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## Fiscal policy and growth: do financial crises make a difference?

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**WORKING PAPER SERIES**

**NO 1217 / JUNE 2010**

**EZB EKT EKP**

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AND GROWTH  
DO FINANCIAL  
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by António Afonso,  
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## WORKING PAPER SERIES

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### FISCAL POLICY AND GROWTH

### DO FINANCIAL CRISES MAKE A DIFFERENCE?¹

by António Afonso<sup>2,3</sup>, Hans Peter Grüner<sup>4,5</sup>  
and Christina Kolerus<sup>4</sup>



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## Abstract

In this paper we assess to what extent in the existence of a financial crisis, government spending can contribute to mitigate economic downturns in the short run and whether such impact differs in crisis and non crisis times. We use panel analysis for a set of OECD and non-OECD countries for the period 1981-2007. The fiscal multiplier for the full sample for instrumented regular and crisis spending is about 0.6-0.8 considering the sample average government spending share of GDP of about one third. Altogether, we cannot reject the hypothesis that crisis spending and regular spending have the same impact using a variation of controls, sub-samples and specifications.

JEL: C23, E62, E44, F43, H50.

Keywords: fiscal policy, financial crisis, growth, OECD, EU, panel analysis.

## Non-technical summary

In 2008-2009 the world was hit by one of the deepest financial crises in modern history. This relates to both the aggregate volume of non-performing loans (mainly in the housing sector) and the fact that international financial linkages almost immediately lead to contagion effects around the globe. In the response to these developments, governments around the world initiated huge fiscal stimulus packages.

Today, many economists argue that the economy reacts differently to fiscal policy in a financial crisis than during normal times. There are some theoretical contributions which distinguish between classical and Keynesian regimes on output and labour markets. A more Keynesian regime is one where unemployment and excessive capacities coexist. There are disequilibria both on labour and on output markets. One may argue that in such a situation fiscal policy may become more effective, replacing the lack of private demand for goods and so stimulating private demand for labour. Such a policy should have strong crowding-out effects when capacities are already exhausted, but this need not be the case when there are excessive capacities.

We empirically assess to what extent in the existence of financial crisis, government spending can contribute to higher economic growth. We employ a panel analysis for a set of OECD and non-OECD countries for the period 1981-2007.

Since causality may run in both directions, from government spending to GDP and from GDP to government spending, we address the endogeneity problem by using instruments for government spending. More specifically, we introduce a variable that is based on the distance to the next or, respectively, to the last democratic election as an instrument in our analysis. Moreover, we use past government budget balance-to-GDP ratios as another instrument.

Altogether, and according to our empirical analysis, we cannot reject the hypothesis that government spending either in the presence or in the absence of a financial crisis has the same impact in our sample, using a variation of controls, sub-samples and specifications. Moreover, we estimate each specification, for the various sub-samples with a 1-year and a 2-year definition of financial crisis. The fiscal multiplier for the full sample for instrumented regular and crisis spending is about 0.6-0.8 considering the sample average government spending share of GDP of about one third.

“The claim that budget deficits make the economy poorer in the long run is based on the belief that government borrowing “crowds out” private investment. (...) Under normal circumstances, there is a lot to this argument. But circumstances right now are anything but normal.” Paul Krugman, NY-Times, December 1, 2008.

“Fiscal policy is back. (...) Fiscal policy must be more effective at times when credit and liquidity constraints are tighter, because firms and households spending decisions are more dependent on current income.” Giancarlo Corsetti, VOX EU, February 11, 2008.

## 1. Introduction

In 2008-2009 the world was hit by what many people now believe is one of the deepest financial crises in modern history. This view relates both to the aggregate volume of non-performing loans (mainly in the housing sector) and to the fact that international financial linkages almost immediately lead to contagion effects around the globe. In the response to these developments, governments around the world initiated huge fiscal stimulus packages. According to the IMF (2009), the US announced the implementation of discretionary fiscal measures of 3.8 percent of GDP in 2009-2010, and the European Union unveiled a European Economic Recovery Plan encompassing a planned two hundred billion Euro fiscal stimulus package. For the OECD, the accumulated budget impact of the stimulus package over 2008-2010 reaches 2.5 percent of GDP (OECD, 2009).<sup>1</sup>

Many economists support these measures, including well known scholars such as Paul Krugman or Joseph Stiglitz. But also economists who were previously opposed to active stabilization policies seem to be in support of such policies under the current – exceptional – circumstances.<sup>2</sup>

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<sup>1</sup> In addition, the headline support for the financial sector is estimated (IMF, 2009), for instance, at 3.7% of GDP in Germany, 6.3% in the US, and 19.8% in the UK.

<sup>2</sup> In 2008, the German council of economic advisors recently proposed to raise government spending by 1 percent of GDP in order to stimulate the economy, a measure that hardly would have found its support in recent years.



These new policy measures contrast with the results of recent empirical research on the potential impact of debt-financed fiscal policy measures (such as spending programmes and tax reductions) on economic growth. There is a wide body of literature which carefully studies the size of fiscal multipliers. The common conclusion of this literature is that there are significant effects of fiscal policy on output.<sup>3</sup> Nevertheless, many papers also conclude that the size of these effects is rather small and the estimated multipliers of government spending or tax reduction are below one. Moreover, in many countries the multipliers declined over the 1980s and 1990s. Taking into account that any debt-financed fiscal stimulus package has to be repaid later on (with interest payments) one may have serious doubts in the usefulness of such policy measures.

However, one may argue that times of financial crises are different from normal times. Indeed, there are some good reasons to believe that the economy reacts differently to discretionary fiscal policy in a financial crisis than during normal times. First, there are some theoretical contributions which distinguish between more classical and more Keynesian regimes on output and labour markets (e.g. Malinvaud 1985, Bénassy, 1986). A classical situation would be one, where unemployment is generated by excessive real wages while output markets are in equilibrium. A more Keynesian regime is one where unemployment and excess capacities coexist. There are disequilibria both on labour and on output markets. One can argue that in such a situation a fiscal stimulus may become more effective, replacing declining private demand for goods and so stimulating private demand for labour. One could view the public provision of private goods as a replacement for the private provision of these goods. In this case the state would take consumers' decisions in their place and run a

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<sup>3</sup> See, for instance, Fatás and Mihov (2001), Blanchard and Perotti (2002), Perotti (2004), de Arcangelis and Lamartina (2003), Galí et al. (2007), Afonso and Claeys (2007), Afonso and Furceri (2010), Afonso and González Alegre (2008), and Afonso and Sousa (2009).

higher deficit that later on would have to be repaid in form of taxes by these consumers. Such a policy might have strong crowding-out effects in a situation where capacities are already exhausted, but this need not be the case when there are excess capacities in the economy.

A second argument in favour of discretionary fiscal policy is that a liquidity trap is associated with financial crises and that “the only policy that still works is fiscal policy” (both Krugman and Stiglitz advocate that).

Most importantly, one can argue that financial crisis cut off many consumers and producers from bank lending. During the current crises, the growth rate of lending to the private sector has fallen significantly. This may have two effects on the effectiveness of fiscal policy measures. First, government transfers or tax reductions may result directly in increased consumption of relatively poor, credit constrained consumers. Along these lines, Galí et al. (2007) recently calculated larger fiscal policy multipliers when more consumers spend their current income. Second, government purchases directly affect the survival of some firms.

Therefore, it is an interesting question whether the emergence of a systemic financial crisis changes the way in which fiscal policy measures affect the economy. This is the question that we want to address in this empirical research. We assess to what extent in the existence of financial crises, government spending can contribute to reduce observed output losses and to foster economic growth. We employ a panel analysis for a set of OECD and non-OECD countries for the period 1981-2007.

