

# How Effective is Fiscal Policy Response in Financial Crises?\*

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## **Abstract**

This paper studies the effects of fiscal policy responses in 140 episodes of banking crisis in advanced and emerging market economies during 1980–2012. It finds that timely countercyclical fiscal measures contribute to shortening the length of crisis episodes by stimulating aggregate demand. Fiscal expansions that rely mostly on measures to support government consumption are more effective in shortening the crisis than those based on scaling up public investment or income tax cuts. But these results do not hold for countries with limited fiscal space, where fiscal expansions are prevented by funding constraints. The composition of countercyclical fiscal responses matters as well for output recovery after the crisis, with increases in public investment yielding the strongest impact on growth.

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## 1. Introduction

Countercyclical fiscal policies—comprising discretionary expansionary budget measures and the operation of automatic stabilizers—have generally helped shorten recession spells in advanced economies during crisis episodes (IMF, 2009b, IMF, 2010b). The evidence is more mixed in emerging market economies where procyclical spending bias, narrow automatic stabilizers and limited credit access have constrained governments' ability to provide fiscal stimulus during adverse economic periods (Kaminsky, Reinhart, and Vegh, 2004). Initial fiscal conditions generally play a key role in crisis responses (Alesina et al. 2002) in both advanced and emerging economies. Countries are more likely to adopt countercyclical fiscal policies if sufficient fiscal space existed before the crisis.<sup>1</sup> The success of fiscal policy in restoring growth also depends on the role of accompanying macroeconomic policies and on the design of the fiscal stimulus packages, as the size of multipliers varies across government spending and tax measures.<sup>2</sup>

One of the key findings of the literature is that expansionary fiscal responses lead to sustained economic recoveries after the crisis only when financial sector's vulnerabilities are addressed without endangering fiscal sustainability (IMF, 2009a). Crisis resolution measures generally entail costly government restructuring of private sector's balance sheet, including of the financial sector, which can have a lasting negative impact on public debt levels. Furthermore, government interventions to boost private sector credit and domestic demand could leave the economy exposed to the risk of high inflation and low private investment growth. Therefore, there is a potential conflict between the size of countercyclical fiscal expansions during downturns and their medium-term growth implications.

Against this backdrop the contribution of this paper is twofold. First, we focus on crisis episodes originating in the banking sector, which are of systemic nature (Laeven and Valencia, 2008; 2010), to assess the effectiveness of fiscal policy in restoring growth during distress times and sustaining economic expansion in the post-crisis period. While studies have been carried out to assess policy responses during recessions (Claessens, Kose, and Terrones, 2008; IMF, 2009b; IMF, 2010a) and the role of fiscal policy to stimulate growth and its limits (Feldstein, 2002), detailed evidence on fiscal policy effects during financial distress periods is lacking.<sup>3</sup> During financial crises, the environment for fiscal policy

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<sup>1</sup> Creating fiscal space includes bringing public sector debt to manageable levels and improving the liabilities' composition (e.g., by currency and maturity) in the public sector balance sheet.

<sup>2</sup> Fiscal multipliers are typically largest for government consumption, public investment, and transfers to households, while they are relatively smaller for indirect taxes (Spilimbergo, Symansky, and Schindler, 2009) Fiscal multipliers can also vary depending on the cyclical position of the economy (IMF, 2012).

<sup>3</sup> Aizenman and Jinjark (2011) provide a general discussion of the fiscal policy response to the 2008 financial crisis for advanced and emerging economies. They show the level and composition of the stimulus packages adopted, but no econometric analysis of its impact on crisis length and growth is attempted .

implementation is made more difficult by the high economic cost associated with the shock. Moreover, financial distress can lead to capital market freezes that make it difficult to access financing for deficit expansions.

Second, we focus on the composition of fiscal policy response to assess its effectiveness during shocks. The composition of fiscal expansions and its impact on crisis length and post-crisis output recovery have not been dealt with in sufficient detail in the literature. However, one could expect fiscal policy composition to play a key role in determining both the likelihood of exiting a crisis and the medium-term growth prospects, as short-term fiscal multipliers differ across fiscal policy instruments. Moreover, tax and spending measures adopted during financial distress periods can have long-term implications for economic efficiency and productivity growth when the crisis is over (Gali, Lopez-Salido, and Valles, 2005; Ghosh et al., 2009; Rogoff and Reinhart, 2009 ) and contribute to debt consolidation success (Baldacci, Gupta, and Mulas-Granados, 2012).

Therefore, the objective of this paper is to answer the following questions:

- What is the effectiveness of fiscal policy in shortening the duration of systemic banking crisis episodes and strengthening economic growth in the medium term?
- Does the composition of the fiscal policy response matter, both in terms of crisis duration and post-shock growth performance?

The remainder of this paper is organized as follows: Section II reviews the relevant literature. Section III describes the data and the econometric approach. Section IV presents the empirical results followed by robustness tests in Section V. The concluding section summarizes the results and discusses the key policy implications.

## 2. Literature Review

**Fiscal impact of banking crisis.** Until recently, the study of financial crises has typically focused either on historical experiences of advanced economies (mainly the banking panics before World War II), or on more recent episodes in emerging market economies.<sup>4</sup> An important strand of this literature deals with the controversial issue of identifying and classifying different types of episodes that occurred in the last century. There are two major references in this area.

First, Reinhart and Rogoff (2008a, 2008b, 2009) mark banking crises as two types of events: bank runs that lead to the closure, merger, or takeover by the public sector of one or more financial institutions; and if there are no runs, the closure, merger, takeover, or large-scale government assistance for an important financial institution that marks the start of a string of similar outcomes for other financial institutions. With these criteria, they identify 66 cases that occurred between 1945 and 2007. They find that banking crises lead to sharp declines in tax revenues, as well as to significant increases in government spending. On average, they find that government debt rises by 86 percent during the three years following a banking crisis, and at the end of this period, growth resumes slowly to reach an average annual rate of 2½ percent in the third year after the crisis. Laeven and Valencia (2010) show that these conclusions hold for a wider sample of crisis episodes.

The second major reference are the papers by Laeven and Valencia (2008, 2010), which introduce a new dataset on banking crises, with information on the type of policy responses implemented to resolve these crises in different countries and the related fiscal cost. Under their definition, in a systemic banking crisis, a country's corporate and financial sectors

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<sup>4</sup> See Calomiris and Gorton (1991) and Gorton (1988) on pre-WWII banking panics; Reinhart and Rogoff (2008a; 2008b) for an analysis of all post-WWII banking crises in advanced economies; Bordo, Eichengreen and Klingebiel (2001) for an analysis that encompasses both advanced and emerging market economies; and Jacome (2008) on banking crises in Latin America.

experience a large number of defaults and financial institutions and corporations face difficulties repaying loans on time. Using this mix of objective data and subjective assessments,<sup>5</sup> they identify 124 systemic banking crises over the period 1970–2007, and estimate that fiscal costs net of recoveries associated with these crises average about 13.3 percent of GDP, while output losses average 20 percent of GDP.

