# The Real Effects of Financial Sector Interventions During Crises

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**Abstract:** We collect new data to assess the importance of supply-side credit market frictions by studying the impact of financial sector recapitalization packages on the growth performance of firms in a large cross-section of 50 countries during the recent crisis. We develop an identification strategy that uses the financial crisis as a shock to credit supply and exploits exogenous variation in the degree to which firms depend on external financing for investment needs, and focus on policy interventions aimed at alleviating the bank capital crunch. We find that the growth of firms dependent on external financing is disproportionately positively affected by bank recapitalization policies, and that this effect is quantitatively important and robust to controlling for other financial sector support policies. We also find that fiscal policy disproportionately boosted the growth of firms more dependent on external financing. These results provide new evidence of a quantitatively important role of credit market frictions in influencing real economic activity.

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## 1. Introduction

Three decades ago, skepticism in the economics profession about the relevance of financial factors for real economic activity prevailed. Such view stemmed from the implications of Modigliani and Miller (1958) that, in frictionless markets, a firm's cost of capital is independent from its financial structure. Since then, most economists have accepted that the presence of financial frictions arising from information asymmetries and bankruptcy risk imply that financial factors matter for real economic decisions.

Most of the debate is now centered on the quantitative importance of these frictions, how they operate, and the extent to which they are supply or demand driven. The recent global financial crisis, and the global deleveraging process that ensued, offers perhaps the most convincing evidence to date of the economic relevance of financial frictions, their real effects, and the role of economic policy in mitigating them.

This paper contributes to the literature on financial frictions and their macroeconomic importance. In particular, we focus on supply-side credit market frictions and look at the real effects of financial sector recapitalization policies implemented by numerous countries during the height of the crisis. In pursuing this analysis, we collect new and comprehensive cross-country data on resolution policies that capture the intensity of government measures across countries, allowing us to quantify their economic importance, unlike previous studies that examined the effectiveness of resolution policies using a binary approach.

We develop a novel identification strategy that uses the global financial crisis as a shock to the supply of credit and exploits exogenous variation in the degree to which firms depend on external financing, appealing to a widely used measure of external finance dependence developed by Rajan and Zingales (1998). Identification is further achieved by

focusing on recapitalization measures that targeted the financial sector directly and thus had a direct impact on the supply of credit. We test whether the growth of firms in industries that are more financially dependent on external finance is boosted more by the distinct measures put in place. Because bank recapitalization has no direct impact on firms' value added, we argue that its effect on firms' value added takes place through the supply of credit.

The critic may observe that this empirical strategy is problematic because government interventions are potentially an endogenous response to real economic activity. However, our empirical strategy is valid as long as the endogeneity of government policies is not correlated with dependence on external finance. While we agree that government policies (such as bank bailouts) may respond to credit demand shocks and pressure from non-financial firms to support lending activity, we think it is unlikely that government policy responds disproportionally to pressure from financially dependent firms as opposed to firms that are not financially dependent. To lend support to this claim and our empirical strategy we show that the intensity of government policies during the crisis is not correlated with the fraction of financially dependent firms in the country.

We address obvious simultaneity problems by controlling for other government interventions that potentially offered relief to banks, including guarantees, asset purchases, and liquidity support. These measures offered alternative ways to alleviate the effects of the capital crunch of banks. Similarly, we also control for monetary and fiscal policy actions, which helped both firms and banks through lowering the cost of funds and by stimulating domestic demand. Remaining simultaneity concerns are addressed through country and industry level fixed effects.

Our outcome variable of interest is real growth in value added, paralleling the work by Rajan and Zingales (1998). While their work was conducted at the industry level, the unavailability of recent industry level data impedes us from proceeding in the same way, and we therefore opt for constructing comparable measures at the firm level.[1] Using firm level data has the added advantage that we can control for firm specific factors.

We compare the value added growth performance of firms over the year 2009 in response to crisis policies announced during the period September 2008 and March 2009, which coincides with the period during which the crisis spread from the United States to other countries and during which countries announced the lion share of their crisis response policies. This is also the period following the collapse of U.S. investment bank Lehman Brothers in September 2008 and before the announcement of the bank stress test results in the United States in May 2009. Our sample consists of a large cross-section of firms from 50 countries in both advanced and emerging market economies.

We find statistically significant and economically important results that reject the null hypothesis of no frictions in the supply side of credit. Recapitalization of the banking sector turns out to significantly and disproportionately affect the growth performance of financially dependent firms, and this result survives a large number of robustness checks. The remaining financial sector intervention policies—guarantees, asset purchases, and liquidity support—are not individually significant, but all financial sector resolution policies are jointly significant.

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[1] The industry level data used in Rajan and Zingales (1998) is updated with a substantial lag. As of the writing of this paper, the latest data point for most countries was only 2008.

We also find that fiscal policy was much more effective than monetary policy in mitigating the effects of the crisis on financially dependent firms. Our result on fiscal policy is consistent with findings in a recent paper by Aghion et al. (2009), who also use the Rajan and Zingales (1998) approach to find that countercyclical fiscal policy helps more firms that are more financially dependent. Our paper differs from their work both in focus and scope. While we control for the impact on fiscal policy, our focus is on direct financial sector intervention policies, notably the impact of bank recapitalization. Aghion et al. (2009) focus on the impact of countercyclical fiscal policy on growth, covering a period ending before the crisis started.

Our paper contributes to the literature by offering new evidence on the relevance of financial frictions in the supply side of credit markets. Existing studies in this branch of the literature have shown that the financial conditions of the lender matter for lending decisions. Kashyap and Stein (2000) have found that the impact of monetary policy shocks on lending is stronger for banks with less liquid balance sheets, while Bernanke and Lown (1991), Peek and Rosengren (1995), and Hancock and Wilcox (1994) each present evidence consistent with the hypothesis that bank lending is curtailed when bank capital is low or when the banking sector has suffered significant capital losses. These studies, however, are not conclusive regarding the real effects of changes in the supply of credit.

A related strand of the literature goes a step further and identifies real effects stemming from exogenous changes in banks' financial conditions. Klein et al. (2002) and Peek and Rosengren (1997, 2000) exploit the losses faced by Japanese banks from the collapse of the Japanese stock market as an exogenous shock to the United States and show it had real consequences by curtailing credit. They estimate an important economic effect of

this shock transmitted through lending by Japanese banks' subsidiaries in the United States and Japanese foreign direct investments into the United States. Ashcraft (2005) uses the closures of healthy subsidiaries of a failed banking holding company as an exogenous disruption in the supply of credit and finds important economic effects in the corresponding local county income. Peek et al. (2003) identify loan supply shocks using CAMEL ratings of U.S. banks and find that bank health has economically significant effects on the U.S. economy. Moreover, they also find that their loan supply measure is particularly important for understanding movements in inventories.

In a cross-country setting, Kroszner et al. (2007) and Dell'Ariccia et al. (2008) examine the real effects of banking crises and find that economic sectors more dependent on external finance suffer more during a banking crisis.

Our paper also contributes to the literature on the mitigating real effects of bank financial sector support packages following a financial shock. Recent theoretical literature on government interventions to support banks following financial shocks includes Philippon and Schnabl (2010) who characterize efficient bank recapitalizations when there is debt overhang in the financial sector, and Farhi and Tirole (2009) who examine government bailouts of banks in a setting in which private leverage choices exhibit strategic complementarities due to the monetary policy reaction.