Since causality may run in both directions, from government spending to GDP and from GDP to government spending, we instrument government spending by using a variable that is based on the distance to the next or, respectively, to the last democratic

election as an instrument in our analysis. Moreover, we also use the past government budget balance-to-GDP ratio as an additional instrument. We perform each specification and sub-sample with a 1-year and with a 2-year definition of financial crisis, with and without time fixed effects.

Overall, our main result is that we cannot reject the hypothesis that crisis spending and spending in the absence of a financial crisis have the same impact throughout our study using a variation of controls, sub-samples and specifications.

The remainder of the paper is organized as follows. Section two reviews the related literature. Section three briefly presents our empirical methodology. Section four reports and discusses the results of the empirical analysis. Section five concludes the paper.

## **2. Related literature**

A theoretical model that establishes a relationship between credit constraints and the effects of fiscal policy is Galí et al. (2007). They develop a sticky price model, in which a certain fraction of households always consume their current income. These “rule-of-thumb consumers” coexist with Ricardian consumers. The larger the share of rule-of-thumb (non-Ricardian) consumers the larger is the effect of fiscal policy on output and consumption. One may think of these consumers as credit constrained individuals – or as individuals with no access to financial markets at all.<sup>4</sup> Therefore, one can view that study as supporting a link between credit market conditions and fiscal

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<sup>4</sup> The separation between Ricardian and non-Ricardian households, which have a higher propensity to consume, is quite paramount in the policy discussion, being notably one of the arguments used in support of recent fiscal stimuli packages implemented by the authorities in Europe. For the euro area the share of non-Ricardian households has been estimated around 25-35% by Ratto, Roeger and in’t Veld (2008) and Forni, Monteforte and Sessa (2009).

policy effectiveness. In addition, a calibration of such a model produces relatively large deficit spending multipliers.

The idea that credit frictions have an impact on the way in which policy shocks affect the economy is also well known in monetary economics. An important earlier contribution that links credit market imperfections with the impact of policy shocks is Bernanke, Gertler and Gilchrist (2000). They consider moral hazard in the lending relationships between financial intermediaries and firms and between households and intermediaries. These imperfections strengthen the impact of macroeconomic shocks on output but also the impact of policy responses. Therefore, the study supports the view that policy interventions work better when credit markets are not working well.

The present paper is related to the empirical literature that studies the effects of fiscal policy on output growth in “normal times”. For instance, Blanchard and Perotti (2002) initially applied structured VAR techniques to the measurement of fiscal policy effects on output and private consumption in the U.S., and Perotti (2004) extended their analysis to other OECD countries. Blanchard and Perotti find a fiscal stimulus in the US with multipliers ranging from 0.66 to 0.9. However, they also found that the effects of fiscal policies declined in the 1980s. Some multipliers have become insignificant, others even negative. Bénassy-Quéré and Cimadomo (2006) argue that domestic fiscal policy multipliers have been declining in the U.S. (since the 1970s) and in Germany (since the 1980s), and that “cross-border” multipliers (from Germany to seven EU economies) have been diminishing.<sup>5</sup>

There is also an ongoing debate in the empirical literature about the role of exogenous expansion in government spending on consumption and real wages. Ramey

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<sup>5</sup> Van Brusselen (2010) provides a broad overview of the effectiveness of fiscal policy, and an evaluation of fiscal multipliers in VAR, macroeconomic models and dynamic stochastic general equilibrium models.

and Shapiro (1998) find that, following an expansionary fiscal policy shock, output rises while private consumption falls (crowding out). Blanchard and Perotti (2002) instead find that output and consumption both increase. The main methodological difference is that Ramey and Shapiro use war build-ups as exogenous dates to identify fiscal expansions while Blanchard and Perotti use identifying restrictions which they derive from delays in the response of fiscal policy decisions to the economic development.

Case studies such as Johnson et al. (2006) also provide valuable insights into the effect of particular spending programmes on individual consumption.

For the EU, and using panel data for the 15 “old” EU countries for the period 1971-2006, Afonso and González Alegre (2008) identify a negative impact of public consumption and social security contributions on economic growth, and a positive impact of public investment. They also uncover the existence of a crowding-in effect of public investment into private investment that provokes an overall positive effect of public investment on economic growth.

More recently, using a Bayesian Structural Vector Autoregression approach for the U.S., the U.K., Germany, and Italy, Afonso and Sousa (2009) show that government spending shocks, in general, have a small but positive effect on GDP, have a varied effect on private consumption and private investment, reflecting the existence of important “crowding-out” effects, and in general, impact positively on the price level and on the average cost of refinancing the debt.

For the case of the U.S., Cogan et al. (2009), find that the government spending multipliers from permanent increases in federal government purchases are lower in new Keynesian models than in old Keynesian models. The differences are quite large regarding estimates of the impact on the future development of U.S. government



spending in a fiscal package such as the one of February 2009. On the other hand Spilimbergo et al. (2008) argue that the content of the fiscal packages put in place in 2008-2009 by the major developed economies, with targeted tax cuts and transfers are likely to have the highest multipliers.

Related to the 2008 financial crisis Blanchard (2008) argued that fiscal expansion must “now play a central role in sustaining domestic demand.” A similar argument was previously put forward by Krugman (2005) who argued that fiscal expansion is quite possible when economic downturns last for several years and low interest rates reduce monetary policy effectiveness. Nevertheless, Cerra and Saxena (2008) report that a financial crisis tends to depress long-run growth, which may cast some doubts on the short-term effectiveness of fiscal policies under such circumstances.

For a panel of 19 OECD countries, Tagkalakis (2008) finds that in the presence of liquidity constrained households, fiscal policy is more effective in increasing private consumption in recessions than in expansions. Such effect squares with the fact that usually constrained consumers contemplate short-term horizons in their consumption and saving decisions. This issue of credit constrained households is also related to the possibility of expansionary fiscal consolidations, and the eventuality of ensuing non-Keynesian effects of fiscal policies.<sup>6</sup>

Finally, Baldacci et al. (2009) analyse the impact of fiscal policy taken during systemic banking crises, and they show that, if countries are not funding constrained, fiscal measures contribute to shortening the length of crisis episodes by stimulating aggregate demand. Their results can not directly be used to compare the impact of fiscal policies in crisis and non-crisis times. In a related study, Röger, Székely, and

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<sup>6</sup> The possibility of expansionary fiscal consolidations, notably when triggered by a crisis, was initially discussed by Giavazzi and Pagano (1990), although the empirical evidence is diverse (see, for instance, Afonso, 2010).



Turrini (2010) found that fiscal policy seems to play a role in the impact of banking crises on headline growth, an insight further rationalised with simulation results. Their econometric analysis consists of a set of OLS regressions distinguishing between crisis and non-crisis multipliers.

### 3. Empirical methodology

The focus of the present paper is on the role of fiscal policies in phases of financial turmoil. Such phases are associated with tighter credit constraints both for firms and for households, leading to pronounced economic downturns.

However, frequent financial crises in single countries are very rare. Hence, if one only looks at GDP in individual countries, there may not be enough data points to run a time series analysis for several countries, and provide meaningful information about the role of fiscal policies during a crisis. In order to overcome this problem we construct an unbalanced panel containing data from the available set of OECD and non-OECD countries.

