246	-4.259
	[1.164]	[1.101]	[0.759]	[0.818]	[3.672]	[3.520]
$Crisis_{i,t-2}$	1.278	1.321	1.699	1.314	7.401	7.001
	[1.091]	[1.063]	[1.220]	[1.308]	[4.508]	[4.493]
$Crisis_{i,t-3}$	-0.967	-1.159	-0.533	-0.460	1.339	1.404
	[1.126]	[1.070]	[1.216]	[1.165]	[2.380]	[2.235]
$Crisis_{i,t-4}$	0.162	0.141	0.967	1.212*	-2.581	-2.130
	[0.925]	[0.862]	[0.669]	[0.711]	[2.577]	[2.565]
Population growth		0.058		0.241		-0.003
		[0.164]		[0.227]		[0.545]
Openness		0.018***		0.018**		0.036***
		[0.005]		[0.007]		[0.012]
Total Observations	1943	1920	1924	1901	1838	1815
Number of countries	64	64	64	64	64	64
AR(1) test statistic	-4.48	-4.58	-3.80	-3.84	-3.68	-3.69
p-value	0.00	0.00	0.00	0.00	0.00	0.00
AR(2) test statistic	-1.19	-1.04	-0.70	-0.56	-1.39	-1.39
p-value	0.24	0.30	0.48	0.58	0.17	0.17
Hansen Statistic	51.42	49.87	47.77	48.31	43.84	45.47
p-value	0.09	0.11	0.16	0.15	0.27	0.22

Note: Dynamic panel-data estimation (two-step Difference GMM). Robust standard errors in square brackets. *, **, *** statistically significant at 10%, 5% and 1% level, respectively.

Table 9: Dynamic panel estimation (External debt crisis).

Lagged dependent variable	GDP growth		Consumption growth		Investment growth	
	(1)	(2)	(1)	(2)	(1)	(2)
	0.295*** [0.055]	0.305*** [0.048]	0.048 [0.047]	0.062 [0.047]	0.232*** [0.046]	0.224*** [0.048]
$v_{i,t-1}$	0.04 [0.034]	0.036 [0.033]	0.100** [0.040]	0.090** [0.038]	0.2 [0.147]	0.201 [0.151]
$v_{i,t-2}$	0.001 [0.036]	-0.007 [0.034]	0.005 [0.055]	0.014 [0.058]	-0.09 [0.156]	-0.113 [0.177]
$v_{i,t-3}$	0.003 [0.023]	0.008 [0.023]	-0.013 [0.041]	-0.005 [0.039]	-0.188** [0.077]	-0.170** [0.070]
$v_{i,t-4}$	-0.015 [0.017]	-0.006 [0.014]	0.008 [0.025]	0.011 [0.023]	0.053 [0.093]	0.074 [0.092]
$(Crisis_i \times v_i)_{t-1}$	-0.002 [0.040]	-0.002 [0.039]	0.057 [0.079]	0.056 [0.075]	0.074 [0.239]	0.065 [0.257]
$(Crisis_i \times v_i)_{t-2}$	0.003 [0.043]	0.013 [0.042]	0.001 [0.075]	-0.016 [0.080]	-0.017 [0.301]	0.015 [0.337]
$(Crisis_i \times v_i)_{t-3}$	-0.058* [0.031]	-0.064** [0.032]	-0.149* [0.080]	-0.156** [0.080]	-0.116 [0.240]	-0.15 [0.224]
$(Crisis_i \times v_i)_{t-4}$	0.014 [0.023]	-0.001 [0.021]	-0.017 [0.037]	-0.015 [0.036]	-0.109 [0.213]	-0.14 [0.209]
$Crisis_{i,t-1}$	-0.574 [0.537]	-0.358 [0.587]	-1.631** [0.695]	-1.312* [0.759]	-0.049 [1.787]	0.37 [1.817]
$Crisis_{i,t-2}$	0.465 [0.630]	0.424 [0.679]	0.906 [0.902]	0.704 [0.999]	2.76 [1.943]	3.119 [2.010]
$Crisis_{i,t-3}$	-0.165 [0.455]	-0.174 [0.439]	0.06 [0.668]	0.096 [0.636]	-1.262 [1.749]	-1.815 [1.818]
$Crisis_{i,t-4}$	-0.012 [0.379]	0.057 [0.358]	0.555 [0.712]	0.523 [0.681]	0.318 [2.007]	0.696 [2.198]
Population growth		0.099 [0.160]		0.245 [0.224]		0.139 [0.700]
Openness		0.017*** [0.005]		0.018** [0.007]		0.044*** [0.015]
Total Observations	1943	1920	1924	1901	1838	1815
Number of countries	64	64	64	64	64	64
AR(1) test statistic	-4.51	-4.55	-3.78	-3.81	-3.70	-3.66
p-value	0.00	0.00	0.00	0.00	0.00	0.00
AR(2) test statistic	-1.28	-1.19	-0.48	-0.33	-1.54	-1.53
p-value	0.20	0.24	0.63	0.74	0.13	0.13
Hansen Statistic	50.32	50.16	49.75	48.62	42.03	45.50
p-value	0.11	0.11	0.12	0.14	0.34	0.22