Many authors have also focused on the origins of banking crises. These studies have typically found that crises tend to erupt when the macroeconomic environment is weak, particularly when growth is low and inflation and interest rates are high (Demirgüç-Kunt and Detragiache, 1998; Collyns and Kincaid, 2003).<sup>6</sup> Others have focused instead on the consequences of these crises, including the study by Reinhart and Rogoff (2009) cited above.<sup>7</sup> Claessens, Kose, and Terrones (2008) took the analysis one step further and studied recessions caused by credit contractions, those associated with house price declines, and episodes of equity price declines. Their results show that the interaction between macroeconomic and financial variables can play a major role in determining severity and duration of recessions. Specifically, they find evidence that recessions associated with credit crunches and house price busts tend to be deeper and longer than other recessions.<sup>8</sup>

**Policy responses to banking crisis.** The analysis of policy responses to these crises constitutes another area of interest for scholars.<sup>9</sup> Some studies have analyzed the type of containment and resolution policies aimed at stabilizing the banking sector during financial crises (Laeven and Valencia, 2008; 2010). Others have assessed the macroeconomic policy response. Claessens, Kose, and Terrones (2008) and IMF (2009b) find that both monetary and fiscal policy tend to be countercyclical during recessions, credit contractions, and asset price declines. In these episodes, fiscal policy appears to be more accommodative, suggesting a more aggressive countercyclical fiscal stance. They also find that expansionary fiscal

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<sup>5</sup> Unlike prior work (Caprio and Klingebiel, 1996, and Caprio et al., 2005), they exclude banking system distress that affected isolated banks, but were not systemic in nature.

<sup>6</sup> For a review of the literature on the origins of banking crisis, see also Lindgren, Garcia and Saal (1996), Kaminsky and Reinhart (1999), and Dooley and Frankel (2003).

<sup>7</sup> For a similar analyses of the real effects of banking crises, see Frydl (1999) and Dell’Ariccia, Detragiache and Raghuram (2008).

<sup>8</sup> See Spilimbergo et al. (2008) for a review of historical episodes of financial crises and the conduct of fiscal policy during the shock period.

<sup>9</sup> For an overview of existing literature on how crisis resolution policies have been used and the trade offs involved, see Hoelscher and Quintyn (2003) and Honohan and Laeven (2005).

policy (proxied by discretionary government consumption) tends to shorten the duration of recessions.<sup>10</sup>

The lessons from these analyses have stimulated other papers with a more prescriptive approach. For instance, one paper argues that an optimal fiscal package to mitigate the adverse consequences of financial crises should be large, lasting, diversified, contingent, collective, and sustainable (Spilimbergo et. al, 2008). Perotti (2011) and DeLong and Summers (2012) also find that in periods of stagnation fiscal policy stimulus can help sustain private sector growth and remove the negative effects on the economy of private sector deleveraging. However, fundamentals matter: Cottarelli and Jaramillo (2012) and Kumar and Woo (2011) show that high debt levels hamper growth; a result confirmed by Panizza and Presbitero (2012). Baldacci and Kumar (2010) highlight that the main channel through which fiscal deficits may reduce long-term growth is via higher interest rates, as economic agents anticipate the effect of future taxes to compensate current deficits and become less confident about debt sustainability. However, fiscal contractions during recessions can harm growth as fiscal multipliers tend to be positive and high during periods of output decline and financial crises (Baum, Poplawski-Ribeiro and Weber, 2012; IMF, 2012).

**Market perceptions of high deficits.** Finally, the increase in fiscal deficits and public debt linked to fiscal policy expansions during crises have also led to a discussion of the perception of financial markets about fiscal sustainability. Ardagna (2009) shows that financial markets value fiscal discipline, since interest rates on long-term government bonds and stock market prices worsen considerably in periods of fiscal expansion.<sup>11</sup> Alper, Forni and Weber (2012) highlight that both fiscal fundamentals and global risk factors are important for credit risk, but in period of fiscal stress and for countries with high debt growth prospects also matter. In addition, during financial crises risks tend to spillover across economies reflecting banking sector links and mutual interdependencies across financial systems (Caceres, Guzzo and Segoviano, 2010).

**Composition of fiscal policy.** Looking at the composition of fiscal policy, Akitoby and Stratmann (2008) show that financial markets react to the composition of the budget in emerging market economies. For example, revenue-based adjustments lower government spreads more than expenditure-based ones, and debt-financed spending increases sovereign risks.<sup>12</sup> Baldacci, Gupta and Mulas-Granados (2012) find that when adjustment needs are large, as in many economies in the aftermath of financial crises, debt sustainability is more

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<sup>10</sup> Berg and Ostry (2011) find that the duration of growth spells is also affected by income distribution. Output growth episodes tend to be shorter and less frequent when income inequality is higher.

<sup>11</sup> Afonso and Strauch (2004) have similar results using events analysis on a sample of EU countries.

<sup>12</sup> Revenue-based adjustments along with expenditure efficiency measures are also found to sustain fiscal consolidation episodes in emerging market economies (Gupta et al., 2005).

likely through a combination of expenditure and revenue measures, rather than expenditure cuts only. Baldacci, Gupta, and Mati (2011) also highlight that the composition of fiscal policy affects for government spreads, but debt levels matter as well. They show that spending on public investment contributes to lower government bond spreads, as long as the fiscal position remains sustainable and the fiscal deficit does not worsen.<sup>13</sup>

Fiscal stimulus is not the only way to support growth during recessions. Automatic stabilizers also play a role and depending on their design and size can contribute to stabilization. Economies with larger automatic stabilizers require on average lower fiscal stimulus to generate the same level of support to the economy. Doll, Fuest and Peichl (2010) report that automatic stabilizers absorb 38 percent of a proportional income shock in the European Union, compared to 32 per cent in the United States. In the case of an unemployment shock, 47 percent of it is absorbed in the European Union, compared to 34 percent in the United States. According to the authors, automatic stabilizers cushion disposable income leading to a demand stabilization of up to 30 percent in the European Union and up to 20 percent in the United States. However, they report large heterogeneity in the size of automatic stabilizers within the European Union( their size is larger in Central and Northern European economies).

Our paper builds on the above literature to assess the relationship between the composition of fiscal policy response during banking crises, duration of these episodes, and post-crisis economic performance. While Laeven and Valencia (2008) report multiple measures of containment and resolution policies, they only use one measure of fiscal policy (the budget balance) and their work is not focused on causal analysis. Subsequent empirical work (IMF, 2009b; 2009c) also proxies the fiscal policy response using government consumption and primary balance indicators. Instead, we measure the effectiveness of fiscal policy in terms of the different budget categories (both on the revenue and spending side) and the observed characteristics of each episode.

### **3. Fiscal Policy During Banking Crises**

This section describes the impact of banking crises on budgets. We build a dataset of banking crises from a panel of 182 countries between 1980 and 2012. We follow the criteria established by Laeven and Valencia (2008; 2010) and identify 140 episodes of banking crises that occurred in 112 different countries (in some countries up to four times during the period, such as in Argentina).<sup>14</sup> We complement Laeven and Valencia's database with additional

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<sup>13</sup> On financial markets reactions to fiscal policy initiatives, and how these developments affect corporate bond spreads, see also Durbi and Ng (2005) and Cavallo and Valenzuela (2007).

<sup>14</sup> Laeven and Valencia (2008) identified 124 episodes of banking crises, 208 currency crises, and 63 sovereign debt crises. We use the dataset of 124 banking crises and drop 10 of them due to lack of fiscal data. We were left with 114 cases and then added 4 more cases from their other two datasets (initially classified as currency  
(continued)



data from the World Economic Outlook (WEO), the Government Financial Statistics (GFS), and the Global Financial Database (GFD).

Unlike Laeven and Valencia (2008; 2010), we not only identify the start of the crises, but also define their duration. We are aware of the difficulties in identifying the duration of banking crises, since there is no single financial indicator that is valid for all of them. Nevertheless, regardless of the origins and the characteristics of each banking crisis, we assume that a crisis ends after two consecutive years of real GDP growth above  $\frac{1}{2}$  percentage points per year.<sup>15</sup> For the purpose of this paper this definition allows us to link the crisis duration with the negative output implication of the crisis. This is consistent with the focus on the effects of fiscal policy responses in restoring economic stability.<sup>16</sup> In Section IV, we test the robustness of our results to a different definition of crisis duration, based on stock market performance.