We test the impact of government spending on economic growth during crises and normal times by interacting the fiscal stimulus variable with a (dummy) variable that indicates the state of the economy, “crisis” or “normal”. In addition, we also perform Wald tests with the null-hypothesis that the coefficients of crisis government spending and government spending in the absence of crisis are equal. The following linear panel model for output growth is then specified,

$$Y_{it} = \beta_i + \delta Y_{it-1} + \phi X_{it} + \gamma FC_{it} + \theta Sp_{it} * FC_{it} + \theta' Sp_{it} * (1 - FC_{it}) + u_{it}. \quad (1)$$

In (1) the index  $i$  ( $i=1, \dots, N$ ) denotes the country, the index  $t$  ( $t=1, \dots, T$ ) indicates the period and  $\beta_i$  stands for the individual effects to be estimated for each country  $i$ .  $Y_{it}$  is real output growth for country  $i$  in period  $t$ ,  $Y_{it-1}$  is the observation on the same series for the same country  $i$  in the previous period,  $X_{it}$  is a vector of additional explanatory variables, in period  $t$  for country  $i$ .  $FC_{it}$  ( $FC_{it-1}$ ) is a dummy variable that captures the existence of a financial crisis (in the preceding year), either banking, currency or sovereign debt crisis, and  $Sp_{it}$  is real government spending growth for country  $i$  in period  $t$ . Additionally, it is assumed that the disturbances  $u_{it}$  are independent across countries. The interaction term  $Sp_{it} * FC_{it}$  denotes government spending in the presence of a financial crisis and  $Sp_{it} * (1 - FC_{it})$  picks up government spending during normal times. Both interactions terms are also tested using lags.

### 3.1. Reverse causality

Obviously, the specification above is not immune to reverse causality. Current economic growth may affect the government's spending behaviour. The influence of GDP growth on contemporaneous spending holds true, in particular, for welfare benefits and subsidies, notably via the functioning of automatic stabilisers. For instance, higher economic growth reduces expenses for unemployment benefits since more people are likely to find a job during an economic upswing. Lower growth can lead to higher government transfers as well as to discretionary, countercyclical spending such as infrastructure programmes. This negative causal effect from growth on fiscal spending would imply an underestimation of the fiscal stimulus' impact. Due to the large number of countries, data on government spending net of transfers were not available and we need to refer to different methods to address endogeneity.

Also, real economic growth can influence government spending in a positive way if governments follow pro-cyclically economic developments<sup>7</sup>. Under this assumption, politicians do not save (discretionarily) in good times and do not (discretionarily) provide fiscal stimuli in crisis times. Without accounting for endogeneity, this effect would lead to an overestimation of the fiscal multiplier. In our sample, which includes OECD and non-OECD countries, we find evidence of the first assumption, that growth affects spending in a negative way.

A possible way to address endogeneity would be to use time lags of the relevant explanatory variables. Due to data availability we can only use yearly change in spending. As shown by single country time series studies with quarterly data (for instance, Perotti et al., 2004) the positive impact of a government spending shock vanishes approximately after four to five quarters. That is, with one year lagged spending growth as ordinary control variable, instead of current spending growth, we could address the endogeneity problem but we cannot measure the fiscal multiplier properly. Using lagged government spending as an instrument captures spending habits potentially linked to the institutional path of the economy, rather than discretionary changes in spending.<sup>8</sup>

### 3.2. Instrumenting spending growth

Altogether, to address the endogeneity problem we use two instruments, the *distance to elections* referring to the political budget cycle (Brender and Drazen 2005) and the *lagged budget balance-to-GDP ratio*. *Distance to elections* is a linear distance

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<sup>7</sup> Jaeger and Schuknecht (2004) mention that boom-bust phases tend to exacerbate already existing pro-cyclical policy biases, toward higher spending and public debt ratios.

<sup>8</sup> The results (not shown) for using the lagged crisis spending as an instrument in a basic panel set up are not statistically significant.

measure between the current year and the year of the next election. The election years are taken from Pippa Norris' Democracy Time series Dataset (2009). For non-OECD countries, we use the year of legislative elections. For OECD countries, we use legislative elections if the country has a parliamentary system and executive elections if the country is characterised by a presidential system.<sup>9</sup> The distance-to-elections indicator takes on values from 1 to 5.

By using a distance-to-elections indicator, which runs throughout the political budget cycle, we are benefiting from two effects: increase in spending before elections, decrease in spending after elections.<sup>10</sup> We obtain a more robust instrument than only using pre-election, election, and post-election dummies by imposing a parameterised linear relationship.

The parameterised linear relation between distance to elections and spending is not always identical: empirically, the year of elections (“zero distance”) does not display the largest spending increase. Changes in government spending in the year of elections depend very much on when elections take place. Elections in spring can trigger spending cuts for the rest of the year while elections in autumn can lead to spending increases. Since our data do not provide information on the month of elections, we test the impact of distance to elections by means of distance year dummies, hence without imposing a parametric structure. The coefficient of the election year dummy is smaller than the coefficients of the one and two year pre-election dummies and more similar to the coefficient of the three year pre-election dummy .

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<sup>9</sup> Due to data accuracy we use information on the political system only for OECD countries.

<sup>10</sup> The relations between electoral cycles and government behaviour be traced back to Nordhaus (1975) and Hibbs (1977), respectively regarding opportunistic and partisan cycles.

Thus, we assume that, on average, the spending behaviour three years before elections<sup>11</sup> is similar to the spending behaviour in the election year. Therefore, we replace the actual value of the distance indicator in the election year (zero) by three.<sup>12</sup> Finally, by the nature of the instrument, we only capture states with regular elections as reported in the dataset. For each specification we report the results of the Kleibergen-Paap test reflecting the validity of our instruments.

As a second instrument we use the one year lagged budget balance-to-GDP ratio, the difference between total revenue and total expenditure of the central government relative to GDP. To avoid that the instrument lagged budget balance-to-GDP ratio is capturing good governance and disciplined political institutions, which is in turn correlated with GDP growth, the budget balance-to-GDP ratio is lagged twice and included in the main regression. Furthermore, to ensure that lagged budget balance to GDP is exogenous, we control for lagged spending growth and lagged revenue growth. The Sargan-Hansen test of over-identifying restrictions (not reported) strongly supports the validity of the above described instruments.

These two instruments capture different aspects of government spending. *Distance to elections* is a good measure for discretionary fiscal activities if politicians act according to the “political budget cycle”. The *budget balance ratio* considers the financial leeway provided by last year’s government budget to predict current spending. We perform the instrumental variable estimations with one and two (interacted) instruments.

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<sup>11</sup> In our sample, the average election cycle is four years. Therefore, three years before the next election corresponds on average to the post election year.

<sup>12</sup> Imposing a missing value in the election year or using the value of two instead of three we obtain similar but less robust results. The actual distance indicator for a country with a 4-year cycle over a period of, for instance, 8 years starting with an election year is accordingly: 3-3-2-1-3-3-2-1.

## 4. Empirical analysis

### 4.1. Data

Our panel covers 127 countries out of which 98 countries experienced financial crises during the years 1981-2007. The crisis dummy was taken from the IMF dataset on financial crisis. The maximum number of observations used, due to data availability across the panel, is 2867 (3271 observations were initially gathered), and the number of crises years is 218 (encompassing banking, currency and sovereign debt crises). To avoid the influence of outliers, we restrict the dependent variable, GDP growth, as well as the spending variables by excluding the first and last percentile of the sample. Data descriptions and sources are reported in the Appendix.

In our panel, government spending increases on average at 0.76 percent of GDP per year. Spending decreases on a yearly basis by 0.05 percent of last period's GDP on average in the starting year of the crisis and by 0.1 percent of GDP in the next year. Hence, during financial crises governments tend to spend less money, eventually because revenues decline as well. Only during 90 crisis episodes we observe a positive change in government spending relative to GDP the year after the beginning of the crisis.