Empirical literature on the real effects of banking interventions is sparse and inconclusive. For example, Dell'Ariccia et al. (2008) find no statistically significant support for the hypothesis that standard government intervention policies such as blanket guarantees and bank recapitalizations were successful in mitigating the effects of the crisis. Similarly, Claessens et al. (2005) find that policies to support the banking system do not seem to reduce

the output cost of banking crises. Detragiache and Ho (2009), on the other hand, find that policies that increased fiscal outlays were associated with lower real GDP growth during a crisis. Klingebiel et al. (2001) assess stock market responses to bank restructuring policies and find that public interventions in banks are largely ineffective. None of these empirical studies controls for the intensity of government interventions, and most cover only a small sample of countries, which may explain the inconclusive findings.

A recent paper by Giannetti and Simonov (2009) conducts a firm-level country case study to explore the real effects of bank bailouts during the Japanese crisis. They find that government recapitalizations increase returns for borrowers of recipient banks, which is consistent with our findings on the real effects of bank recapitalizations in a large cross-section of countries.

The paper is organized as follows. Section 2 summarizes the policy measures we examine in this paper; Section 3 elaborates on the methodology; Section 4 describes the dataset employed; Section 5 presents the empirical findings; Section 6 shows robustness exercises of the results; and Section 7 concludes.

**2. Policy Intervention Measures**

A negative bank capital shock causes a capital crunch, which in turn leads to a disruption in the supply of credit (Peek and Rosengren, 1995, and Valencia, 2008). Therefore, our focus is on policies that replenish bank capital. Policy options to alleviate the impact of a capital crunch on the supply of credit range from direct measures to recapitalize banks to macroeconomic stabilization policies (fiscal and monetary policy) that support the supply of credit indirectly through their effects on aggregate demand and asset prices.

In this section, we review the policies that were used in the context of the current crisis, building on the classification of crisis intervention policies proposed by Laeven and Valencia (2008). These policies are similar to those used in previous banking crises, as documented in Claessens et al. (2005) and Laeven and Valencia (2010).[2]

The most direct way to alleviate a capital crunch is through direct capital injections. Public sector recapitalizations, mostly in the form of common and preferred stocks, took place in roughly half of the countries in our sample (Figure 1). Many countries pledged significant amounts, using on average roughly half of the initially committed resources. This is our key variable of interest.

However, there are alternative ways to alleviate the effects of a capital crunch and these other options are commonly used around the same time as bank recapitalization policies are announced. These policies include asset purchases, guarantees, and liquidity support. These alternatives do not offer capital support, but also alleviate disruptions in the supply of credit.

Asset purchases are implemented by central banks or Treasury departments and can entail a broad range of asset classes, including performing assets such as long-term government bonds and mortgage-backed securities as well as non-performing and illiquid instruments. Our measure of asset purchases includes only those conducted by the Treasury. We exclude purchases of mortgage-backed securities and long-term government bonds by central banks because their effects are captured by our alternative measure of monetary

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[2] Laeven and Valencia (2008) also mention other types of interventions, such as deposit freezes and bank holidays, which were not used in this crisis and are therefore not included in our analysis. We refer to Laeven and Valencia (2010) for a more detailed description of policy interventions adopted during banking crises, and for differences in the frequency with which different policies were employed in recent crisis episodes compared to past crisis episodes.

policy, the change in the money base. It is worth highlighting, however, that until 2009, only a handful of Central Banks in our sample conducted operations in this area: the U.S. Federal Reserve Bank, the Bank of England, the Bank of Japan, the Swiss National Bank, and the Reserve Bank of Australia. Asset purchases provide liquidity to banks and help sustain asset prices and thus avoid losses from the sale of assets at fire sale prices. The use of asset purchases was significant in some countries in our sample (Figure 1). For example, they were substantial in Norway where the government announced that it would purchase assets from banks in the order of 13.8 percent of GDP.

Guarantees and liquidity support are more typically deployed at the earlier stages of a crisis, when it is difficult to assess the extent to which the turmoil is due to liquidity or solvency problems. This period is commonly referred to as the crisis containment phase (Calomiris et al., 2003). These policies can also be seen as alternative ways to alleviate the effects of a capital crunch because they improve access to funding for banks in turbulent times.

Figure 1 shows the total amount of liquidity injected into the banking system by country over the period September 2008 to March 2009, measured as the change in the claims of central banks again financial institutions and normalized by GDP.[3] This measure reflects the quantitative impact of all actions taken from the traditional discount window to the broadening of collateral for accessing liquidity support, and the creation of new facilities. For countries such as Luxembourg, Ireland, Iceland, and Belgium, the injections were sizable given the size of their corresponding banking systems.

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[3] The data section of the paper offers more detailed descriptions on how variables are constructed and their corresponding sources.

Figure 1 also illustrates the size of guarantees. Guarantees comprise mainly bank liabilities, but occasionally have been used for non-banks—as it was the case for money market funds in the United States—and bank assets. Guarantees on assets were used mainly in Europe (see Boudghene et al., 2010 for detailed cases in Europe) and generally take the form of covering the losses on a portfolio of assets, after a first loss tranche covered by the financial institution, while guarantees on bank liabilities were used more widespread.

Guarantees on bank liabilities usually range from deposits to all liabilities, usually excluding subordinated debt. Guarantees have also taken the form of government programs to support credit to small and medium-sized firms, as was the case in Korea, Singapore, Malaysia, and Israel in our sample. These programs are included in our asset guarantee measure, although they were small in overall magnitude compared to other measures taken. Furthermore, these schemes do not directly benefit the firms in our sample given that we focus on the growth of large and listed firms.

The financial sector policies we described (and reported in Table 1) include the most significant explicit actions taken by governments, which have also been popular in the past (Laeven and Valencia, 2008).[4] However, during this crisis policymakers also deployed significant support through monetary and fiscal stimulus packages.[5] The last two charts in Figure 2 illustrate the responses in terms of discretionary fiscal policy and monetary policy

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[4] Implicit support may also have an impact on firms' actions through the perception that banks will be bailed out. To the extent that governments signal the support they are willing to provide to the financial sector through their explicit measures, our variables will capture also the role implicit support may have in improving the supply of credit.

[5] Laeven and Valencia (2010) note that a difference between the policy response in the recent crises relative to past crises is the substantial support from fiscal and monetary policy. In past crises, that were concentrated among emerging and developing countries, monetary policy was typically tightened to defend the domestic currency, while fiscal space and the capacity to finance a large deficit were usually limited, leaving little room to support the real economy and the financial sector through expansionary monetary or fiscal policy.

used by policymakers in the countries in our sample. The focus on discretionary policy follows from our interest in measuring the impact of policy actions, isolating the impact of the depth of the recession.

The cross-sectional variation is significant, with fiscal impulses ranging from a 9 percent expansion in Nigeria to a 16 percent contraction in Latvia. These numbers include the cumulative fiscal impulses announced in late 2008 or early 2009 for the 2008 to 2010 period (see Section 4). Most countries relaxed monetary policy significantly, but some had to tighten it in response to currency pressures, as seen in Figure 2.