Note: Dynamic panel-data estimation (two-step Difference GMM). Robust standard errors in square brackets. *, **, *** statistically significant at 10%, 5% and 1% level, respectively.

Table 10: Dynamic panel estimation (Inflation crisis).

Lagged dependent variable	GDP growth		Consumption growth		Investment growth	
	(1)	(2)	(1)	(2)	(1)	(2)
	0.289*** [0.055]	0.304*** [0.049]	0.034 [0.045]	0.054 [0.049]	0.233*** [0.048]	0.235*** [0.045]
$v_{i,t-1}$	0.088*** [0.029]	0.073** [0.028]	0.113 [0.070]	0.094 [0.079]	0.206 [0.187]	0.246 [0.180]
$v_{i,t-2}$	-0.004 [0.036]	-0.003 [0.037]	0.078 [0.072]	0.079 [0.078]	0.142 [0.169]	0.106 [0.166]
$v_{i,t-3}$	0.004 [0.046]	0.011 [0.046]	-0.011 [0.060]	-0.004 [0.058]	-0.251* [0.134]	-0.269** [0.136]
$v_{i,t-4}$	-0.025 [0.020]	-0.019 [0.017]	0.027 [0.034]	0.021 [0.030]	-0.083 [0.068]	-0.083 [0.062]
$(Crisis_i \times v_i)_{t-1}$	-0.082* [0.049]	-0.062 [0.055]	0.004 [0.110]	0.019 [0.135]	0.072 [0.248]	0.028 [0.240]
$(Crisis_i \times v_i)_{t-2}$	0.006 [0.058]	0.004 [0.058]	-0.124* [0.070]	-0.120* [0.073]	-0.347* [0.199]	-0.320* [0.199]
$(Crisis_i \times v_i)_{t-3}$	-0.048 [0.060]	-0.051 [0.061]	-0.104 [0.072]	-0.110 [0.075]	-0.017 [0.178]	0.006 [0.179]
$(Crisis_i \times v_i)_{t-4}$	0.029 [0.025]	0.025 [0.023]	-0.058 [0.048]	-0.039 [0.046]	0.186* [0.104]	0.183* [0.104]
$Crisis_{i,t-1}$	0.051 [0.445]	-0.014 [0.438]	-0.930* [0.497]	-0.961* [0.514]	1.623 [1.523]	2.064 [1.319]
$Crisis_{i,t-2}$	0.445 [0.454]	0.475 [0.448]	1.582*** [0.582]	1.724*** [0.601]	2.051 [1.863]	2.119 [1.733]
$Crisis_{i,t-3}$	-0.488 [0.421]	-0.384 [0.421]	-0.371 [0.656]	-0.371 [0.650]	-0.596 [1.650]	-0.940 [1.540]
$Crisis_{i,t-4}$	0.091 [0.325]	0.169 [0.297]	-0.406 [0.405]	-0.293 [0.426]	0.063 [1.936]	0.644 [1.794]
Population growth		0.121 [0.164]		0.176 [0.223]		0.002 [0.597]
Openness		0.016*** [0.005]		0.020** [0.008]		0.044*** [0.014]
Total Observations	1943	1920	1924	1901	1838	1815
Number of countries	64	64	64	64	64	64
AR(1) test statistic	-4.48	-4.53	-3.68	-3.69	-3.67	-3.73
p-value	0.00	0.00	0.00	0.00	0.00	0.00
AR(2) test statistic	-1.29	-1.19	-0.61	-0.39	-1.44	-1.40
p-value	0.20	0.24	0.54	0.69	0.15	0.16
Hansen Statistic	50.35	49.65	51.03	52.59	44.52	42.84
p-value	0.11	0.12	0.09	0.07	0.25	0.31

Note: Dynamic panel-data estimation (two-step Difference GMM). Robust standard errors in square brackets. *, **, *** statistically significant at 10%, 5% and 1% level, respectively.