Real GDP growth is adversely affected by a financial crisis as will be confirmed in our regression results reported in the next sections. While the average real growth rate in our panel is 3.4%, it goes down to 0.1% during a crisis.

We also collected data on claims to the private sector. Indeed, some existing evidence links credit contractions to financial markets distress (see, Claessens et al., 2008), and the hypothesis that increases in credit concession to the private sector can attenuate economic slowdowns is then tested.



## 4.2. Results and discussion

Table 1 reports the panel estimation results using real GDP growth as the dependent variable as in specification (1), using only the distance to elections as an instrument for real government spending growth, and controlling for the existence of a financial crisis, in which case the dummy variable  $FC$  assumes the value of one (zero otherwise). We perform each specification with a 1-year definition of financial crisis –  $FC$  equals one in the starting year of the crisis – and a 2-year definition of financial crisis (reported in the Annex) – where  $FC2$  equals one in the crisis' starting year as well as in the following year.

From Table 1 we can see that increases in real government spending growth have a positive impact on real GDP growth. In addition, the estimated government spending coefficients are higher when a crisis occurs. However, as shown by the Wald test, we cannot reject the null hypothesis that the estimated coefficients for government spending are equal with and without a financial crisis. The existence of a financial crisis also decreases real growth unequivocally. In this specification government spending coefficients can not directly be interpreted as fiscal multipliers. We have to multiply them by the inverse average share of government spending in GDP.<sup>13</sup> In our data sample, government spending amounts to around 36% of GDP for the full sample, 33% of GDP for non-OECD countries and 46% of GDP for OECD countries. Overall, the above fiscal multipliers (about 0.6-08 for regular and crisis spending) are somewhat smaller when compared to multipliers observed in the existing literature.

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<sup>13</sup> With  $Y$  – GDP,  $G$  – government spending,  $m$  – fiscal multiplier,  $(Y_t - Y_{t-1})/Y_{t-1} = m(G_t - G_{t-1})/G_{t-1} \Leftrightarrow \Delta Y_t = m \Delta G_t (Y_{t-1}/G_{t-1})$  and  $\Delta Y / \Delta G \cong m \times (Y/G)$ .

Table 1 – Results for real GDP growth (1981-2007), spending growth rates, instrument: distance to elections, 1-year crisis

	(1)	(2)	(3)	(4)
Spending*(1-FC)	0.322* (1.89)	0.228* (1.70)	0.180 (1.24)	0.0858 (0.68)
Spending*FC	0.642 (1.10)	0.489* (1.93)	0.428* (1.80)	0.601 (1.60)
GDP(-1)	0.197 (1.58)	0.243*** (2.66)	0.242** (2.49)	0.142* (1.73)
FC	-0.0797** (-2.17)	-0.0869*** (-3.89)	-0.0909*** (-4.36)	(dropped)
FC(-1)	0.000166 (0.03)	-0.000828 (-0.15)	-0.00112 (-0.22)	-0.00618 (-1.20)
Spending(-1)*(1-FC(-1))		0.00586 (0.33)	0.00472 (0.26)	0.00541 (0.33)
Spending(-1)*FC(-1)		0.0645 (1.49)	0.0583 (1.41)	0.0700 (1.05)
Revenue(-1)		0.00815 (0.33)	0.0139 (0.54)	0.0246 (1.33)
Claims on Private Sector				0.0168*** (2.65)
Inflation				-0.00261** (-2.20)
Time Fixed Effects	No	No	Yes	Yes
Observations	2605	2516	2516	1937
Cross-sections	122	122	122	101
Kleibergen-Paap LM Statistic	6.91	8.10	6.41	5.35
Kleibergen-Paap p-value	0.0086	0.0044	0.0113	0.0207
Wald Test Statistic	0.28	0.87	0.80	1.57
Wald Test p-value	0.5959	0.3502	0.3719	0.2096

Notes: unbalanced panels with country fixed effects. t-statistics are in brackets. \*, \*\* and \*\*\* denote level of significance indicating 10%, 5% and 1% respectively. A Wald test is conducted to test whether crisis spending and regular spending are statistically different. The underlying null hypothesis of the test is that the coefficients of the interaction terms between spending and financial crisis are equal. *GDP*, *Spending*, *Revenue* and *Claims on Private Sector* are used as growth rates. *FC* – dummy variable for the existence of financial crisis. The Kleibergen-Paap statistic tests the null that the equation is underidentified. Constant as well as fixed effects interactions with crises dummy are partialled out.

Similar results can be observed when government spending is instrumented with both the distance to elections and the lagged budget balance (see Table 2). In this case, the fiscal multiplier is around 0.8. In addition, both with one and with two instruments, we can see that claims to the private sector have a positive estimated coefficient, implying that increases in credit concession to the private sector can positively impinge on economic growth (see last columns of tables 1 and 2).

Our sample comprises observations from a diverse set of countries and thus collects information from very heterogeneous financial crises. To allow for a different severity of crisis across countries and a reaction of economic variables to the occurrence of financial crisis (possibly due, for instance, to institutional differences) we interact country dummies with crisis dummies in each specification.

Table 2 – Results for real GDP growth (1981-2007), spending growth rates, instrument: distance to elections and lagged budget balance, 1-year crisis

	(1)	(2)	(3)	(4)
Spending*(1-FC)	0.151*** (2.95)	0.291** (2.48)	0.251** (2.20)	0.192 (1.36)
Spending*FC	0.128 (1.60)	0.263** (2.13)	0.256** (2.12)	0.140 (1.09)
GDP(-1)	0.307*** (5.68)	0.226*** (2.92)	0.216*** (2.81)	0.117 (1.40)
GDP(-2)	0.0190 (0.53)	0.0227 (0.64)	0.0237 (0.69)	0.00771 (0.22)
FC	-0.111*** (-5.79)	-0.104*** (-5.40)	-0.105*** (-5.53)	
FC(-1)	-0.00835** (-2.06)	-0.00418 (-0.85)	-0.00427 (-0.92)	-0.00747 (-1.42)
Budget balance ratio(-2)	-0.0315 (-1.24)	-0.113 (-1.48)	-0.0991 (-1.40)	-0.134 (-1.40)
Spending(-1)*(1-FC(-1))		0.0367 (1.28)	0.0310 (1.15)	0.0375 (1.11)
Spending(-1)*FC(-1)		0.0533 (1.01)	0.0487 (0.96)	0.00794 (0.11)
Revenue(-1)		-0.0163 (-0.66)	-0.00886 (-0.38)	-0.00289 (-0.12)
Claims on Private Sector				0.0165*** (3.10)
Inflation				-0.00193*** (-4.13)
Time Fixed Effects	No	No	Yes	Yes
Observations	2504	2439	2439	1884
No. Clusters	122	122	122	101
Kleibergen-Paap LM Statistic	26.14	13.80	14.31	9.22
Kleibergen-Paap p-value	0.0000	0.0032	0.0025	0.0264
Wald Test Statistic	0.07	0.09	0.00	0.14
Wald Test p-value	0.7931	0.7691	0.9596	0.7090

Notes: unbalanced panels with country fixed effects. t-statistics are in brackets. \*, \*\* and \*\*\* denote level of significance indicating 10%, 5% and 1% respectively. A Wald test is conducted to test whether crisis spending and regular spending are statistically different. The underlying null hypothesis of the test is that the coefficients of the interaction terms between spending and financial crisis are equal. *GDP*, *Spending*, *Revenue* and *Claims on Private Sector* are used as growth rates. *FC* – dummy variable for the existence of financial crisis. The Kleibergen-Paap statistic tests the null that the equation is underidentified. Equation (4) is over-identified. Constant as well as fixed effects interactions with crises dummy are partialled out.