We focus our analysis on interventions between September 2008 and March 2009, which comprise the majority of all actions taken. While signs of distress were felt as early as the first half of 2007 (e.g. problems at HSBC, New Century, and Bear Sterns funds)  it was not until the collapse of Lehman Brothers, in September 2008, when policy intervention escalated significantly in the United States and elsewhere.[6]

In reviewing all the measures that were put in place in response to the global turmoil, it is worth emphasizing the richness of the sample we analyze in this paper, which is a clear advantage over past studies assessing the impact of crisis resolution policies. As illustrated by the figures discussed above, we quantify not only the scope but also the intensity of the support provided to the financial system—as opposed to using the binary approach taken in earlier work (e.g., Claessens et al., 2005 and Dell'Ariccia et al., 2008) which only captures the range of interventions taken.

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[6] A detailed timeline of domestic and international events is maintained by the Federal Reserve Bank of New York, from which the intensification of the policy intervention in the fourth quarter of 2008 becomes evident. The timeline is available at http://www.ny.frb.org/research/global_economy/policyresponses.html.

We also contribute to the literature by including not only crisis countries but also countries that did not experience a crisis in our sample. The latter countries include those in which financial systems were unaffected and those in which policies were implemented preemptively and helped to avoid a financial crisis. Some of these countries implemented significant monetary or fiscal stimuli, while others did not change policy in a major way. Adding these "no crisis" countries to our sample mitigates concerns that results are driven by a selection bias that arises when only analyzing countries that ended up experiencing a systemic financial crisis.

Our paper is the first to quantify and then analyze the real effects of a comprehensive set of key policy measures taken during the recent global financial crisis in a broad cross-section of crisis and non-crisis countries.

## 3. Empirical Strategy

Our interest is in measuring the impact of financial sector intervention on growth. However, using standard cross-country regressions to analyze this question is subject to an obvious endogeneity problem, since policy responses are endogenous to the macroeconomic environment.

We overcome this problem by appealing to the work by Rajan and Zingales (1998). They use industry-level data on growth in a cross-section of countries to study whether real growth in value added of industries that are more dependent on external financing is relatively higher in countries that have more developed financial systems. Compared to standard cross-country regressions, their approach is less subject to criticism regarding an omitted variable bias or model specification. The reason is that by focusing on within-

country differences among industries based on an interaction between a country and industry

characteristic, their approach allows for the correction of unobserved, time-invariant country

and industry characteristics.

We depart, however, from their original strategy in that we construct value-added

growth measures at the firm level instead of the industry level. The main reason for this

departure is that industry-level data on value added growth, including from the United

Nations database on Industrial Statistics which is the database used by Rajan and Zingales

(1998), is not yet available for a sufficiently large number of countries, given the time lag

with which such is collected. However, this departure has the added advantage that it allows

for the inclusion of firm controls and further strengthens identification by mitigating

concerns about reverse causality, since it is highly unlikely that country level policy

responses are driven in a systematic way by individual firm's value-added growth prospects.

We estimate the following regression model:

$$g_{i,k} = \alpha_j + \alpha_k + \beta_1 ED_j \cdot G_k + \beta_2 X_{i,k} + \varepsilon_{i,k} \tag{1}$$

The dependent variable in equation (1), $g_{i,k}$, is annual growth rate in real value added

(in percentages) of firm $i$ in country $k$ during the year 2009. Our primary variable of interest,

$ED_j \cdot G_k$, is the interaction between industry $j$'s dependence on external financing and a

vector of country-level government interventions. In our baseline specification, $G_k$ consists

of the following three variables: fiscal policy in country $k$, monetary policy in country $k$, and

bank recapitalization in country $k$, all measured over the period September 2008 and March

2009. In the case of bank recapitalization, it corresponds to committed amounts of public

recapitalization funds. The inclusion of fiscal and monetary policy in our baseline regression

follows from the fact that many countries enacted bank support packages while also making

use of these macroeconomic stabilization tools. $X_{i,k}$ is a vector of additional firm-level explanatory variables. Finally, $\alpha_j$ and $\alpha_k$ are a set of industry and country indicators, and $\varepsilon_{i,k}$ is the error term.

We follow Rajan and Zingales (1998) and compute dependence on external finance as capital expenditures minus cash flow from operations divided by capital expenditures. In our baseline specification, we use the external financial dependence of U.S. firms over the 1980's as computed by Rajan and Zingales (1998). As in their work, the use of an industry-level measure of external finance dependence (common to all countries) follows from the assumption that it is determined by technological characteristics of the industry that are correlated across countries. In robustness tests, we compute this measure using the same approach for the period 1980-2006, as an industry's intrinsic need for external finance may have changed over time due to changes in technology.

To enhance comparability of our results with those obtained in earlier work, including those obtained by Rajan and Zingales (1998), we limit the sample to manufacturing firms only. Because government policies vary only at the country level, we also adjust standard errors for clustering at the country level.

Since we use U.S. data to establish our benchmark of an industry's external financial dependence, one could argue that this variable is endogenous to the growth performance of U.S. firms. Following Rajan and Zingales (1998), we therefore drop U.S. firms from all regressions, thereby addressing these endogeneity concerns. Importantly, our main results are not affected by the exclusion of U.S. firms from the sample (not reported).

In sum, our approach overcomes endogeneity concerns in three ways: first, external finance dependence is measured over a period prior to the crisis, thus it is unlikely to be

driven by what happened during the crisis; second, external finance dependence is measured

using data from U.S. firms to study the growth performance of firms outside of the United

States, and it is unlikely that value-added growth elsewhere affects external finance of firms

in the United States (moreover, we drop U.S. firms from the sample); and third, we conduct

our analysis at the firm level, with external finance dependence measured at the industry

level, further strengthening our identification strategy.

Still, the critic may observe that endogeneity concerns remain because government

interventions could be an endogenous response to a decline in real economic activity.

However, our empirical strategy is valid as long as the endogeneity of government policies

are not correlated with a firm's dependence on external finance. While government policies

may respond to pressure from non-financial firms to support lending activity, we consider it

indeed unlikely that government policy responds disproportionally to pressure from

financially dependent firms. To lend support to this claim and our empirical strategy we will

show in the next section of the paper that the intensity of government policies during the

crisis is not correlated with the median level of financial dependence of firms in the country.


**4. Data**

Firm-level data comes from the Compustat North America (for U.S. and Canadian

firms) and Global Compustat (for firms outside the U.S.) databases. As indicated in the

previous section, external financial dependence is defined as the difference between capital

expenditure and operating cash flow, computed over the 1980's and the 1980-2006 period,

and expressed as a fraction of capital expenditure. Financial dependence is computed at the

industry level using data on individual U.S. firms. We follow the level of industry

aggregation in Rajan and Zingales (1998), which is based on ISIC industry classifications. Table 2 reports external dependence figures by ISIC industry. We obtain an industry-level measure by taking the median across firms within the industry.

We compute value added using Compustat data as the sum of earnings before taxes and depreciation (EBITDA) and labor expense. We limit the sample of firms to those whose fiscal year ends between October and December. We lose all firms from the Republic of Korea and Japan because of missing data on labor expense and because the fiscal year ends in March (including these firms does not alter our main findings). We also do not include firms from the United States, which is the benchmark country for financial dependence. We compute real growth in value added by converting value added into local currency and by deflating the annual growth rate in value added using the CPI inflation rate in the country where the firm is located.