Using the above criteria, we find that banking crises lasted on average for 2.6 years, with 83 percent of the crisis episodes lasting between one to four years, and only one episode lasting eight years (see Figure 1). This is consistent with the findings of Claessens, Kose, and Terrones (2008) who report an average duration of recessions linked to credit crises of  $2\frac{1}{2}$  years. Reinhart and Rogoff (2008b) estimate an average duration for their reduced sample of financial crises of about three years.

(insert Figure 1)

Consistent with previous studies, we also find that banking crises generate large economic costs. Peak-to-trough figures show that the average GDP growth rate fell by more than 6.2 percentage points during the crisis, general government debt increased by 59 percentage points of GDP and the budget deficits increased by 3.4 percentage points of GDP (see Figure 2).<sup>17, 18</sup>

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crises or debt crises that later triggered a banking crises). Finally, we came up with a total sample of 140 cases by including 22 new observations that Laeven and Valencia (2010) added to their updated database, most of which were advanced countries affected by the financial meltdown in the US and Europe of 2007-08.

<sup>15</sup> For those episodes of banking crisis that are still going on, we take 2011 as the final year and use IMF projections to assess post crisis GDP growth.

<sup>16</sup> An alternative measure to the one used in the paper could be the cumulative output loss during the crisis. We find that there is a strong positive correlation between crisis length and output losses during the banking crisis episodes used in the analysis.

<sup>17</sup> Results using alternative measures, such as period changes and period averages yield similar conclusions. This is why in the rest of the paper, we focus on one definition of crisis effects. We check the robustness of empirical findings to alternative definitions and results still hold. The fiscal balance incorporates the effect of discretionary policy changes (including measures to support the financial system), automatic stabilizers, and

(continued)

(insert Figure 2)

To assess the behavior of fiscal variables during crises episodes we calculate period changes. Results of descriptive statistics are expressed as a percentage of GDP (Table 1).

(insert Table 1)

During banking crises, fiscal deficits increased by almost 3 percentage points and public debt worsened by 40 percentage points of GDP. Total revenues increased by 2 points during the crisis period, despite the heavy fall in tax revenues because they were compensated by non-tax revenues. Instead, government expenditures rose by more than 5 percentage points of GDP.<sup>19</sup>

#### 4. The Effectiveness of Fiscal Response

In a standard Keynesian framework, we would expect a fiscal expansion driven by cuts in taxes and increases in public spending to shorten the duration of the crisis and sustain medium-term growth. Higher government spending and lower taxes help boost aggregate demand during downturns associated with banking crises, replacing falling private consumption as a growth engine (Arreaza, Sorensen, and Joshua, 1999). Public investment measures can, at least in part, offset the collapse in private investment (Aschauer, 1989). A simple plot of changes in levels of these variables as a ratio to GDP against the duration of banking crisis episodes supports these hypotheses.<sup>20</sup> Figure 3 and Table 2 show a strong positive correlation between higher deficits and shorter crisis duration. However, budget composition changes matter as well as the size of the fiscal package (see Table 3). Higher public consumption (as a percentage of total expenditures) and lower income taxes (as a percentage of total revenues) also shorten the duration of banking crises. The contribution of

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other nondiscretionary budget changes. Public debt also incorporates the cost of below-the-line measures to repair the financial system during crises.

<sup>18</sup> The fiscal balance incorporates only “above-the-line” budget measures implemented during the crisis to support the financial sector (e.g., interest rate subsidies) following the GFS methodology. “Below-the-line” measure to help bank recapitalization and support liquidity are included in public sector debt data when governments bear the cost.

<sup>19</sup> This in part reflects a decline in output, which raises the ratio of spending to GDP. Nonetheless, cyclically-adjusted spending also rose in the period reflecting discretionary fiscal expansion and automatic stabilizers. In the rest of the paper we use fiscal variables expressed as a ratio to GDP. We test the robustness of this assumption by replacing these indicators with cyclically adjusted variables in Section 5 and find that results hold.

<sup>20</sup>As in the previous section, all variables are calculated as the change over the period. Public consumption and public investment are computed as a share of total expenditures, and tax revenues from income and goods and services are computed as a share of total revenues.

higher public investment in reducing the crisis length is, however, significantly weaker. Instead, its role is much higher in increasing post-crisis economic growth (see Table 4): this confirms previous findings pointing to larger multipliers for public investment than government consumption (Spilimbergo, Symansky, and Schindler, 2009).

(insert Figure 3)

(insert Table 2)

(insert Table 3)

(insert Table 4)

To build this indicator we follow Laeven and Valencia (2008) and create a variable labeled “expansionary fiscal policy.”

We use the following model to determine the effect of fiscal policy and other accompanying measures on the duration of banking crises:

$$Duration(t) = \alpha + \beta_1 FiscalExpansion_t + \beta_2 CreditBoom_{t-1} + \beta_3 Containment(Dep.Guarantee)_t + \beta_4 Resolution(N.BanksClosed)_t + \beta_4 Resolution(GovtIntervention)_t + \varepsilon_t \quad (1)$$

Where  $t$  refers to the time period during the episode of banking crisis and  $t-1$  refers to the year preceding the onset of the crisis. *Expansion* is the indicator of fiscal expansion that takes value equal to 1 if the budget balance worsens by more than 1½ percent of GDP in the first three years following the onset of the crisis, and is equal to zero otherwise. *Credit Boom* is a dummy variable that takes value equal to 1, when the banking crises was preceded by an abnormal expansion of credit, and is equal to 0 otherwise; and *Guarantee* is a dummy variable that takes value equal to 1 when there was a freeze of deposits and/or a blanket guarantee in the first phases of banking crises.<sup>21</sup> Finally, we include two measures of resolution policies, captured by the total *Number of Banks Closed* during the episode and the degree of *Government Intervention* in the financial sector.<sup>22</sup>

The dependent variable is of a discrete nature, and takes values ranging from 1 year to 8 years. We estimate a baseline model in a truncated sample of 140 episodes of banking crises, using OLS and Ordered Logit.<sup>23</sup> Results are reported in Table 5 and show that fiscal

<sup>21</sup> We tried to include other containment policies defined in Laeven and Valencia (2008) but these factors were strongly correlated to the other exogenous variables.

<sup>22</sup> See Laeven and Valencia (2008) for the derivation of these variables.

<sup>23</sup> The ordered logit estimation can be seen as a robust analysis method to control for the influence of outliers (e.g., crises with long duration). We also estimated this equation using a Tobit estimator to account for the non-negativity of the dependent variable. Results are similar to the ordered logit.

expansions are a decisive factor for reducing the duration of banking crises. Based on these results, the average fiscal policy response in the sample would reduce the crisis length by more than two quarters.

The variables capturing the role of the accompanying policies have the expected coefficient signs and are statistically significant. Crises tend to be shorter when fiscal expansions are accompanied by decisive actions to guarantee deposits (two to four quarters reduction in crisis length) and to close failed banks (about one year reduction in average crisis length). Crises last about one year longer when preceded by credit booms leading to banking sector vulnerabilities and asset bubbles.<sup>24</sup>

(insert Table 5)

The model is then estimated to capture the role of budget composition:

$$\begin{aligned}
 Duration(t) = & \alpha + \beta_1 FiscalExpansion_t + \beta_2 \sum_{i=1}^4 FiscalComposition_{i,t} + \beta_3 CreditBoom_{t-1} \\
 & + \beta_4 Containment(Dep.Guarantee)_t + \beta_5 Resolution(N.BanksClosed)_t \\
 & + \beta_6 Resolution(GovtIntervention)_t + \varepsilon_t
 \end{aligned} \tag{2}$$

Results are reported in Table 6 and confirm that a fiscal expansion helps reduce the duration of banking crises.<sup>25</sup> An increase in the share of public consumption in total expenditure reduces the duration of crisis episodes as it stimulates aggregate demand.<sup>26</sup> An increase by 5 percentage points in this composition variable reduces the crisis length by almost three months. The size of the estimated coefficient is similar for public investment, although its statistical significance is weaker. The results further indicate that governments can actually choose between expenditure-based and revenue-based fiscal expansions, as a declining share of revenues from income taxes and/or from goods and services also help shorten the duration of banking crises. The effect of consumption tax cuts is, however, larger than the impact of

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<sup>24</sup> While our model measures the direct impact of various financial crisis responses, we do not rule out the possibility of more complex dynamic interactions between fiscal variables and other accompanying policies in response to shocks. However, attempts to add interaction terms do not yield significant results. The good fit of the estimated model confirms that other factors, including interactions, would not add much to the explanatory power of the equation.