The above results from the IV regression with “differentiated fixed effects” are similar to the results obtained with a sample split into crises and non-crises observations.<sup>14</sup> By keeping the full sample and introducing a country specific interaction term with crises we benefit from gains in efficiency and instrument validity. Moreover, we can directly test the hypothesis of equality between spending in crises and non-crises times.<sup>15</sup>

A direct consequence of this approach is that – as in the case of fixed effects – observations for countries with only one crisis-year (singleton dummies) are not included in the analysis. Since many countries indeed experienced several financial crises, our *FC* dummy variable captures 111 crises years for 45 countries with 2 to 4 crises. The coefficient of the *FC* dummy in the tables has to be interpreted by taking into account that country specific crises reactions of GDP have already been partialled out. For robustness, we run every specification with a 2-year definition of crises, which also includes observations with only one crisis per country (see Annex).

### *Instrument Performance*

In Tables 1 and 2 we can reject the null hypothesis that the equation is underidentified. In Table 2, including the lagged budget ratio balance improves the instrument performance in the first stage for crisis spending. Indeed, the Kleibergen-Paap test statistic also passes the critical value of 10 allowing rejecting the null of underidentification.

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<sup>14</sup> Tables are not reported and can be obtained from the authors upon request.

<sup>15</sup> The coefficients of these interaction terms are not reported since they are partialled out in the regressions, together with the constant.

Therefore, regular distance to elections and regular lagged budget balance ratios are good predictors for regular spending. The closer to elections, the higher is spending growth. The larger the buffer provided by last year's budget balance position relative to last year's GDP, the higher is government spending growth during normal times. The instrument lagged budget balance has a similar performance during financial crises as during regular times: there is a significant and positive correlation between regular spending and regular lagged budget balance. Distance to elections, however, changes the sign such that the political budget cycle during crises is positively correlated with crisis spending and is weakly (1-year crisis) to highly (2-year crisis, see Annex) significant. The further away elections are, the more the government is reacting via spending during crisis.<sup>16</sup>

### *Fiscal Multipliers*

According to the results in Table 1 and 2 the fiscal multiplier for instrumented regular spending ranges between 0.6 and 1.1 assuming an average government spending share of GDP of about one third.<sup>17</sup> In addition, reverse causality seems to be stronger in crisis times. Indeed, our results show a somewhat larger marginal impact for crisis spending. Intuitively, this is appealing, implying that social transfers and discretionary spending react stronger during an expected and/or experienced economic downturn than in times of an economic upswing. Overall, albeit the qualitative differences, endogeneity does not influence our findings since the marginal impact of spending is not statistically different in crisis and non-crisis times.

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<sup>16</sup> Exogeneity tests rejected the hypothesis that a fall in GDP leads to new elections, hence we reject the hypothesis that the instrument is correlated with the dependent variable.

<sup>17</sup> Our estimates based on different instruments yield output multipliers that are close to the ones derived, for instance, in the papers by Baxter and King (1993), Linnemann and Schabert (2003).

Moreover, government spending in the presence of a financial crisis, when compared to normal times, is clearly larger in Table 1 compared to Table 2. This is likely to be due to a weak instrument bias for crisis spending when using only the distance to elections indicator (see above). Including the lagged budget balance ratio, the coefficients of crisis spending and regular spending are approximately equal.

### 4.3. Robustness analysis

#### *OECD and non-OECD economies*

Evidence from the related literature points out that (economic) cyclical fiscal behaviour in developed economies is somewhat different from the case of developing economies. The conventional wisdom that emerges from such studies is that fiscal policy is counter-cyclical or a-cyclical in most developed countries, while it is pro-cyclical in developing countries.<sup>18</sup> More specifically, reverse causality could be different in developed and developing economies. It is therefore important to analyse the instrument's performance and instrumented fiscal multipliers in OECD and non-OECD sub-samples.

As Table 3 shows, the results for non-OECD countries are close to the results obtained for the full sample and fiscal multipliers, for both crisis and regular spending, are on average 0.6. In addition, the instruments behave similarly in the first stage and statistical significance is even stronger compared to the full sample regressions.

For OECD countries, however, distance to elections, i.e. the political budget cycle, does not perform very well as an instrument during regular times (see Table 4).

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<sup>18</sup> See, for instance, Galí (1994), Lane (2003), Kaminsky et al. (2004), Talvi and Vegh (2005), and Alesina et al. (2008)



Table 3 – Results for real GDP growth (1981-2007), spending growth rates, instrument: distance to elections and lagged budget balance, non-OECD countries, 1-year crisis

	(1)	(2)	(3)	(4)
Spending*(1-FC)	0.153*** (3.08)	0.258** (2.48)	0.218** (2.18)	0.177 (1.53)
Spending*FC	0.137* (1.65)	0.258** (1.97)	0.237* (1.90)	0.170 (1.33)
GDP(-1)	0.295*** (5.08)	0.229*** (2.99)	0.218*** (2.96)	0.0951 (1.26)
GDP(-2)	0.0329 (0.83)	0.0376 (0.98)	0.0295 (0.80)	0.0147 (0.40)
FC	-0.111*** (-5.72)	-0.104*** (-5.33)	-0.105*** (-5.47)	(dropped)
FC(-1)	-0.00756* (-1.66)	-0.00301 (-0.56)	-0.00337 (-0.68)	-0.00579 (-0.98)
Budget balance ratio(-2)	-0.0324 (-0.96)	-0.102 (-1.20)	-0.0825 (-1.08)	-0.160 (-1.39)
Spending*(1-FC(-1))		0.0332 (1.14)	0.0253 (0.93)	0.0422 (1.17)
Spending*FC(-1)		0.0545 (1.03)	0.0476 (0.93)	0.0268 (0.39)
Revenue(-1)		-0.0121 (-0.50)	-0.00362 (-0.16)	-0.00673 (-0.26)
Claims on Private Sector				0.0168** (2.32)
Inflation				-0.00204*** (-4.33)
Time Fixed Effects	No	No	Yes	Yes
Observations	1814	1750	1750	1261
Cross-sections	94	94	94	73
Kleibergen-Paap LM Statistic	26.99	15.79	16.36	12.42
Kleibergen-Paap p-value	0.0000	0.0013	0.0010	0.0061
Wald Test Statistic	0.04	0.00	0.04	0.00
Wald Test p-value	0.8479	0.9969	0.8329	0.9568

Notes: unbalanced panels with country fixed effects. t-statistics are in brackets. \*, \*\* and \*\*\* denote level of significance indicating 10%, 5% and 1% respectively. A Wald test is conducted to test whether crisis spending and regular spending are statistically different. The underlying null hypothesis of the test is that the coefficients of the interaction terms between spending and financial crisis are equal. *GDP*, *Spending*, *Revenue* and *Claims on Private Sector* are used as growth rates. *FC* – dummy variable for the existence of financial crisis. The Kleibergen-Paap statistic tests the null that the equation is underidentified. Constant as well as fixed effects interactions with crises dummy are partialled out.