Other firm-level variables used in our regressions include log of total assets (size); firm leverage (lev), defined as the ratio of total liabilities to total assets); asset tangibility (ppe), computed as the ratio of fixed assets to total assets; and Tobin's Q, computed as the ratio of the market value of equity plus the book value of debt divided by the book value of total assets.

Unless indicated otherwise, all government policies are computed over the period September 2008 to March 2009 and normalized by the country's 2008 GDP. As a proxy for the change in the fiscal stance, we use the change in the structural balance, which we refer to as Fiscal1. Our two primary sources are the OECD (OECD, 2009) and the IMF's Fiscal Monitor, with cut-off dates in 2009 Q1. Both sources reflect the size of announced discretionary fiscal stimuli measured as their net effect on fiscal balances over the period

2008-10 and exclude fiscal measures that had been announced before the crisis as well as fiscal outlays associated with financial sector support packages announced during the crisis. Most cases were covered with these two sources, but in a handful of cases where this was not the case we used fiscal discretionary packages reported in IMF Staff reports that were announced in response to the crisis, excluding financial sector support, to complete the dataset.

As an alternative proxy for fiscal policy, we compute the fiscal impulse following Fedelino et al. (2009), and using data from the April 2010 WEO. It corresponds to the sum of the variations in the cyclically adjusted primary balance (relative to potential GDP) over 2008-2010. Revenue elasticity is equal to one, while expenditure elasticity is taken from the OECD (Girouard and Andre, 2005), or set to zero when missing. This measure, however, is not purged from financial sector support packages and consists of actual rather than intended stimulus. We refer to this variable as Fiscal2.

The reason for focusing on structural fiscal balance is because we want to capture discretionary policy, isolating the effects of the economic cycle. Furthermore, we focus on 2008-2010 because in most cases fiscal packages involved multiyear programs. Firms and the market should have reacted to the overall fiscal package and not only to the component to be implemented in 2009 only.

As a proxy for change in the monetary policy stance we use the change in nominal short-term interest rates over the period September 2008 to March 2009. As short-term interest rates we used money market rates whenever available and treasury bills otherwise, taken from the IMF's International Financial Statistics (lines 60B..ZF... and 60C..ZF...). As

an alternative measure of monetary policy, we use the change in the money base over the same period, also using data from the IMF's International Financial Statistics.

We collect new data on bank intervention policies for our sample of countries. For the crisis countries in our sample, we obtain information on bank intervention policies from Laeven and Valencia (2010), and we complement this data for the countries not included in that paper using the same approach and using information from IMF Staff reports, and Central Banks' and Ministry of Finances' official announcements.

Finally, we construct new data on the size of guarantees not included in Laeven and Valencia (2010), relying on information contained in IMF Staff reports, Central Banks', and Ministry of Finance's official announcements. The ultimate sample of countries used in the regressions is chosen based on availability of firm-level data. It comprises 50 countries, of which 10 are considered to have experienced a systemic banking crisis, and 9 are borderline crisis per Laeven and Valencia (2010)'s definition of a banking crisis (see Table 1).

We proxy for emergency liquidity support using the change in gross claims of the monetary authorities to financial institutions, normalized by 2008 nominal GDP. If the result is a negative number, we set this variable to zero. Gross claims on the financial system were taken from the IMF International Financial Statistics (the sum of lines 12E..ZF..., 12F..ZF..., and 12G..ZF...). Although these claims on the financial system may include central bank transactions other than emergency liquidity support, these other transactions are likely to relatively small and are unlikely to behave in a systematic way that biases our results.

Turning to resolution measures, we record amounts used in bank recapitalization with public funds, in which we include direct capital injections in the form of preferred or common shares as well as subordinated debt. Asset purchases and swaps include the removal

of impaired or illiquid assets from banks' balance sheets but include direct lending by the Treasury/Ministry of Finance. Direct lending by the Treasury/Ministry of Finance, however, took place in only a handful of cases. It is worth emphasizing that our measure does not include purchases of mortgage-backed securities and long-term government bonds conducted by central banks. The impact of these excluded measures is captured by our alternative definition of monetary policy, the change in the monetary base. In collecting data for these measures we record committed amounts, announced between September 2008 and March 2009, and used amounts up to end-2009. Table 1 shows the values for the individual policy interventions at the country level.

The list of countries experiencing a systemically important banking crisis is taken from Laeven and Valencia (2010), where a crisis is defined as a situation with significant signs of financial distress in the banking system and significant policy intervention measures. In our final sample, countries falling under this category include: Austria, Belgium, Denmark, Germany, Iceland, Ireland, Latvia, Luxembourg, Netherlands, and the United Kingdom.[7] We also include countries listed as borderline crisis cases in Laeven and Valencia (2010): France, Greece, Hungary, Portugal, Russia, Slovenia, Spain, Sweden, and Switzerland.

While most crisis-affected countries resorted to accommodative fiscal and monetary policy to counter the negative impact of the crisis on growth, there was much dispersion. In the area of fiscal policy, countries like Iceland and Latvia tightened fiscal policy substantially under the auspice of an IMF program despite a dramatic fallout of the financial crisis on their

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[7] This list excludes the United States, which also experienced a systemic banking crisis according to the definition in Laeven and Valencia (2010) but which, being the benchmark country, is excluded from the sample.

economy. On the other hand, countries like Australia, Korea, and Morocco substantially loosened their fiscal policy stance, and also faced milder consequences from the financial shock, either because they were less exposed to the financial crisis shock emanating from the U.S. or because their policies were more successful in containing the impact of this shock.

In terms of country level control variables, we consider public debt, trade openness, and financial development. Public debt data corresponds to the general government gross debt, dated as of end-2006, expressed in percent of GDP. For cases where general government debt was not available, we used central government gross debt. Debt figures were taken also from the IMF's World Economic Outlook (WEO) database. Other country-specific control variables include country openness, measured as the ratio of the sum of exports and imports to GDP, financial development, measured as the sum of outstanding credit to the private sector, and stock market capitalization, both expressed as percent of GDP. These variables are dated as of 2006 and are taken from the World Bank's World Development Indicators database.

Table 3 reports the summary statistics of the main regression variables. The average growth in real value added for firms over our sample period was -4 percent, though there was much dispersion with the firm at the $25^{th}$ percentile growing at a rate of -25 percent and the firm at the $75^{th}$ percentile growing at 16 percent.

While our empirical strategy address several important endogeneity and simultaneity concerns (see section 3), the critic may observe that endogeneity concerns remain because government interventions could be an endogenous response to a decline in real economic activity. Our empirical strategy is valid as long as the endogeneity of government policies are not correlated with a firm's dependence on external finance. Table 4 reports the correlations

between our main government intervention measures and the median level of financial dependence of firms in the country. We find that none of the government measures considered is significantly correlated with the financial dependence of firms in the country. In fact, the correlation of the country-median financial dependence with our measures of fiscal policy is negative (and insignificant) and the correlation with our measures of bank recapitalization is close to zero (and insignificant). The absence of a significant correlation between the intensity of government policies and the dependence on external finance of firms in the country suggests that policies are not endogenous to financial dependence in the country and thus lends additional support to our identification strategy.