<sup>25</sup> These results hold also, when the budget balance is used instead of the large fiscal expansion indicator. For the sake of space, results are not reported in the paper but are available upon request from the authors.

<sup>26</sup> As mentioned earlier, we define the end of the crisis period on the basis of output growth. This is why fiscal measures associated with aggregate demand boost are effective in shortening crisis duration, consistent with the literature on fiscal multipliers (Spilimbergo, Symansky, and Schindler, 2009). This assumption is also tested for robustness using alternative definitions of crisis' end based on financial sector performance. Results reported in the next section show that our findings hold under different definitions of crisis duration.

income tax reductions, as the former affect a wider number of taxpayers with likely larger impacts on consumption decisions.

As in the previous results, the policy control variables are also statistically significant. Crises that have been preceded by a credit boom tend to last longer. And those in which a guarantee for bank deposits was provided tend to be shorter. Closing failed banks and a strong government intervention is also beneficial to resolving the crisis; all these results are consistent with historical evidence. Overall, the size of the coefficients show that fiscal variables are as important as other accompanying policies in shortening crisis length.

(insert Table 6)

The effectiveness of fiscal policy during banking crises not only contributes to reducing the length of crisis episodes. It also helps create conditions for promoting economic growth following a crisis. We estimate the factors affecting the average GDP growth rate in the five years following the end of the crisis using the following specification:<sup>27</sup>

$$\begin{aligned}
 PostGrowth(t) = & \alpha + \beta_1 FiscalExpansion_t + \beta_2 \sum_{i=1}^4 FiscalComposition_t + \beta_3 CreditBoom_{t-1} \\
 & + \beta_4 Containment(Dep.Guarantee)_t + \beta_5 Resolution(N.BanksClosed)_t \\
 & + \beta_6 Resolution(GovtIntervention)_t + \beta_7 \sum_{i=1}^3 PrivateSector_t + \varepsilon_t
 \end{aligned} \tag{3}$$

In this model, three new variables are included under a common vector that captures the underlying conditions for the activity of the *Private Sector*. These variables are expected to have an important effect on medium-term growth based on the literature. First, we include the change in private investment during the episode as a percentage of total investment to capture the vitality of the private sector in stimulating productivity growth. Second, we include the cost of financing for companies and households (measured by the average difference between long-term interest rates and interbank interest rates) to proxy the cost of capital.<sup>28</sup> Last, we include a dummy (fresh capital injections) from Valencia and Leaven (2008) that takes value equal to 1 for cases where new capital injections into the banking sector were made as part of the resolution policies.

Results for the growth equation are reported in Table 7 and show that fiscal expansions do not have any statistically significant effect on GDP growth in the period following banking

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<sup>27</sup> As we focus here on the implications of fiscal responses during shock episodes on post-crisis growth, we do not include current fiscal and monetary policy variables in the equation to avoid endogeneity and collinearity among regressors. However, given the potential importance of these factors, we assessed the robustness of the results to the inclusion of the coincident fiscal deficit and short-term nominal interest rate and found that conclusions in the text are not affected.

<sup>28</sup> This variable measures the opportunity cost of investing compared to holding liquidity.

crises.<sup>29</sup> Changing the composition of government spending through higher public consumption is also not statistically significant, while an increase in public investment or a reduction in the share of income taxes are both positive for medium-term growth as they boost productivity and eliminate inefficient distortions.<sup>30</sup>

Variables controlling for the origin of the crisis and the accompanying containment and resolution policies lose statistical significance. However, variables capturing the behavior of the private sector are systematically linked with the expected sign to better economic performance. An increase in the share of private investment, a reduction in the cost of financing, and an increase in fresh capital for the banking sector all have a positive impact on medium-term output growth.

(insert Table 7)

Initial fiscal and economic conditions are key to fiscal policy effectiveness during crises. In order to isolate the potential nonlinear effects of initial levels of public debt and GDP per capita on fiscal policy performance, a new augmented specification is estimated. We include two new dummy variables: *Highly Indebted* that takes value equal to 1 when initial public sector debt as a ratio to GDP is above the sample average; and *HighGDP percapita* that takes value equal to 1 when initial GDP per capita (in PPP dollars) is above the sample average.<sup>31</sup> These variables are included in the equation in isolation and they are also interacted with the indicator of fiscal expansion and the budget composition vector.

Consistent with the expectations, the positive impact of fiscal expansions and the budget mix on crisis length weakens substantially when initial conditions are poor (Tables 8 and 9). Countries with higher debt levels and lower per capita income face a higher probability of exiting a banking crisis later than countries with stronger initial conditions. However, the impact of fiscal expansions on crisis duration is larger once initial economic and fiscal conditions are accounted for: countries with more sustainable public finances have more scope for countercyclical fiscal response during banking crises. While weak fiscal conditions do not affect post-crisis growth, countries with high initial per capita GDP tend to be associated with a better economic performance in the period immediately following the crises. In all cases, controlling for initial fiscal and economic conditions leads to higher effects of the budget composition variables on growth.

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<sup>29</sup> Results are confirmed when using the fiscal balance in the place of the fiscal expansion indicator.

<sup>30</sup> This is consistent with previous studies for a sample of crisis and noncrisis episodes (for example, Alesina et al., 2002). The fiscal mix in noncrisis periods is also found to be a significant driver of medium-term financial implications of fiscal expansions (Ardagna, 2009) and the sustainability of fiscal adjustments in emerging market economies (Gupta et al., 2005).

<sup>31</sup> Using alternative thresholds for these variables yields similar results.

(insert Table 8)

(insert Table 9)

## 5. Robustness Analysis

This section assesses the strength of the above results on the basis of three robustness analyses:

- A different definition of duration: In the baseline model, the definition of duration is based on GDP growth recovery. This means that the end of the banking crises can only be registered when output growth resumes. However, this definition may be inappropriate if the banking sector problems are resolved quickly, but GDP growth lags due to other cyclical or structural impediments. The opposite can also be true in theory as cyclical growth may resume with persistent weakness in the financial sector, therefore, the baseline definition of duration is potentially biased. As an alternative, the end of the crisis is defined as the first year in which the stock market index returns to its precrisis level. Under this definition, episodes' duration is shorter because the stock market tends to recover faster than real output in our sample. Results of regressions using the alternative definition of crisis length are robust to alternative definitions of duration (see Table 10).<sup>32</sup>
- A different measure of discretionary fiscal policy: The index of fiscal expansion created by Laeven and Valencia (2008) and used in the baseline model is appropriate for identifying sizeable fiscal expansions (those beyond 1½ percent of GDP). But this index is incapable of differentiating between fiscal expansions which are discretionary and those which are the unintended result of a dramatic collapse of GDP growth. We calculated an indicator of discretionary fiscal policy following Blanchard (1990).<sup>33</sup> Results are reported in Table 11 and show that baseline results are consistent with this new formulation.
- Testing for endogeneity between duration and fiscal policy: Since fiscal policy and output growth are correlated, baseline results could be biased due to endogeneity as GDP growth enters the definition of crisis length. In order to control for this factor, a new model is estimated using a Two-Stage Least Square (TSLS) estimator, including all other independent variables and a measure of liquidity support as instruments. Results in Table 12 suggest that the main findings hold.