Table 4 – Results for real GDP growth (1981-2007), spending growth rates, instrument: distance to elections and lagged budget balance, OECD countries, 1-year crisis

	(1)	(2)	(3)	(4)
Spending*(1-FC)	0.784 (1.00)	1.029 (0.85)	0.719 (1.09)	-0.0415 (-0.15)
Spending*FC	0.303*** (2.65)	0.327** (1.99)	0.284* (1.79)	0.216* (1.73)
GDP(-1)	0.121 (0.32)	-0.00886 (-0.02)	0.0932 (0.26)	0.411*** (4.03)
GDP(-2)	-0.135 (-1.55)	-0.141* (-1.65)	-0.0971 (-1.44)	-0.0642 (-1.29)
FC	(dropped)	0.0488*** (3.87)	(dropped)	(dropped)
FC(-1)	-0.0314 (-1.08)	-0.0379 (-0.83)	-0.0336 (-1.05)	-0.00437 (-0.28)
Budget balance ratio(-2)	-0.135 (-0.99)	-0.237 (-0.90)	-0.167 (-1.20)	-0.00491 (-0.06)
Spending*(1-FC(-1))		-0.0234 (-0.46)	0.0138 (0.32)	0.0364* (1.78)
Spending*FC(-1)		-0.0410 (-0.10)	0.161 (0.43)	-0.0359 (-0.20)
Revenue(-1)		0.0213 (0.26)	-0.00359 (-0.06)	0.00969 (0.35)
Claims on Private Sector				0.00730 (1.39)
Inflation				-0.0198* (-1.81)
Time Fixed Effects	No	No	Yes	Yes
Observations	690	689	689	623
Cross-sections	28	28	28	28
Kleibergen-Paap LM Statistic	2.69	0.68	1.11	3.68
Kleibergen-Paap p-value	0.4423	0.8775	0.7740	0.2977
Wald Test Statistic	0.32	0.37	0.48	1.12
Wald Test p-value	0.5702	0.5448	0.4907	0.2907

Notes: unbalanced panels with country fixed effects. t-statistics are in brackets. \*, \*\* and \*\*\* denote level of significance indicating 10%, 5% and 1% respectively. A Wald test is conducted to test whether crisis spending and regular spending are statistically different. The underlying null hypothesis of the test is that the coefficients of the interaction terms between spending and financial crisis are equal. *GDP*, *Spending*, *Revenue* and *Claims on Private Sector* are used as growth rates. *FC* – dummy variable for the existence of financial crisis. The Kleibergen-Paap statistic tests the null that the equation is underidentified. Constant as well as fixed effects interactions with crises dummy are partialled out.

Literature on the political budget cycle mostly confirms our results of different fiscal attitudes in OECD and non-OECD countries (see, for instance, Shi and Svensson, 2006). Interestingly, distance to elections matters for crisis spending as we find a significant negative correlation in the first stage. In other words, during financial crisis, fiscal action is required by the electorate in OECD countries. The lagged budget

balance-to-GDP ratio is also significant during crisis with a clearly larger coefficient than in the non-OECD countries regressions, while it is not significant in regular times.

Overall, it proved to be difficult to build a significant instrument for regular spending in OECD countries. Therefore, in Table 4 (and 4b in the Annex) the under identification test is not passed. The reported value, however, only captures the average validity of instruments over both endogenous variables. The instruments for crisis spending, crisis distance to elections and crisis lagged budget balance, are still highly significant in the first stage. The fiscal multiplier of crisis spending ranges between 0.5 and 0.7 and is therefore slightly larger than in non-OECD countries (the underlying fiscal share is 46% of GDP, as described above).

### *Banking crisis*

The previous analysis showed the impact of government spending on economic growth during up to 141 financial crises, which included banking crises, currency crises, and debt crises. Table 5 reports on to which extent government spending and growth are correlated during 60 banking crises.

Given the limited number of banking crises recorded in the IMF dataset on financial crisis, between 1981 and 2007 and, in particular, the high proportion of only one banking crises per country, we can only use the 2-year definition of crises, which provides us with two observations per crisis and thus allows us to use the singleton crises. Again, country dummies are interacted with banking crisis dummy in specifications (1)-(3) in Table 5, hence the coefficient of *BC2* has to be interpreted taking into account the country specific crises reactions. Without interactions, *BC2* is significantly negative, as in regression (1).

Table 5 – Results for real GDP growth (1981-2007), spending growth rates, instrument: distance to elections and lagged budget balance, 2-year banking crisis

	(1) IV	(2) IV	(3) IV
Spending*(1-BC2)	0.163*** (2.93)	0.195* (1.83)	0.172 (1.62)
Spending*BC2	-0.164 (-1.25)	-0.116 (-1.07)	-0.130 (-1.15)
GDP(-1)	0.278*** (4.42)	0.249*** (3.19)	0.232*** (2.97)
GDP(-2)	0.0323 (0.97)	0.0417 (1.32)	0.0395 (1.25)
BC2	0.0571*** (7.68)	0.0550*** (8.26)	0.0531*** (7.99)
Budget Balance to GDP(-2)	-0.0314 (-1.24)	-0.0621 (-0.89)	-0.0612 (-0.90)
Spending(-1)		0.00876 (0.33)	0.00805 (0.31)
Revenue(-1)		0.00749 (0.35)	0.0101 (0.47)
Time Fixed Effects	No	No	Yes
Observations	2438	2375	2375
Cross-sections	119	119	119
Kleibergen-Paap LM Statistic	22.92	14.42	13.86
Kleibergen-Paap p-value	0.0000	0.0024	0.0031
Wald Test Statistic	5.48	6.69	6.27
Wald Test p-value	0.0193	0.0097	0.0123

Notes: unbalanced panels with country fixed effects. t-statistics are in brackets. \*, \*\* and \*\*\* denote level of significance indicating 10%, 5% and 1% respectively. A Wald test is conducted to test whether crisis spending and regular spending are statistically different. The underlying null hypothesis of the test is that the coefficients of the interaction terms between spending and financial crisis are equal. *GDP*, *Spending*, *Revenue* and *Claims on Private Sector* are used as growth rates. *BC2* – dummy variable for the existence of banking crisis. The Kleibergen-Paap statistic tests the null that the equation is underidentified.

Essentially, in the IV estimation spending significantly differs in crises and non-crises times. While there is no impact of a change in spending in the first and second year of a banking crises on GDP growth, the impact of spending in normal times is still positive (and mostly significant) with a multiplier of about 0.5.

Performing the analysis with all remaining financial crises, hence debt and currency crises, supports these results (see Table 5b in the Annex), and the coefficient of crisis spending is larger as for the full set of financial crises. The difference between spending in crisis times and normal times is not significant.

## 5. Conclusion

In this paper we have studied the impact of government spending on output notably during the occurrence of financial crises, covering 127 countries for the period 1981-2007. We have performed each estimation using a 1-year and a 2-year definition of financial crisis, with and without time fixed effects.

To address the endogeneity issue we have used two instruments: the distance to elections – a linear distance measure between the current year and the year of the next election – and the lagged budget balance-to-GDP ratio. According to the results, the fiscal multiplier for instrumented regular spending ranges between 0.6 and 0.8, considering the average government spending share of GDP of about one third. The multipliers of instrumented government spending are higher than the simple OLS multipliers. However, the differences between the coefficients of government spending in crises and non-crises periods are also insignificant in most of our estimations.

More specifically, the fiscal multiplier for the full sample and for the non-OECD sub-sample, for instrumented regular and crisis government spending, is about 0.6, with an average government spending-to-GDP ratio of one third. For the OECD sub-sample, government spending in the presence of a financial crisis also produces a fiscal multiplier of 0.6 assuming an average fiscal share of GDP of around 40 percent. Moreover, for the sub-sets of OECD and non-OECD countries our results show, that altogether, we also cannot reject the hypothesis that government spending either in the presence or in the absence of a financial crisis has the same impact. Interestingly, for the cases when a banking crisis occurred, our results do not support the idea that expansionary fiscal policies positively impact on economic growth.

Therefore, the main result of our panel analysis is that that government spending has essentially the same impact on economic growth with or without a financial crisis. This result holds throughout our sample, using a variation of controls, sub-samples and specifications. Consequently, taking into account that larger spending programmes tend to be less targeted, this indicates that they may actually not be particularly helpful.