## 4. Empirical Findings

Table 5 reports our baseline results obtained by including our main proxies for fiscal policy, monetary policy, and bank recapitalization. Because many countries that announced recapitalization packages also announced other support measures such as guarantees and asset purchases, we add these extra variables one at a time. The regressions in the first three columns of Table 5 do not correct standard errors for clustering. Since the policy variables of interest have repeated observations for firms in a given country, standard errors are likely to be underestimated. Therefore, in column 4 and in all other reported regression output that follows, we report standard errors that are corrected for clustering at the country level. In unreported regressions, we also clustered standard errors at the country-industry level, and the main results of the paper remain unaltered. In columns 3 and 4, we include different bank intervention variables.

The first result to highlight is that our results reject the hypothesis of a frictionless supply of credit. Recapitalizing banks has a positive and statistical significant effect on the value added growth of firms in industries that are more dependent on external finance. Because our external-finance dependence measure is constructed in a way that is not affected by the position of the country in the economic cycle, the firm's financial structure is not the driver of the results, neither are country or industry specific shocks, given that we include industry and country dummies to control for them. Therefore, our results are evidence of the real effects of a disruption in the supply of credit, which is alleviated by bank recapitalization. This is consistent with earlier work by, among others, Klein et al. (2002) and Peek and Rosengren (1997, 2000), who provide evidence of the real effects of negative shocks to bank capital. An interesting aspect of our results is that among financial sector interventions only bank recapitalization turns out to be significant, while guarantees and asset purchases do not. However, all bank intervention variables taken together enter jointly significant, but only at the 10 percent level. These results confirm our priors that, of all bank intervention policies considered, bank recapitalization is most directly targeted to alleviate solvency problems in the financial sector, and therefore has a quantitatively important effect on the supply of bank credit.

A second result to highlight is that the coefficient estimate for the interaction between external financial dependence and fiscal policy is positive and statistically significant at the 1 percent level. Discretionary fiscal policy tends to give a greater boost to the growth of firms in industries that are more dependent on external finance. While there is a largely unsettled

debate on the effects of fiscal policy on output, most economists would agree that it increases

output in the short run. Our results are broadly in line with such conclusions.[8]

Our results on fiscal policy are consistent with Aghion et al. (2009) who analyze the

effect of countercyclical fiscal policy on growth and also finds that it helps more firms that

are more financially dependent.[9] They present a model in which firms choose to invest in

short- and long-term projects, but the long-term project exposes the firm to risks of

illiquidity. In their framework, credit constraints induce a concavity in the firm's profit

function, because the risk of illiquidity increases with the level of long-term investment—for

a given amount of initial endowment. Fiscal policy increases the relative profitability of long-

versus short-term investments because with higher expected profits, the illiquidity risk goes

down. The effect of fiscal policy is stronger for firms more dependent on external finance

because they are more exposed to this illiquidity risk. To the extent that firms' financial

condition is highly correlated with external finance dependence at the industry level, the

observed effect of fiscal policy could be understood as stemming from the demand side of

credit. However, an alternative explanation is that improved firm profitability reduces banks'

expected losses on outstanding loans, which in turn leads banks to loosen standards on new

loans, thereby increasing the supply of credit. Our empirical approach does not disentangle

these demand and supply effects of fiscal policy. Importantly, however, our main result on

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[8] Some examples in this debate include Mountford and Uhlig (2008) who argue that tax cuts are more effective than spending increases, and, Perotti (2005) who shows that multipliers greater than 1 are seen only in pre-1980 US data, but tax cuts do not work better than spending increases; Fatas and Mihov (2001) find that an increase in government spending increases consumption and employment, whereas Blanchard and Perotti (2002) find that both tax cuts and spending increases have a positive effect on growth.

[9] Their work is conducted at the industry level, as it was the case for Rajan and Zingales (1998), but does not extend to the recent global financial crisis episode, nor does it consider the role of bank intervention policies, as we do.

the supply-side effect of bank recapitalization is not affected by the inclusion of fiscal policy as an alternative channel affecting the growth of financially dependent firms.

A third result to highlight is the insignificance of our monetary policy variable. It is not found to have a differential effect on the returns of financially dependent firms. In principle, proponents of the bank lending channel of monetary transmission, as first proposed by Bernanke and Blinder (1988) and further developed by Kashyap et al. (1993, 1994), would expect to see a differential, positive effect of interest rate reductions on the lending to and growth of financially dependent firms, for which financial conditions matter the most. At the same time, the increased accessibility of banks to non-deposit sources of funds are seen under this view as mitigating the importance of the bank lending channel (Romer and Romer, 1990). The increasing importance of wholesale funding markets for banks in many of the countries in our sample could thus partly explain this result. Moreover, the transmission channel of monetary policy may be less powerful at time of crises, when banks are capital constrained (Van den Heuvel, 2009).

Finally, we find that the growth in value added over the sample period was higher for larger firms, as measured by total assets, possibly because larger firms were more diversified or enjoyed relatively larger internal capital markets, and were therefore shielded to a greater extent from the fallout of the crisis.

The effect of bank recapitalization is economically significant. The estimation results in Column 4 of Table 5 suggest that, *ceteris paribus*, a one standard deviation increase in the interaction between financial dependence and bank recapitalization would result in an increase in real growth in value added of 2.3 percentage points. Alternatively, the estimation results suggest that, *ceteris paribus*, a firm from an industry at the 75th percentile of financial

dependence would have a real growth in value added that is 1.1 percentage points higher than a firm from an industry that is at the 25$^{th}$ percentile of financial dependence if it were located in a country that is at the 75$^{th}$ percentile compared to a country at the 25$^{th}$ percentile of bank recapitalizations. Both differentials in real growth rates are substantial compared to the average growth rate in value added of -4.0 percent.

The effect of fiscal policy is also economically significant. The estimation results in Column 4 of Table 5 suggest that, *ceteris paribus*, a one standard deviation increase in the interaction between financial dependence and fiscal expenditure would result in an increase in real growth in value added of 2.5 percentage points. Alternatively, the estimation results suggest that, *ceteris paribus*, a firm from an industry at the 75$^{th}$ percentile of financial dependence would have a real growth in value added that is 1.4 percentage points higher than a firm from an industry that is at the 25$^{th}$ percentile of financial dependence if it were located in a country that is at the 75$^{th}$ percentile compared to a country at the 25$^{th}$ percentile of fiscal expenditures. Again, both differentials in real growth rates are substantial compared to the average growth rate in value added of -4.0 percent.

Interestingly, the effect of bank recapitalization is, on average, of similar magnitude as the impact of fiscal policy: both variables enter with a similar coefficient of about 1.3 (which is directly comparable because both measures are expressed in terms of GDP), indicating that a 1 percentage point of GDP increase in either fiscal stimulus or bank recapitalizations would enhance the growth performance of financially dependent firms by 1.3 percentage points. This of course is not the total impact of each corresponding measure since we are only assessing their short-run effect. The total impact, including long-term, will likely differ because of indirect effects, such as improved financial stability. Nevertheless,

this equivalence in the magnitude of effects of financial sector and fiscal policies suggests that—at least during periods of financial distress—policymakers can exploit this short run equivalence in mitigating the real effects of financial turmoil by using the alternative that turns out easier to implement, given the institutional constraints faced by each country.

Importantly, this result is not driven by collinearity between fiscal policy and bank recapitalization. In fact, the data shows a low and negative correlation of -0.14 between our main fiscal policy variable (Fiscal1) and our main bank recapitalization variable (Recapa).