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<sup>32</sup> This and other robustness results are available from authors upon request.

<sup>33</sup> Blanchard (1990) defined this indicator as follows: “the value of the primary surplus which would have prevailed, were unemployment at the same value as in the previous year, minus the value of the primary surplus in the previous year.” Both variables are expressed as a percent of GDP. When this change was greater than -1½ percent of GDP, we labeled the year as a fiscal expansion (value 1), and zero otherwise.

## 6. Conclusion

This paper assessed the effects of fiscal policy responses during 140 episodes of systemic banking crises in advanced and emerging market economies. The results indicate that timely countercyclical fiscal expansions (both due to discretionary measures and automatic stabilizers), accompanied by actions to deal with financial sector weaknesses, contribute to shortening the length of crisis episodes. During crises caused by financial sector distress, fiscal expansions increase the likelihood of earlier exit from a shock episode. Expansionary fiscal policies reduce the crisis duration by almost one year in our sample. These results hold for different definitions of crisis duration and alternative specification and estimation methods. The findings are consistent with recent studies that highlight the importance of countercyclical macroeconomic policies in response to recessions associated with financial sector problems (Classens, Kose, and Terrones, 2008; IMF, 2009b; IMF, 2009c).

Initial fiscal conditions matter for fiscal performance during shocks. In countries with high precrisis public debt levels, lack of fiscal space not only constraints the government's ability to implement countercyclical policies, but also undermines the effectiveness of fiscal stimulus and the quality of fiscal performance. In these countries, crises last almost one year longer than low-debt countries and the effect of high public debt on duration offsets the benefits of expansionary fiscal policies. Similar results are found for countries with lower per capita income, as poor implementation capacity and high macroeconomic risks limit the scope and the effects of fiscal expansions during crises (Botman and Kumar, 2006). These findings point to the importance of creating fiscal space and enhancing macroeconomic stability in tranquil times to limit the risk of falling into crises and to enhance the effectiveness of policy responses when exogenous shocks hit countries (Tavares and Valkanov, 2001). In emerging market economies, attention needs to be paid to strengthening fiscal institutions, reduce political risks and improve budget execution capacity to reap the benefits of countercyclical fiscal policies (Baldacci, Gupta, and Mati, 2011).

The composition of fiscal expansions matters for crisis length—a point that has not been studied in the literature. Stimulus packages that rely mostly on measures to support government consumption are more effective in shortening the crisis duration than those based on scaling up public investment. A 10 percentage point increase in the share of public consumption in the budget reduces the crisis length by three to four months. Reducing the share of income taxes is also less effective than lowering consumption taxes. These results suggest that tailoring the composition of fiscal response packages is important for enhancing the effectiveness of countercyclical fiscal measures in both advanced and emerging market economies (Spilimbergo et al., 2008; IMF, 2009).

Initial conditions weigh on output recovery after the crisis though. Crises can have long-term negative effects, damaging human and physical capital with negative implications for productivity and potential output growth. Early recovery from a crisis is therefore important, to minimize output losses in the short term and enhance medium-term growth prospects. This



calls for timely fiscal responses during downturns. However, fiscal policy responses may not be effective when initial fiscal conditions are poor and fiscal space is limited. High public debt levels and past macroeconomic instability limit the scope for countercyclical deficit expansions and hamper the effectiveness of fiscal stimulus measures as markets perceive the higher future fiscal risks entailed by larger deficits (Balduzzi, Corsetti, and Foresi, 1997; Uribe, 2006).

The quality of the fiscal stimulus package matters most for post-crisis growth resumption. Fiscal responses relying largely on scaling up the share of public investment in the budget show the largest positive effect on medium-term output growth. A one percent increase in the share of capital outlays in the budget raised post-crisis growth by about  $\frac{1}{3}$  of one percent per year. Income tax reductions are also associated with positive growth effects.

The results of the short-term and medium-term impacts of fiscal policy during financial crises highlight a potential trade-off between short-run aggregate demand support measures and medium-term productivity growth objectives in fiscal policy response to shocks. Implementation lags for government investment, which were documented also during the current crisis, may be, at least in part, responsible for these results. They also point to careful consideration of the composition of fiscal stimulus packages, as different short-term and medium-term fiscal multipliers can affect fiscal policy performance during the crisis and in its aftermath (Spilimbergo, Symansky, and Schindler, 2009).

The results of the paper also call for further research. Economic theory predicts that, in normal circumstances, fiscal expansions tend to crowd out private investment and increase the cost of financing for the private sector. However, the empirical findings presented here indicate that an increase in the share of public investment (as a percentage of total public spending) is compatible with an increase in the share of private investment (as a percentage of total investment) during banking crises, and both can have a positive contribution to long-term growth in the subsequent period. This constitutes a very preliminary evidence of the crowding-in effects potentially attributed to expansionary fiscal policy in situations of financial stress (Aschauer, 1989). But a proper test of this hypothesis was beyond the scope of this paper.

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## Tables and Figures

**Table 1. Period Change in Fiscal Aggregates. Descriptive Statistics**

	Mean	Std. Dev	Min	Max	Obs.
Change in Public Debt (percent of GDP)	40.60	22.55	11.12	80.34	140
Change in Budget Balance (percent of GDP)	-2.82	5.75	-31.37	15.45	140
Change in Public Revenue (percent of GDP)	2.38	13.46	-50.23	41.63	140
Ch. tax revenues (percent of total revenues)	-1.97	4.93	-16.45	8.55	140
Ch. tax from Income (percent of total revenues)	-2.40	4.03	-13.58	11.59	139
Ch. tax from Good & Services (percent of total revenues)	2.93	1.29	-5.72	13.83	139
Ch. non-tax revenues (percent of total revenues)	4.37	13.53	-48.75	37.17	140
Change in Public Expenditure (percent of GDP)	5.20	13.07	-46.95	38.25	140
Ch. public consumption (percent of total expend)	2.61	9.50	-34.55	35.21	140
Ch. public investment (percent of total expend)	2.58	6.72	-19.21	22.37	140

Source: Author's calculations based on data from WEO and GFS.

**Table 2. The Relationship Between Government Balance and Duration. Simple Regressions**

	Duration of crisis			
	Coef.	T-stat	R-sq	Obs.
Change in the budget balance over crisis episode	0.071***	3.35	0.075	140
Expansionary budget balance (Laeven&valencia)	1.033***	-4.16	0.111	140

\*\*\* significant at 1 percent \*\* significant at 5 percent; \* significant at 10 percent

**Table 3. The Relationship Between Composition of the Budget and Duration. Simple Regressions**

	Duration of crisis			
	Coef.	T-stat	R-sq	Obs.
Ch. in total public expenditures over crisis episode	-0.042***	-4.72	0.139	140
Ch. public consumption (percent of total expenditures)	-0.042***	-3.33	0.074	140
Ch. public investment (percent of total expenditures)	-0.075***	-4.24	0.115	140
Ch. in total public revenues over crisis episode	0.043***	-5.04	0.155	140
Ch. tax revenues (percent of total revenue)	0.099***	4.1	0.109	140
Ch. tax from Income (percent of total revenues)	0.128***	4.33	0.121	139
Ch. tax from Good & Services (percent of total revenues)	0.078*	1.82	0.024	139
Ch. non-tax revenues ((percent of total revenues)	-0.042***	-4.84	0.145	140