The present analysis is a first step and these conclusions are tentative. Additional research is needed to further study the relevance of fiscal policies in the context of financial crisis. One way forward would be to use more detailed data on the composition of government spending and to distinguish between budgetary components that react to changes in output and others that don't.

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## Appendix – Data description and sources

Non-performing loans: data available on the website of Luc Laeven, reported as a percentage of GDP at the peak of a crisis. <http://www.luclaeven.com/Data.htm>

Year of crisis: banking, currency or sovereign debt crisis. Source: IMF database on financial crises, Laeven and Valencia (2008), and at <http://www.luclaeven.com/Data.htm>

Government spending: general government spending deflated with the GDP deflator. For some countries only central government data are available. Source: IMF World Economic Outlook database.

Budget balance: general government budget balance as percent of GDP. For some countries only central government data are available. Source: IMF World Economic Outlook database.

Government debt: government gross debt as percent of GDP. For some countries only central government data are available. Source: IMF World Economic Outlook database.

Real GDP: Source: IMF World Economic Outlook database.

GDP gap: difference between actual and trend real GDP, as a percentage of trend real GDP. Trend GDP is estimated using an HP-filter on real GDP. The lambda value is chosen as 100.

Inflation rate: Consumer price index. Source: IMF World Economic Outlook database

Long-term nominal interest rate: Data are only available for OECD countries. Source: OECD Economic Outlook database.

Election dates: Legal and Executive Elections taken from *Pippa Norris. 2009. Democracy Time series Dataset.*

<http://www.hks.harvard.edu/fs/pnorris/Data/Data.htm>

## List of countries

All countries		OECD sub-sample	
Albania	Ghana	Oman	Australia
Algeria	Greece	Pakistan	Austria
Antigua and Barbuda	Guinea	Panama	Belgium
Argentina	Guinea-Bissau	Paraguay	Canada
Australia	Guyana	Peru	Czech Republic
Austria	Hungary	Philippines	Denmark
Azerbaijan	Iceland	Poland	Finland
Bahamas, The	India	Portugal	France
Bangladesh	Indonesia	Romania	Germany
Barbados	Iran	Russia	Greece
Belgium	Ireland	São Tomé and Príncipe	Hungary
Belize	Israel	Saudi Arabia	Iceland
Bolivia	Italy	Senegal	Ireland
Bosnia and Herzegovina	Jamaica	Seychelles	Italy
Brazil	Japan	Singapore	Japan
Bulgaria	Jordan	Slovak Republic	Korea
Burkina Faso	Kazakhstan	Slovenia	Luxembourg
Burundi	Kenya	South Africa	Mexico
Cambodia	Korea	Spain	Netherlands
Canada	Kuwait	Sri Lanka	New Zealand
Cape Verde	Kyrgyz Republic	Swaziland	Norway
Chile	Lao	Sweden	Poland
China	Latvia	Switzerland	Portugal
Colombia	Lebanon	Syrian Arab Republic	Slovak Republic
Costa Rica	Lithuania	Taiwan	Spain
Côte d'Ivoire	Luxembourg	Tajikistan	Sweden
Croatia	Madagascar	Thailand	Switzerland
Cyprus	Malaysia	Trinidad and Tobago	United Kingdom
Czech Republic	Mauritania	Turkmenistan	United States
Denmark	Mauritius	Uganda	
Djibouti	Mexico	Ukraine	
Dominican Republic	Moldova	United Arab Emirates	
Ecuador	Mongolia	United Kingdom	
Egypt	Morocco	United States	
El Salvador	Mozambique	Uruguay	
Equatorial Guinea	Namibia	Uzbekistan	
Estonia	Nepal	Venezuela	
Ethiopia	Netherlands	Vietnam	
Fiji	New Zealand	Yemen	
Finland	Nicaragua	Zambia	
France	Niger	Zimbabwe	
Georgia	Nigeria		
Germany	Norway		

## Annex – Additional results

Table 1b – Results for real GDP growth (1981-2007), spending growth rates, instrument: distance to elections, 2-year crisis

	(1)	(2)	(3)	(4)
Spending*(1-FC2)	0.337** (2.32)	0.275** (2.26)	0.212* (1.68)	0.146 (1.40)
Spending*FC2	0.512 (1.17)	0.399 (1.53)	0.339 (1.41)	0.271 (1.42)
GDP(-1)	0.131 (1.29)	0.160* (1.90)	0.171** (2.02)	0.0689 (0.91)
FC2	-0.0841*** (-12.90)	-0.0837*** (-20.14)	-0.0789*** (-16.93)	
Spending(-1)		0.0203 (1.00)	0.0178 (0.90)	0.00712 (0.47)
Revenue(-1)		0.000643 (0.03)	0.00608 (0.31)	0.0166 (1.14)
Claims on Private Sector				0.0150*** (2.76)
Inflation				-0.00222*** (-3.09)
Time Fixed Effects	No	No	Yes	Yes
Observations	2605	2516	2516	1937
Cross-sections	122	122	122	101
Kleibergen-Paap LM Statistic	11.05	12.12	10.68	9.47
Kleibergen-Paap p-value	0.0009	0.0005	0.0011	0.0021
Wald Test Statistic	0.14	0.20	0.22	0.35
Wald Test p-value	0.7040	0.6575	0.6400	0.5555

Notes: unbalanced panels with country fixed effects. t-statistics are in brackets. \*, \*\* and \*\*\* denote level of significance indicating 10%, 5% and 1% respectively: A Wald test is conducted to test whether crisis spending and regular spending are statistically different. The underlying null hypothesis of the test is that the coefficients of the interaction terms between spending and financial crisis are equal. *GDP*, *Spending*, *Revenue* and *Claims on Private Sector* are used as growth rates. *FC2* – dummy variable for the existence of financial crisis. The Kleibergen-Paap statistic tests the null that the equation is underidentified. Constant as well as fixed effects interactions with crises dummy are partialled out.

Table 2b – Results for real GDP growth (1981-2007), spending growth rates, instrument: distance to elections and lagged budget balance, 2-year crisis

	(1)	(2)	(3)	(4)
Spending*(1-FC2)	0.164*** (2.80)	0.262** (2.38)	0.224** (2.11)	0.207* (1.82)
Spending*FC2	0.0692 (0.95)	0.181* (1.75)	0.175* (1.70)	0.105 (1.14)
GDP(-1)	0.257*** (4.73)	0.193*** (2.68)	0.183** (2.55)	0.0782 (1.05)
GDP(-2)	0.0329 (1.03)	0.0414 (1.33)	0.0450 (1.52)	0.0240 (0.78)
FC2	-0.0814*** (-54.12)	-0.0836*** (-40.78)	-0.0786*** (-23.58)	
Budget balance ratio(-2)	-0.0232 (-0.82)	-0.0898 (-1.25)	-0.0795 (-1.20)	-0.141* (-1.79)
Spending(-1)		0.0291 (1.10)	0.0253 (0.98)	0.0259 (0.86)
Revenue(-1)		-0.00708 (-0.34)	-0.00240 (-0.12)	-0.00141 (-0.07)
Claims on Private Sector				0.0158*** (3.23)
Inflation				-0.00203*** (-3.88)
Time Fixed Effects	No	No	Yes	Yes
Observations	2504	2439	2439	1884
No. Clusters	122	122	122	101
Kleibergen-Paap LM Statistic	25.54	15.53	16.71	13.60
Kleibergen-Paap p-value	0.0000	0.0014	0.0008	0.0035
Wald Test Statistic	1.08	0.55	0.21	1.19
Wald Test p-value	0.2995	0.4592	0.6488	0.2753

Notes: unbalanced panels with country fixed effects. t-statistics are in brackets. \*, \*\* and \*\*\* denote level of significance indicating 10%, 5% and 1% respectively. A Wald test is conducted to test whether crisis spending and regular spending are statistically different. The underlying null hypothesis of the test is that the coefficients of the interaction terms between spending and financial crisis are equal. *GDP*, *Spending*, *Revenue* and *Claims on Private Sector* are used as growth rates. *FC2* – dummy variable for the existence of financial crisis. The Kleibergen-Paap statistic test the null that the equation is underidentified. Constant as well as fixed effects interactions with crises dummy are partialled out.