Since firms in our dataset are unequally distributed across both countries and industries—for example, UK firms and firms in the food processing industry dominate the sample—one obvious concern is that the results are being driven by the unbalanced nature of the dataset. To alleviate concerns that the unbalanced nature of the firm level dataset is driving the results, we re-run our baseline regressions using weighted least squares, where observations are weighted by the inverse of the number of firm observations in each country-industry pair. In unreported regressions, we find that our main results do not qualitatively change when we control for the unbalanced number of firms and industries across countries. The coefficients on bank recapitalization and fiscal policy remain statistically significant, and are close to the magnitudes in our baseline specification.

## 5. Robustness Tests and Extensions

In this section, we consider several robustness checks and extensions of our main analysis.

**5.1 Additional Firm Controls**

Our main objective is to test the economic and statistical importance of credit frictions on the supply side. For this, we need to be sure that the results are not driven by the financial condition of firms. Therefore, we include an additional regressor which is firm leverage, Lev, computed as the ratio of firm liabilities to total assets. Results could also be driven by firms' ability to pledge fixed assets as collateral for bank loans. We therefore also control for the ratio of fixed assets to total assets, ppe, which proxies for the tangibility of firm assets. The results are presented in Column 1 of Table 6. We find that the growth performance of firms is negatively affected by high leverage, although the result is not statistically significant. In addition, we find that growth performance of firms is negatively and significantly affected by high tangibility. Importantly, our main findings on fiscal policy and bank recapitalizations are unaltered when controlling for these additional firm characteristics.

**5.2 Alternative Definitions of Intervention Variables**

In column 2 of Table 6, we use Fiscal2, our own estimate of the fiscal impulse. Unlike our main fiscal variable, this alternative measure of fiscal policy does not exclude outlays that are targeting the financial sector directly, because it is estimated from outcomes, instead of intentions, as our baseline Fiscal1 variable. The first implication is then that the fiscal variable now includes outlays associated with bank intervention policies. It is therefore not surprising that Fiscal2 enters with a statistically significant coefficient, while the effect of bank recapitalization does not. This exercise highlights the superiority of using Fiscal1 as our baseline measure of fiscal policy. We also try an alternative way to control for monetary policy, to account for quantitative measures other than policy rate shifts. In Column 3, we use

the expansion of the monetary base, normalized by GDP. We still find a statistically insignificant effect for monetary policy in affecting the growth performance of firms.

Recall that in our baseline regressions, we use committed amounts in measuring bank intervention policies. In column 4, we include variables that denote the actual amounts used for bank recapitalization and asset purchases rather than the amounts announced up to the end of 2009. The difference between announced bank interventions and interventions that have actually taken place can be substantial, particularly in terms of recapitalizations and asset purchases. The results, however, are not dependent on using announced packages or actually used amounts. We again find that bank recapitalization has a statistically significant differential effect on the growth performance of financially dependent firms. Notably, the economic effect is somewhat more pronounced than for the announced bank recapitalization packages.

In column 5, we consider the impact of emergency liquidity support to banks. Given the role of central banks as a lender of last resort, liquidity support is generally the most common component in the policy response package to contain a banking crisis, acting as the first line of defense. In the particular crisis episode we analyze here, a number of existing liquidity facilities had already expanded in scope and several new liquidity facilities had been introduced before September 2008, the start of the period over which we measure policy interventions. For instance, by this time the U.S. Federal Reserve Bank had already established the Term Auction Facility (TAF), had made emergency liquidity available not only to banks but also broker-dealers, and had established U.S. dollar swap lines with other central banks.

We do not find that liquidity support disproportionately affected the growth performance of financially dependent firms during the financial crisis. When banks face solvency problems and not just liquidity problems, as was likely the case for many banks during this crisis, bank capital shortfalls are not repaired through liquidity injections, which would explain the insignificance of the liquidity support variable.

**5.3 Systemic Banking Crises**

It could also be that our results depend on whether or not the country experienced a systemic banking crisis, in part because the severity of the crisis is likely to influence the extent of government interventions such as fiscal and monetary policy and bank support. In Column 1 of Table 7, we control for whether or not the country faced a systemically important banking crisis. We do so by interacting financial dependence and a dummy variable that denotes whether or not the country experienced a systemic banking crisis in 2009, as defined by Laeven and Valencia (2010). Section 4 lists the countries that are considered as having had a systemic or borderline systemic banking crisis.

Similar to the findings in Kroszner et al. (2007) and Dell'Ariccia et al. (2008), we find that the growth performance of financial dependent firms is particularly hurt during systemic financial crises, though the effect is not statistically significant. Importantly, the impact of fiscal policy and bank recapitalization policies is unaltered. The insignificance of the crisis indicator is likely driven by two factors: first, we focus on a period of global financial crises that shared a common shock, while previous studies examined financial crises that were mostly idiosyncratic or regional in nature. Many countries were hurt significantly by the collapse in global trade that was triggered by the global deleveraging process, but nevertheless managed to avoid a banking crisis. Second, Laeven and Valencia

(2010)'s definition of a systemic banking crisis relies heavily on the intensity with which policy interventions were announced, which has already been directly controlled for in our regressions.

**5.4 Financial Development**

Another potential alternative explanation for our results could simply be that countries with more developed financial systems are more capable of recapitalizing banks and are in a better position to conduct countercyclical fiscal policy. Alternatively, deeper financial systems could offer alternative sources of financing at times of financial crisis. If financial development affects growth in such ways, then we would have an omitted variable problem. We test this alternative explanation by including in our regression the interaction between financial dependence and financial development. Following Rajan and Zingales (1998), we measure financial development as the sum of private credit and stock market capitalization to GDP in 2006, prior to the ongoing financial crisis that started in 2007 in the United States.

We find that financial development has an independent growth enhancing effect for financially dependent firms, although this effect is entirely driven by capital market development (as measured by stock market capitalization to GDP), and not banking sector development (as measured by private credit to GDP), as indicated in Columns 2 and 3 of Table 7. This suggests that capital markets can be a "spare wheel" at times of banking distress by offering an alternative source of finance to traditional bank credit. These results are also consistent with earlier findings by Kroszner et al. (2007) who find that deeper banking systems are not enhancing the growth performance of financially dependent firms when these systems are undergoing financial stress.

**5.5 Openness and Integration**

Thus far, we have not considered the potential role of financial and trade integration. Yet, the crisis hit a number of economies that were well integrated in global markets, and thus policy responses in part reflect actions taken to mitigate the effects from financial integration. Since financially integrated economies have better access to external financing, they also have the capacity to finance larger bank bailout packages, thus our bank intervention variables could in part simply capture the degree of financial integration. Similarly, the financial shock was followed by a collapse in trade, hitting more open economies more adversely. Not controlling for trade openness could therefore also raise concerns about an omitted variables problem. We address this concern by including the interaction between trade openness (as measured by the ratio of trade to GDP) and financial dependence. Column 4 in Table 7 shows the results. Allowing for this alternative channel does not alter our main findings on the relevance of fiscal policy and bank recapitalization.

**5.6 Fiscal Space and Size of Government**

Next, we test if the size of government and fiscal space empower governments to conduct countercyclical fiscal policy or to recapitalize banks, while it also may affect growth. It is not clear what an ideal, simple measure of fiscal space is, therefore we use total public debt, as of 2006 and expressed as percentage points of GDP, as an alternative variable. Column 5 in Table 7 shows the results. Again, our main findings remain unaltered.