\*\*\* significant at 1 percent; \*\* significant at 5 percent; \* significant at 10 percent



**Table 4. The Relationship Between Composition of the Budget and Post-Growth. Simple Regressions**

	Average Growth (t-t+5)			
	Coef.	T-stat	R-sq	Obs.
Ch. in total public expenditures over crisis episode	0.098***	4.57	0.132	140
Ch. public consumption (percent of total expenditures)	0.430	1.37	0.014	140
Ch. public investment (percent of total expenditures)	0.283***	7.55	0.293	140
Ch. in total public revenues over crisis episode	0.088***	4.22	0.115	140
Ch. tax revenues (percent of total revenues)	0.081	-0.43	0.001	140
Ch. tax from Income (percent of total revenues)	-0.253***	-3.54	0.084	139
Ch. tax from Good & Services (percent of total revenues)	0.317***	3.2	0.070	139
Ch. non-tax revenues (percent of total revenues)	0.081***	3.86	0.097	140

\*\*\* significant at 1 percent; \*\* significant at 5 percent; \* significant at 10 percent

Note: Post-Growth defined as average GDP growth rate during the next 5 years after end of the crisis

**Table 5. The Relationship Between Fiscal Policy, Resolution Policies and Duration. Multiple Regressions**

	Duration (OLS)		Duration (Ord.Logit)	
	Model 1	Model 2	Model 3	Model 4
ΔBudget Balance(percent GDP)	0.537*** (2.98)		0.083*** (2.62)	
Expansionary fiscal policy		0.665*** (-3.03)		-0.932*** (-2.63)
Previous Credit boom	0.829*** (4.04)	0.755*** (3.65)	1.217*** (3.67)	1.113*** (3.33)
Deposit freeze or guarantee	-0.608*** (-2.89)	-0.603*** (-2.87)	-0.766** (-2.32)	-0.714** (-2.15)
Number of banks closed	-0.163*** (-3.40)	-0.147*** (-3.03)	-0.394*** (-4.49)	-0.374*** (-4.27)
Government intervention	-0.632*** (-2.95)	-0.690*** (-3.24)	-0.827** (-2.39)	-0.894** (-2.59)
Constant	3.424*** (15.35)	3.728*** (14.61)		
Observations	139	139	139	139
Adj. R-squared / Pseudo R-squared	0.357	0.358	0.155	0.154

\*\*\* significant at 1 percent; \*\* significant at 5 percent; \* significant at 10 percent

**Table 6. The Relationship Between Composition of the Budget, Resolution Policies and Duration. Multiple Regressions**

	Duration of crisis (OLS)				Duration of crisis (Ord.Logit)			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Expansionary fiscal policy	-0.602*** (-2.72)	-0.629*** (-2.90)	-0.585*** (-2.75)	-0.654*** (-2.97)	-0.880** (-2.46)	-0.898** (-2.53)	0.805** (-2.26)	-0.903** (-2.55)
ΔPublic consumption (percent of total expenditures)	-0.019* (-1.70)				-0.017 (-1.02)	-0.041* (-1.71)		
ΔPublic investment (percent of total expenditures)		-0.035** (-2.22)						
ΔIncome tax revenue (percent of total revenues)			0.086*** (3.40)				0.138*** (-3.03)	
ΔGoods&services tax revenue (percent of total revenues)				0.034 (0.97)				0.063 (-1.09)
Previous Credit boom	0.728*** (3.53)	0.715*** (3.49)	0.692*** (3.45)	0.741*** (3.56)	1.092*** (3.26)	1.102*** (3.29)	1.087*** (-3.23)	1.094** (-3.27)
Deposit freeze or guarantee	-0.614*** (-2.94)	-0.514** (-2.44)	-0.479** (-2.32)	-0.609*** (-2.88)	-0.724** (-2.18)	-0.605* (-1.79)	-0.583* (-1.72)	-0.745** (-2.23)
Number of banks closed	-0.137*** (-2.82)	-0.129*** (-2.66)	-0.134*** (-2.85)	-0.141*** (-2.86)	-0.362*** (-4.09)	-0.355*** (-1.79)	-0.340*** (-3.86)	-0.361*** (-4.07)
Government intervention	-0.640*** (-3.00)	-0.661*** (-3.15)	-0.748*** (-3.63)	-0.699*** (-3.27)	-0.851** (-2.45)	-0.880** (-2.54)	-1.009*** (-2.86)	-0.930*** (-2.68)
Constant	3.700*** (14.57)	3.712*** (14.75)	3.867*** (15.48)	3.717*** (14.32)				
Observations	139	139	138	138	139	139	138	138
Adj. R-squared / Pseudo R-squared	0.367	0.376	0.407	0.360	0.157	0.161	0.177	0.158

\*\*\* significant at 1 percent; \*\* significant at 5 percent; \* significant at 10 percent

**Table 7. The Relationship Between Composition of the Budget, Resolution Policies and LT-Growth. Multiple Regressions**

	Average Growth (t-t+5) (OLS)				Average Growth (t-t+5) (Robust)			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Discretionary Expansionary fiscal policy	0.072 (0.11)	-0.326 (-0.58)	-0.072 (-0.12)	0.078 (0.14)	0.072 (0.13)	-0.326 (-0.77)	-0.003 (-0.01)	0.131 (0.27)
ΔPublic consumption (percent of total expenditures)	-0.000 (-0.00)				-0.001 (-0.01)			
ΔPublic investment (percent of total expenditures)		0.243*** (5.93)				0.245*** (5.54)		
ΔIncome tax revenue (percent of total revenues)			-0.170** (-2.30)				-0.169** (-2.41)	
ΔGoods&services tax revenue (percent of total revenues)				0.370*** (3.96)				0.370*** (4.15)
Previous Credit boom	-0.078 (-0.14)	0.245 (0.48)	0.0256 (0.05)	-0.102 (-0.19)	-0.078 (-0.14)	0.245 (0.52)	0.033 (0.06)	-0.095 (-0.18)
Deposit freeze or guarantee	1.415** (2.39)	0.855 (1.60)	1.102* (1.83)	1.415** (2.50)	1.415** (2.55)	0.855** (1.87)	1.091* (1.98)	1.413*** (2.69)
Number of banks closed	0.203 (1.48)	0.125 (1.03)	0.174 (1.30)	0.279** (2.14)	0.203* (1.89)	0.125 (1.45)	0.173 (-1.6)	0.276*** (-2.81)
Government intervention	-0.240 (-0.40)	-0.353 (-0.67)	-0.137 (-0.23)	-0.216 (-0.38)	-0.239 (-0.43)	-0.353 (-0.73)	-0.142 (-0.27)	-0.215 (-0.42)
ΔPrivate Investment (percent of total Investment)	0.438 (0.74)	0.830 (1.58)	0.115 (0.17)	0.014 (0.02)	0.438 (1.38)	0.830*** (2.98)	0.100 (0.27)	0.002 (0.01)
ΔCost of financing (a)	-0.127*** (-3.35)	-0.075** (-2.19)	-0.120*** (-3.23)	-0.124*** (-3.47)	-1.274** (-2.12)	-0.075 (-1.36)	-0.121** (-2.03)	-0.124** (-2.21)
Fresh capital injections into financial sector	1.270** (2.14)	0.833 (1.58)	1.159** (1.99)	1.287** (2.30)	1.270** (2.18)	0.833* (1.85)	1.163** (2.15)	1.279** (2.39)
Constant	2.168*** (2.90)	2.384*** (3.62)	2.065*** (2.87)	1.901*** (2.74)	2.168*** (3.19)	2.384*** (4.12)	2.035*** (2.96)	1.871*** (3.00)
Observations	139	139	138	138	139	139	138	138
Adj. R-squared	0.134	0.319	0.168	0.228	0.190	0.363	0.222	0.278