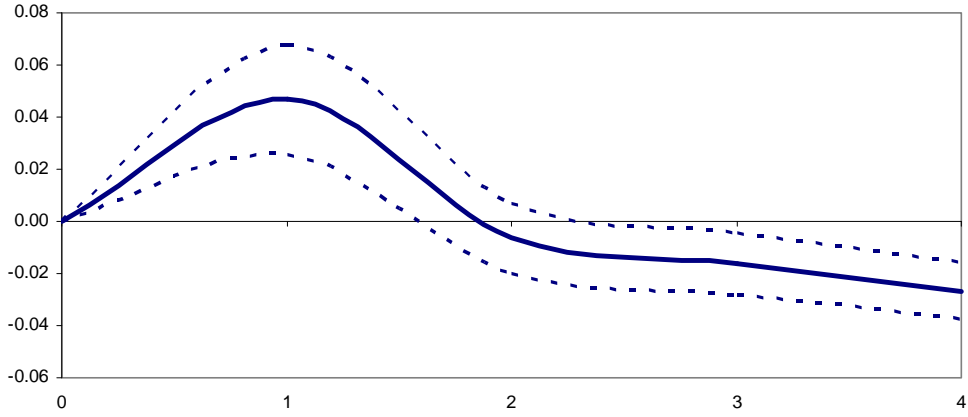
Table 11: The size of crowding-in and crowding-out effects.

Type of crisis	GDP growth		Consumption growth		Investment growth	
	Crowd-in	Crowd-out	Crowd-in	Crowd-out	Crowd-in	Crowd-out
Bank Crises	0.012	-0.097	0.050	-0.156	0.242	-0.452
Currency Crises	0.028	-0.024	0.124	-0.131	0.235	-0.156
Domestic Debt Crises	0.000	-0.124	0.032	-0.189	0.278	-0.466
Ext. Debt Crises	0.034	-0.051	0.146	-0.160	0.266	-0.328
Inflation Crises	0.011	-0.039	0.113	-0.115	0.274	-0.298
OECD	0.090	0.000	0.172	0.000	0.190	-0.260
Not-OECD	0.104	-0.027	0.054	-0.030	0.135	-0.146
Baseline	0.047	-0.027	0.061	-0.035	0.149	-0.123

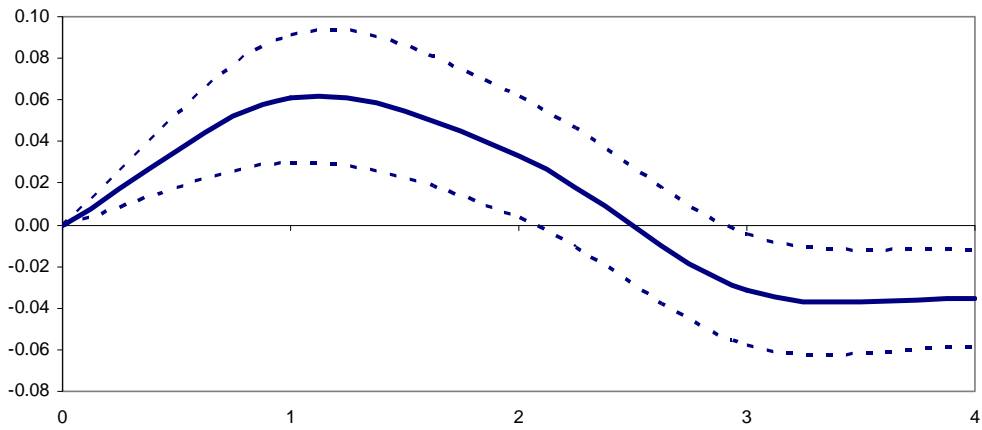
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Figure 1: Impulse-response functions (Baseline model).