Table 3b – Results for real GDP growth (1981-2007), spending growth rates, instrument: distance to elections and lagged budget balance, non-OECD countries, 2-year crisis

	(1)	(2)	(3)	(4)
Spending*(1-FC2)	0.168*** (2.99)	0.248** (2.54)	0.203** (2.17)	0.192** (2.05)
Spending*FC2	0.0985 (1.47)	0.209** (2.08)	0.183* (1.85)	0.147 (1.49)
GDP(-1)	0.239*** (4.15)	0.180** (2.48)	0.174** (2.47)	0.0478 (0.67)
GDP(-2)	0.0467 (1.33)	0.0588* (1.74)	0.0513 (1.61)	0.0328 (0.98)
FC2	-0.0821*** (-54.66)	-0.0847*** (-36.37)	-0.0771*** (-18.50)	
Budget balance ratio(-2)	-0.0204 (-0.55)	-0.0870 (-1.07)	-0.0663 (-0.92)	-0.174* (-1.77)
Spending(-1)		0.0306 (1.10)	0.0230 (0.87)	0.0346 (1.08)
Revenue(-1)		-0.00662 (-0.32)	0.000649 (0.03)	-0.00635 (-0.32)
Claims on Private Sector				0.0147** (2.29)
Inflation				-0.00210*** (-4.20)
Observations	1814	1750	1750	1261
Cross-sections	94	94	94	73
Kleibergen-Paap LM Statistic	27.30	17.92	19.63	17.05
Kleibergen-Paap p-value	0.0000	0.0005	0.0002	0.0007
Wald Test Statistic	0.73	0.17	0.04	0.27
Wald Test p-value	0.3927	0.6816	0.8348	0.6028

Notes: unbalanced panels with country fixed effects. t-statistics are in brackets. \*, \*\* and \*\*\* denote level of significance indicating 10%, 5% and 1% respectively: A Wald test is conducted to test whether crisis spending and regular spending are statistically different. The underlying null hypothesis of the test is that the coefficients of the interaction terms between spending and financial crisis are equal. *GDP*, *Spending*, *Revenue* and *Claims on Private Sector* are used as growth rates. *FC2* – dummy variable for the existence of financial crisis. The Kleibergen-Paap statistic test the null that the equation is underidentified. Constant as well as fixed effects interactions with crises dummy are partialled out.

Table 4b – Results for real GDP growth (1981-2007), spending growth rates, instrument: distance to elections and lagged budget balance, OECD countries, 2-year crisis

	(1)	(2)	(3)	(4)
Spending*(1-FC2)	1.052** (2.00)	1.132** (2.20)	0.694** (2.33)	0.157 (0.66)
Spending*FC2	-0.322*** (-2.75)	-0.284** (-2.15)	-0.143 (-0.65)	-0.222 (-1.12)
GDP(-1)	-0.0454 (-0.17)	-0.0615 (-0.24)	0.0969 (0.63)	0.300*** (2.80)
GDP(-2)	-0.131 (-1.42)	-0.116 (-1.16)	-0.0756 (-1.24)	-0.0523 (-1.02)
FC2	(dropped)	0.0423** (2.54)	(dropped)	(dropped)
Budget balance ratio(-2)	-0.181* (-1.86)	-0.262** (-2.23)	-0.165** (-2.19)	-0.0624 (-0.89)
Spending(-1)		-0.0362 (-0.64)	0.00939 (0.21)	0.0272 (1.04)
Revenue(-1)		-0.00227 (-0.03)	-0.0232 (-0.49)	-0.00435 (-0.18)
Claims on Private Sector				0.00974 (1.50)
Inflation				-0.0129 (-1.45)
Time Fixed Effects	No	No	Yes	Yes
Observations	690	689	689	623
Cross-sections	28	28	28	28
Kleibergen-Paap LM Statistic	6.16	5.73	7.27	5.53
Kleibergen-Paap p-value	0.1039	0.1254	0.0637	0.1366
Wald Test Statistic	6.97	7.70	5.40	3.57
Wald Test p-value	0.0083	0.0055	0.0201	0.0589

Notes: unbalanced panels with country fixed effects. t-statistics are in brackets. \*, \*\* and \*\*\* denote level of significance indicating 10%, 5% and 1% respectively. A Wald test is conducted to test whether crisis spending and regular spending are statistically different. The underlying null hypothesis of the test is that the coefficients of the interaction terms between spending and financial crisis are equal. *GDP*, *Spending*, *Revenue* and *Claims on Private Sector* are used as growth rates. *FC2* – dummy variable for the existence of financial crisis. The Kleibergen-Paap statistic tests the null that the equation is underidentified. Constant as well as fixed effects interactions with crises dummy are partialled out.

Table 5b – Results for real GDP growth (1981-2007), spending growth rates, instruments: distance to elections and lagged budget balance-to-GDP ratio, 2-year debt and currency crisis

	(1)	(2)	(3)	(4)
Spending*(1-DCC2)	0.170*** (3.00)	0.302*** (2.72)	0.276** (2.49)	0.226* (1.87)
Spending*DCC2	0.107 (1.28)	0.238* (1.88)	0.226* (1.90)	0.396* (1.87)
GDP(-1)	0.229*** (4.06)	0.159** (2.00)	0.143* (1.80)	0.0701 (0.84)
GDP(-2)	0.0392 (1.27)	0.0413 (1.34)	0.0387 (1.32)	0.0204 (0.60)
DCC2	-0.141*** (-46.30)	-0.144*** (-32.66)	-0.136*** (-23.63)	0.00701 (0.95)
Budget balance ratio(-2)	-0.0248 (-0.93)	-0.112 (-1.52)	-0.107 (-1.53)	-0.171* (-1.90)
Spending(-1)		0.0392 (1.37)	0.0387 (1.36)	0.0400 (1.13)
Revenue(-1)		-0.0168 (-0.78)	-0.0145 (-0.67)	-0.0112 (-0.48)
Claims on Private Sector				0.0143*** (2.93)
Inflation				-0.00225*** (-3.67)
Time Fixed Effects	No	No	Yes	Yes
Observations	2438	2375	2375	1863
Cross-sections	119	119	119	98
Kleibergen-Paap LM Statistic	26.64	14.68	14.77	11.74
Kleibergen-Paap p-value	0.0000	0.0021	0.0020	0.0083
Wald Test Statistic	0.48	0.35	0.21	0.87
Wald Test p-value	0.4896	0.5546	0.6470	0.3513

Notes: unbalanced panels with country fixed effects. t-statistics are in brackets. \*, \*\* and \*\*\* denote level of significance indicating 10%, 5% and 1% respectively. A Wald test is conducted to test whether crisis spending and regular spending are statistically different. The underlying null hypothesis of the test is that the coefficients of the interaction terms between spending and financial crisis are equal. . *GDP*, *Spending*, *Revenue* and *Claims on Private Sector* are used as growth rates. *DCC2* – dummy variable for the existence of a debt or currency crisis. The Kleibergen-Paap statistic tests the null that the equation is underidentified. Constant as well as fixed effects interactions with crises dummy are partialled out.