\*\*\* significant at 1 percent; \*\* significant at 5 percent; \* significant at 10 percent

Dependent Variable: average GDP growth in the 5 years following the end of the crisis

Note (a): the cost of financing variable is an average of the lending interest rates and the interbank interest rates

Source: Authors' estimates

**Table 8. Robustness Estimations. Explaining Duration and Controlling for Initial Fiscal and Economic Conditions.**

	Duration of crisis			
	Model 1	Model 2	Model 3	Model 4
Expansionary fiscal policy	-0.340 (-1.16)	-0.394 (-1.33)	-0.322 (-1.03)	-0.328 (-1.09)
Expansionary fiscal policy* HighlyIndebted (t-1)	-0.715* (-1.68)	-0.672 (-1.57)	-0.696 (-1.66)	-0.695 (-1.57)
ΔPublic consumption (percent of total expenditures)	-0.050*** (-2.79)			
ΔPublic consumption* HighlyIndebted (t-1)	0.041* (1.79)			
ΔPublic investment (percent of total expenditures)		-0.059** (-2.38)		
ΔPublic Investment* HighlyIndebted (t-1)		0.031 (0.97)		
ΔIncome tax revenue (percent of total revenues)			0.096*** (2.70)	
ΔIncome tax revenue* Highly Indebted (t-1)			-0.025 (-0.47)	
ΔGoods&services tax revenue (percent of total revenues)				0.049 (0.84)
ΔGoods&services tax revenue * Highly Indebted (t-1)				-0.043 (-0.58)
Previous Credit boom	0.644*** (3.10)	0.668*** (3.22)	0.599*** (2.89)	0.661*** (3.07)
Deposit freeze or guarantee	-0.633*** (-3.01)	-0.545** (-2.55)	-0.518** (-2.44)	-0.676*** (-3.12)
Number of banks closed	-0.142*** (-2.95)	-0.138*** (-2.84)	-0.149*** (-3.04)	-0.151*** (-3.01)
Government intervention	-0.573*** (-2.68)	-0.574*** (-2.62)	-0.709*** (-3.30)	-0.693*** (-3.16)
Highly Indebted (t-1)	0.948*** (2.80)	0.939*** (2.76)	0.868** (2.58)	0.872** (2.44)
GDP per capita (t-1)	-7.28e-06* (-1.84)	-5.65e-06 (-1.43)	-5.83e-06 (-1.48)	-6.79e-06 (-1.66)
Constant	3.577*** (10.31)	3.544*** (10.18)	3.771*** (10.73)	3.654*** (9.988)
Observations	133	133	132	132
Adj. R-squared	0.409	0.405	0.423	0.376

\*\*\* significant at 1 percent; \*\* significant at 5 percent; \* significant at 10 percent

**Table 9. Robustness Estimations. Post-Growth and Controlling for Initial Fiscal and Economic Conditions.**

	Average Growth (t-t+5) (OLS)			
	Model 1	Model 2	Model 3	Model 4
Expansionary fiscal policy	-0.476 (-0.81)	-0.480 (-0.97)	-0.645 (-1.11)	-0.514 (-0.99)
Expansionary fiscal policy* HighlyIndebted (t-1)	0.684 (0.77)	0.116 (0.16)	0.474 (0.57)	1.078 (1.40)
ΔPublic consumption (percent of total expenditures)	-0.025 (-0.60)			
ΔPublic consumption* HighlyIndebted (t-1)	0.027 (0.51)			
ΔPublic investment (percent of total expenditures)		0.264*** (5.36)		
ΔPublic Investment* HighlyIndebted (t-1)		-0.040 (-0.64)		
ΔIncome tax revenue (percent of total revenues)			-0.155* (-1.95)	
ΔIncome tax revenue* Highly Indebted (t-1)			-0.088 (-0.78)	
ΔGoods&services tax revenue (percent of total revenues)				0.605*** (5.12)
ΔGoods&services tax revenue * Highly Indebted (t-1)				-0.343*** (-2.27)
Previous Credit boom	0.121 (0.25)	0.355 (0.88)	0.279 (0.59)	0.024 (0.05)
Deposit freeze or guarantee	1.256** (2.51)	0.640 (1.52)	0.855* (1.73)	1.059** (2.39)
Number of banks closed	0.193* (1.71)	0.134 (1.43)	0.141 (1.25)	0.278*** (2.75)
Government intervention	-0.346 (-0.69)	-0.615 (-1.431)	-0.205 (-0.416)	-0.527 (-1.190)
ΔPrivate Investment (percent of total investment)	0.554 (1.12)	0.772* (1.87)	0.120 (0.22)	0.122 (0.24)
ΔCost of financing (a)	-0.082** (-2.55)	-0.021 (-0.77)	-0.074** (-2.41)	-0.062** (-2.20)
Fresh capital injections into financial sector	0.917* (1.82)	0.487 (1.17)	0.776 (1.61)	0.796* (1.80)
Highly Indebted (t-1)	0.016 (0.02)	-0.110 (-0.18)	0.123 (0.17)	-0.774 (-1.17)
GDP per capita (t-1)	-7.23e-06 (-0.77)	-8.97e-06 (-1.16)	-8.41e-06 (-0.93)	-8.78e-06 (-1.06)
Constant	2.758*** (3.39)	3.143*** (4.65)	2.688*** (3.44)	3.125*** (4.31)
Observations	133	133	132	132
Adj. R-squared	0.087	0.375	0.161	0.283

\*\*\* significant at 1 percent; \*\* significant at 5 percent; \* significant at 10 percent

**Table 10. Robustness Estimations. A Different Definition of Duration Based on Stock Market Recovery**

	Duration of crisis (b)			
	Model 1	Model 2	Model 3	Model 4
Expansionary fiscal policy	-0.859*** (-4.55)	-0.892*** (-4.76)	-0.843*** (-4.57)	-0.883*** (-4.71)
ΔPublic consumption (percent of total expenditures)	-0.069 (-1.15)			
ΔPublic investment (percent of total expenditures)		-0.00364 (-0.27)		
ΔIncome tax revenue (percent of total revenues)			0.051** (2.30)	
ΔGoods&services tax revenue (percent of total revenues)				0.008 (0.28)
Previous Credit boom	0.384** (2.19)	0.396** (2.24)	0.357** (2.05)	0.386** (2.18)
Deposit freeze or guarantee	-0.210 (-1.18)	-0.195 (-1.07)	-0.138 (-0.77)	-0.216 (-1.20)
Number of banks closed	-0.070* (-1.69)	-0.074* (-1.76)	-0.069* (-1.69)	-0.0756* (-1.81)
Government intervention	-0.373** (-2.05)	-0.399** (-2.20)	-0.442** (-2.48)	-0.415** (-2.29)
Constant	2.949*** (13.61)	2.963*** (13.64)	3.057*** (14.13)	2.981*** (13.51)
Observations	139	139	138	138
Adj. R-squared	0.275	0.268	0.297	0.269

\*\*\* significant at 1 percent; \*\* significant at 5 percent; \* significant at 10 percent