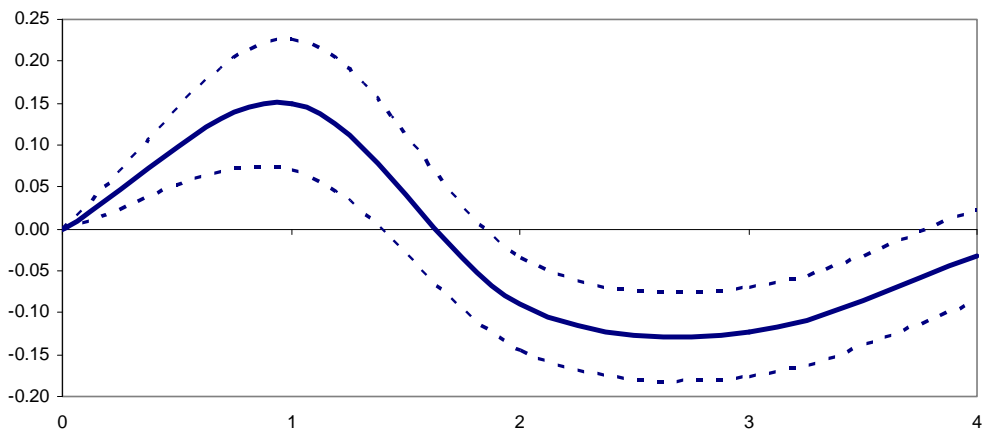
Response of GDP growth



Response of Consumption growth



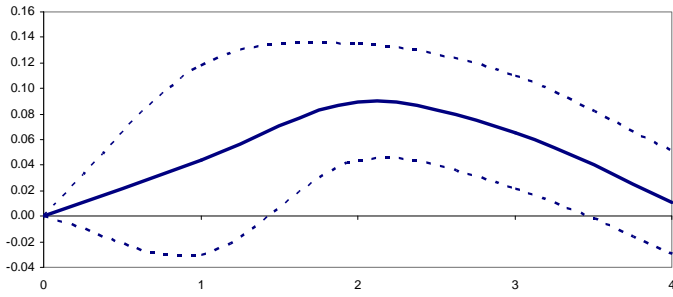
Response of Investment growth



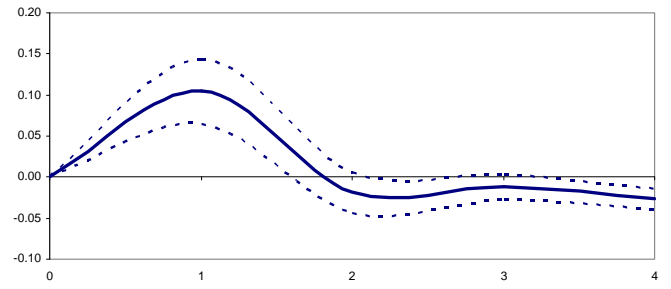
Note: Confidence bands at 68% level of significance. Blue line refers to the model with additional control variables.

Figure 2: Impulse-response functions (Baseline model, Sub-samples).

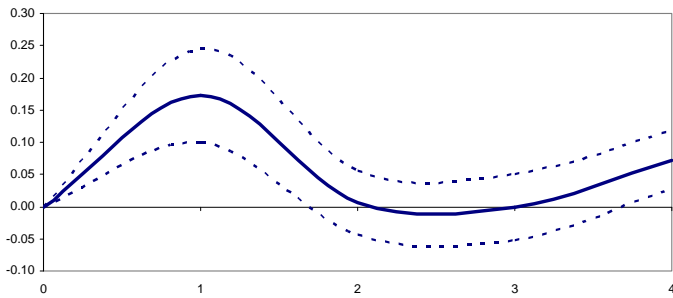
Response of GDP growth (OECD)



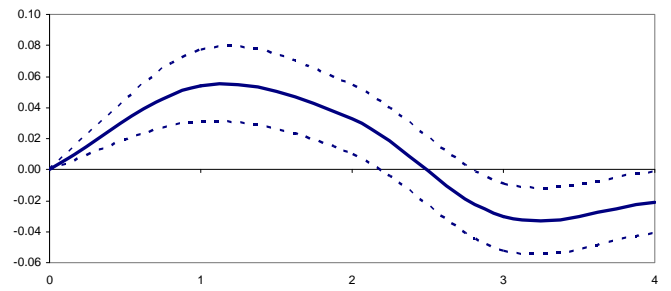
Response of GDP growth (Non-OECD)



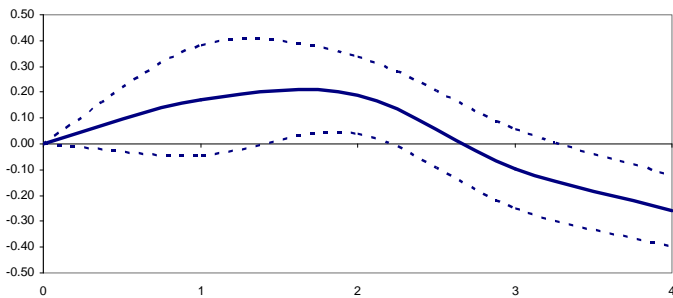
Response of Consumption growth (OECD)