**5.7 Additional Industry Characteristics**

Table 8 presents results using alternative measures of industry financial dependence and additional industry-level controls. Column 1 shows results when using the Rajan and Zingales (1998) measure of industry dependence on equity financing as alternative measure

of financial dependence. Dependence on equity financing is defined as the ratio of the amount of net equity issues to capital expenditures and is computed for US firms over the period 1980-1989. The results are qualitatively similar to those obtained for our main measure of financial dependence.

In Column 2, we use financial dependence computed over the period 1980-2006 using Compustat data for U.S. firms and obtain qualitatively similar results. This is not surprising given the high correlation between financial dependence over the period 1980-1989 and the period 1980-2006 of 0.73 (see Table 3). The results are also robust to using dependence on equity financing computed over the period 1980-2006 (not reported).

**5.8 Short-Term Financing Needs**

Thus far, we have focused on the importance of government interventions for the performance of firms that depend on outside finance for the capital expenditure needs; in other words, for their long-term financing needs. However, firms also have short-term financing needs for shorter term investment projects or simply working capital purposes, including inventory investment and accounts payables and receivables management. The global financial crisis also curtailed the availability of short-term credit for these purposes. We therefore separately investigate whether government interventions, and in particular banking sector interventions, alleviated the financing constraints of firms in need of working capital financing by including interaction terms between intervention policies and a measure of an industry's natural dependence on working capital financing.

To measure an industry's working capital needs, we follow Raddatz (2006) who develops a measure of an industry's intrinsic need for working capital financing analogous to the dependence on external finance for capital expenditure purposes developed by Rajan and

Zingales. Specifically, liquidity needs (liq) is defined as the industry median ratio of inventories to sales during the pre-crisis period 2000 to 2006, and a broader measure of working capital needs (ccc) is computed using the so-called cash conversion cycle method as the industry median ratio of inventories to sales plus ratio of receivables to sales minus accounts payables to cost of goods sold during the pre-crisis period 2000 to 2006. The results are presented in Columns 3 and 4 of Table 8.

Interestingly, we find that bank recapitalization measures also disproportionately enhance the growth performance of firms that are dependent on working capital financing. However, fiscal policy does not appear to disproportionately benefit these firms, contrary to firms that are dependent on outside financing for capital expenditure purposes. We can rationalize the insignificance of fiscal policy for working capital needs in the context of Aghion et al. (2009)'s model, briefly referred to earlier. In their model, fiscal policy increases the size of the market for long-term projects (a concrete example could be government investing in infrastructure creates greater demand for cement), and thus affects only firms' investment in these projects because their profitability increases. But there is no differential effect, on firms' needs for short-term financing because short-term projects are not subject to illiquidity risks.

**5.10 Growth Opportunities**

The results obtained thus far could also be driven by a change in growth opportunities rather than dependence on external finance. In Table 8, column 5, we include interactions between the government intervention policies and a firm's Tobin's Q, a proxy of a firm's growth opportunities. We do not construct an industry level measure of a firm's growth opportunities using US data because growth opportunities vary substantially across countries

and within industries depending on firm specific circumstances, so the United States is not a useful benchmark. We compute Tobin's Q at year-end 2006 as the ratio of market value of equity plus book value of liabilities to the book value of total assets using Compustat data on the book value of assets and liabilities of firms and Datastream and CRSP data on the market value of equity of firms.

The interactions terms with Tobin's Q as proxy for growth opportunities do not alter our findings on the relevance of fiscal policy and bank recapitalization measures, suggesting that part of the transmission channel operates through financial dependence. Importantly, the correlation between financial dependence and the measure of Tobin's Q is low at 0.18, indicating that the financing channel, as captured by our measure of financial dependence, operates separately from the growth opportunities channel, as captured by Tobin's Q.

In sum, we find that the real growth rate in value added of financially dependent firms is disproportionately positively affected by fiscal stimulus and bank recapitalization measures. Fiscal policy, by giving a boost to domestic demand, improves the growth prospects of firms, and firms that are financially dependent benefit relatively the most from such a boost because they are hurt the most from a disruption in the supply of credit. Bank recapitalizations, by mitigating the negative credit supply shock, similarly benefit financially dependent firms that face financial constraints the most.

## 6. Conclusions

Current wisdom in economics suggests that financial factors matter for real economic activity because of the existence of frictions that stem from the presence of information asymmetries and the risk of bankruptcy. Economists, however, still debate the specific

mechanisms through which these frictions operate and their quantitative importance, as well as the relative importance of frictions in the demand versus the supply side of credit markets.

This paper contributes to the literature on financial frictions with new evidence on the real effects of disruption in the supply of credit, using new data on policy intervention measures that were deployed in many countries during 2008 and 2009 as a response to the global shock that started in the United States. We address potential endogeneity concerns by exploiting the cross-sectional variation of firm-level data, using a widely used measure of external finance dependence developed by Rajan and Zingales (1998), in a sample of 50 countries.

We find statistically significant, economically important, and robust results that suggest that bank recapitalization policies boosted the value added growth of firms that are more financially dependent. Therefore, our results emphasize the importance of supply-side financial frictions in influencing real economic activity. We also find that discretionary fiscal policy helped financially dependent firms grow more, just as bank recapitalization did. Importantly, our results are shown to not be driven by correlation between fiscal and bank recapitalization policies. Importantly, our results are likely to be underestimated because we focus on large and listed firms that have better non-bank financing alternatives than smaller and bank-dependent firms.

Monetary policy and other bank intervention measures turn out insignificant once we control for the effects of fiscal policy and bank recapitalization. Our conjecture is that these other actions were less effective in supporting the growth of financially dependent firms because they were much less targeted to alleviate solvency problems at banks, which may have been the largest concern at the time.

Overall, our results provide new insights in the relative effectiveness of government interventions in managing financial crises, and new evidence on the importance of credit market frictions in explaining differences in economic growth.

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## Table 1. Government Interventions During the Global Financial Crisis

Systemic banking crises and borderline cases are taken from Laeven and Valencia (2010), where a crisis is defined as a situation with significant signs of financial distress in the banking system and significant policy intervention measures. Recapitalization packages include bank capital injections by the public sector. Guarantees of assets corresponds to announced coverage of bank assets, existing or new. Guarantees of bank creditors measures coverage of deposits and/or other liabilities, existing or new. Asset purchases reflect acquisition of assets either by a special entity or the central bank, from banking institutions, excluding long-term government bonds, but including loans from the Treasury to banks. All the above intervention measures are expressed in percent of 2008 GDP and include packages announced during the period September 2008 to March 2009, and used amounts up to end-2009. Liquidity support is measured by the change in gross claims of the monetary authorities to financial institutions, expressed in percent of GDP. Monetary policy is proxied by the change in nominal short-term interest rates and the change in the money base in percent of GDP. Liquidity support and monetary policy indicators are measured over the period September 2008 to March 2009. Public debt data corresponds to the general government gross debt, dated as of end-2006, expressed in percent of GDP. Fiscal1 reflects the size of announced discretionary fiscal stimulus packages, measured as the net effect on fiscal balances over the period 2008-10, expressed as percent of GDP, and excludes fiscal measures that had been announced before the crisis as well as fiscal outlays associated with financial sector support packages announced during the crisis. Fiscal2 corresponds to the sum of the variations in the cyclically adjusted primary balance (relative to potential GDP) over 2008-2010.