**Table 11. Robustness Estimations. Focusing on Discretionary Expansionary fiscal policy**

	Duration of crisis			
	Model 1	Model 2	Model 3	Model 4
Discretionary Expansionary fiscal policy	-0.484** (-2.25)	-0.526** (-2.50)	-0.459** (-2.20)	-0.530** (-2.45)
ΔPublic consumption (percent of total expenditures)	-0.020* (-1.81)			
ΔPublic investment (percent of total expenditures)		-0.037** (-2.34)		
ΔIncome tax revenue (percent of total revenues)			0.087*** (3.40)	
ΔGoods&services tax revenue (percent of total revenues)				0.034 (0.96)
Previous Credit boom	0.738*** (3.55)	0.723*** (3.50)	0.705*** (3.48)	0.754*** (3.59)
Deposit freeze or guarantee	-0.597*** (-2.82)	-0.487** (-2.28)	-0.463** (-2.20)	-0.590*** (-2.75)
Number of banks closed	-0.145*** (-2.98)	-0.137*** (-2.81)	-0.142*** (-3.02)	-0.151*** (-3.05)
Government intervention	-0.627*** (-2.91)	-0.648*** (-3.06)	-0.740*** (-3.55)	-0.689*** (-3.19)
Constant	3.601*** (14.55)	3.618*** (14.76)	3.765*** (15.40)	3.611*** (14.22)
Observations	139	139	138	138
Adj. R-squared	0.356	0.366	0.395	0.347

\*\*\* significant at 1 percent; \*\* significant at 5 percent; \* significant at 10 percent

**Table 12. Robustness Estimations. Controlling for endogeneity (2SLS estimations)**

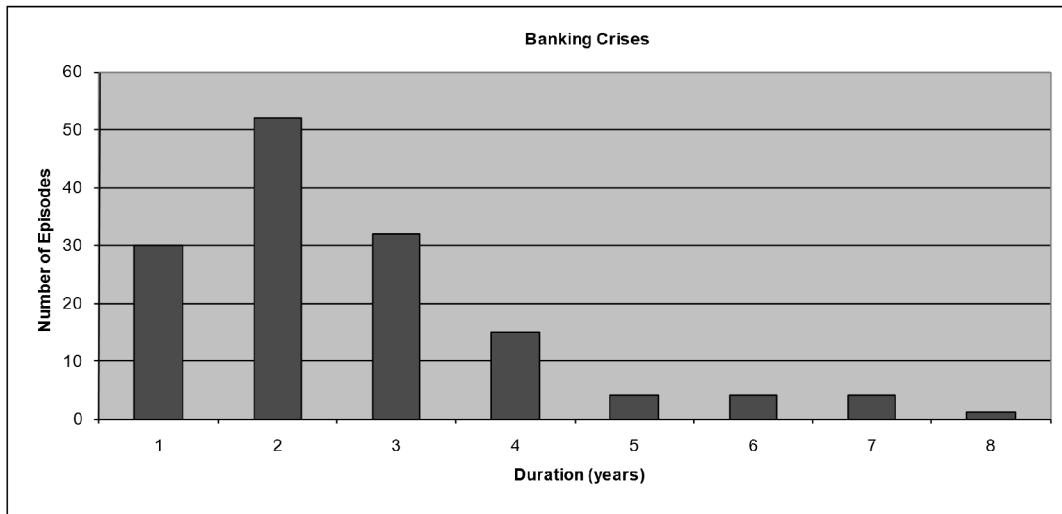
	Duration of crisis			
	Model 1	Model 2	Model 3	Model 4
Expansionary fiscal policy	-0.602*** (-2.72)	-0.629*** (-2.90)	-0.585*** (-2.75)	-0.654*** (-2.97)
ΔPublic consumption (percent of total expenditures)	-0.019* (-1.70)			
ΔPublic investment (percent of total expenditures)		-0.035** (-2.22)		
ΔIncome tax revenue (percent of total revenues)			0.086*** (3.40)	
ΔGoods&services tax revenue (percent of total revenues)				0.034 (-0.97)
Previous Credit boom	0.728*** (3.53)	0.715*** (3.49)	0.692*** (3.45)	0.741*** (3.56)
Deposit freeze or guarantee	-0.614*** (-2.94)	-0.514** (-2.44)	-0.479** (-2.32)	-0.609*** (-2.88)
Number of banks closed	-0.137*** (-2.82)	-0.129*** (-2.66)	-0.134*** (-2.85)	-0.141*** (-2.86)
Government intervention	-0.640*** (-3.00)	-0.661*** (-3.15)	-0.748*** (-3.63)	-0.699*** (-3.27)
Constant	3.700*** (14.57)	3.712*** (14.75)	3.867*** (15.48)	3.717*** (14.32)
Observations	139	139	138	138
Adj. R-squared	0.367	0.376	0.407	0.360

\*\*\* significant at 1 percent; \*\* significant at 5 percent; \* significant at 10 percent

Note: Instrumented variable: Expansionary fiscal policy; Instrument: Liquidity Support

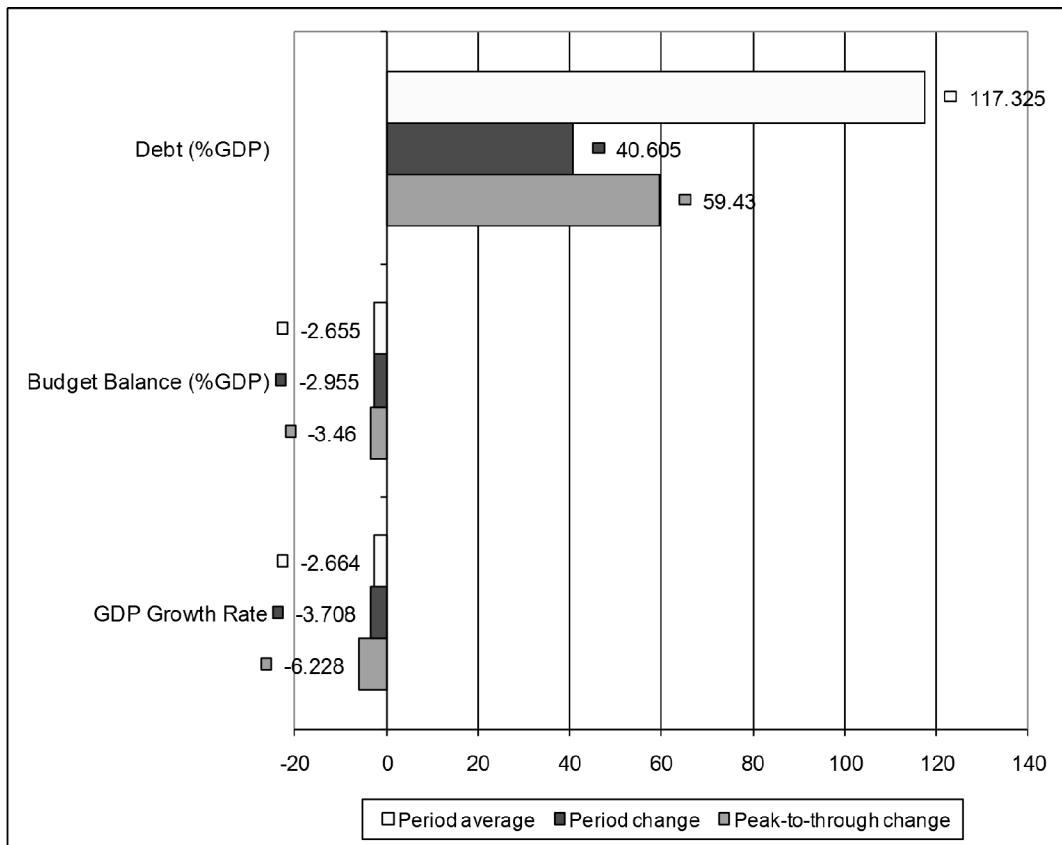


**Figure 1. Frequency and Duration of Banking Crises**



Source: Authors' calculations.

**Figure 2. Economic Consequences of Banking Crises**



Source: Authors' calculations.

Note: Peak-to-trough values are differences between the worst level reached by the variables during the crisis and their pre-crisis value. Period changes denote differences between the last year of the crisis and the pre-crisis year. Period averages show the average value of the variable during the crisis episodes.

Figure 3. Fiscal Policy and Duration of crisis