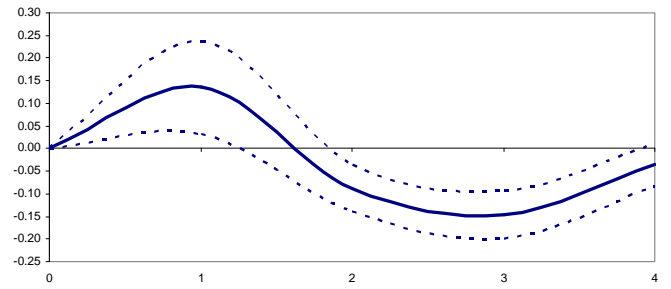
Response of Consumption growth (Non-OECD)



Response of Investment growth (OECD)

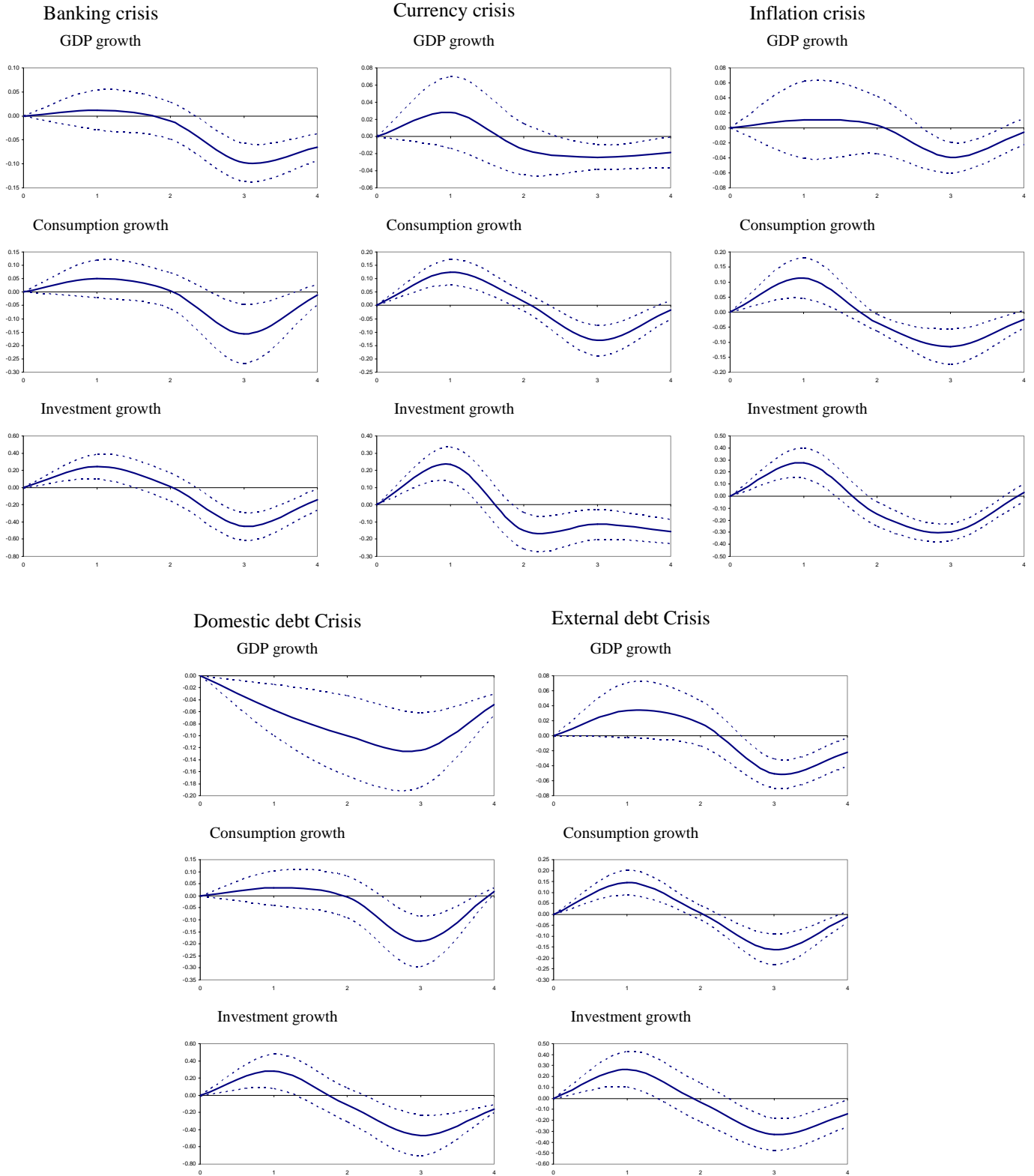


Response of Investment growth (Non-OECD)



Note: Confidence bands at 68% level of significance.

Figure 3: Impulse-response functions (Crises).



Note: Confidence bands at 68% level of significance.

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