| | Banking Crises | | Recapitalizations | | Guarantees | | Asset Purchases and Lending by Treasury | | Liquidity | Monetary and fiscal indicators | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Country | Systemic | Borderline | Pledged amount (Percent of GDP) | Used amount (Percent of GDP) | Asset guarantees (Percent of GDP) | Bank Creditor's guarantees (Percent of GDP) | Pledged amount (Percent of GDP) | Used amount (Percent of GDP) | Liquidity Support (Percent of GDP) | Change in ST interest rate (percent, 08/08-03/09) | Change in Money base or Reserve Money (% of GDP) | Public Debt (Percent of 2006 GDP) | Fiscal stimulus (fiscal1) Percent of GDP | Fiscal stimulus (fiscal 2) Percent of GDP |
| Argentina | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -2.2 | 0.6 | 76.5 | 1.5 | 2.8 |
| Australia | | | 0.0 | 0.0 | 0.0 | 97.0 | 0.0 | 0.0 | 1.4 | 3.6 | -0.2 | 10.1 | 4.6 | 5.2 |
| Austria | * | | 5.2 | 2.1 | 0.6 | 25.7 | 2.0 | 2.0 | 8.9 | 2.4 | 0.0 | 62.3 | 1.1 | 2.1 |
| Belgium | * | | 5.0 | 5.0 | 7.7 | 26.2 | 8.2 | 8.2 | 23.9 | 2.4 | 0.0 | 87.7 | 1.6 | 2.7 |
| Brazil | | | 0.0 | 0.0 | 0.0 | 0.5 | 0.8 | 0.0 | 0.5 | 1.7 | -2.2 | 66.7 | 0.6 | -0.4 |
| Canada | | | 0.0 | 0.0 | 0.0 | 0.0 | 9.1 | 4.4 | 2.3 | 2.2 | 0.0 | 68.0 | 4.1 | 4.6 |
| Chile | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.3 | 0.0 | 5.3 | 5.0 | 9.6 |
| China | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.4 | 0.0 | 16.5 | 4.4 | 3.5 |
| Hong Kong | | | 0.0 | 0.0 | 0.0 | 295.2 | 0.0 | 0.0 | 0.0 | 2.1 | 0.0 | 1.7 | -0.2 | 8.3 |
| Colombia | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 1.4 | 0.0 | 35.8 | 1.0 | 1.3 |
| Croatia | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.6 | -9.4 | -1.7 | 35.9 | 0.1 | -4.8 |
| Czech Republic | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 1.5 | 0.0 | 29.5 | 3.0 | 1.3 |
| Denmark | * | | 5.8 | 2.8 | 0.0 | 237.5 | 0.3 | 0.3 | 10.9 | 1.9 | 0.0 | 30.6 | 2.5 | 5.2 |
| Finland | | | 2.2 | 0.0 | 0.0 | 28.4 | 0.0 | 0.0 | 1.4 | 2.4 | 0.1 | 39.2 | 3.1 | 4.9 |
| France | | * | 1.3 | 1.0 | 0.3 | 16.9 | 0.0 | 0.0 | 6.2 | 2.4 | 0.0 | 63.6 | 0.6 | 3.2 |
| Germany | * | | 3.4 | 1.2 | 6.1 | 17.2 | 0.2 | 0.2 | 8.4 | 2.4 | 0.0 | 65.9 | 3.0 | 3.7 |
| Greece | | * | 2.1 | 1.7 | 0.0 | 6.2 | 1.9 | 1.9 | 15.4 | 2.4 | 0.1 | 95.9 | 0.1 | 1.5 |
| Hungary | | * | 1.1 | 0.1 | 0.0 | 48.8 | 2.6 | 2.6 | 1.2 | 2.0 | 0.0 | 65.7 | -4.4 | -5.6 |
| Iceland | * | | 24.0 | 13.0 | 0.0 | 108.4 | 0.0 | 0.0 | 24.7 | -0.4 | -2.3 | 30.1 | -9.4 | 5.6 |
| India | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 6.7 | 0.0 | 82.2 | 0.5 | 4.4 |
| Indonesia | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.7 | 0.0 | 39.0 | 1.9 | 0.9 |
| Ireland | * | | 7.6 | 7.6 | 0.0 | 200.0 | 0.0 | 0.0 | 42.2 | 2.4 | 0.1 | 24.8 | -4.4 | 5.8 |
| Israel | | | 1.7 | 0.0 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 3.2 | 5.8 | 84.4 | 0.3 | 3.7 |
| Italy | | | 1.3 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 2.7 | 2.4 | 0.0 | 106.5 | 0.0 | 1.8 |
| Jamaica | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -2.9 | 2.5 | 90.3 | 0.6 | 0.6 |
| Japan | | | 2.5 | 0.1 | 0.0 | 7.2 | 4.1 | 0.1 | 2.0 | 0.4 | 0.0 | 191.3 | 2.0 | 4.2 |
| Kenya | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 3.1 | 0.1 | 50.6 | 2.1 | 2.1 |
| Korea | | | 1.2 | 0.4 | 1.8 | 11.6 | 3.9 | 0.4 | 2.2 | 0.1 | 0.0 | 30.1 | 4.9 | 2.8 |
| Latvia | * | | 2.5 | 2.5 | 0.0 | 3.5 | 2.5 | 2.5 | 3.9 | 2.4 | -5.0 | 9.9 | -16.3 | -16.3 |
| Lithuania | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.4 | -1.1 | 18.0 | -6.4 | -6.4 |
| Luxembourg | * | | 7.7 | 7.7 | 0.0 | 12.0 | 0.0 | 0.0 | 57.5 | 2.4 | 0.4 | 6.6 | 3.6 | 4.4 |

| Country | Banking Crises | | Recapitalizations | | Guarantees | | Asset Purchases and Lending by Treasury | | Liquidity | Monetary and fiscal indicators | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Systemic | Borderline | Pledged amount (Percent of GDP) | Used amount (Percent of GDP) | Asset guarantees (Percent of GDP) | Bank Creditor's guarantees (Percent of GDP) | Pledged amount (Percent of GDP) | Used amount (Percent of GDP) | Liquidity Support (Percent of GDP) | Change in ST interest rate (percent, 08/08-03/09) | Change in Money base or Reserve Money (% of GDP) | Public Debt (Percent of 2006 GDP) | Fiscal stimulus (fiscal1) Percent of GDP | Fiscal stimulus (fiscal 2) Percent of GDP |
| Malaysia | | | 1.5 | 0.0 | 3.6 | 112.0 | 0.0 | 0.0 | 0.0 | 1.0 | -2.6 | 40.9 | 3.0 | 1.8 |
| Mexico | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.4 | 1.5 | 0.6 | 38.3 | 1.3 | 0.2 |
| Morocco | * | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 | -0.1 | -1.4 | 58.1 | 6.4 | 6.4 |
| Netherlands | * | | 6.5 | 6.5 | 10.8 | 34.8 | 6.1 | 6.1 | 9.3 | 2.4 | 0.0 | 47.4 | 1.5 | 4.0 |
| New Zealand | | | 0.0 | 0.0 | 0.0 | 93.0 | 0.0 | 0.0 | 3.9 | 4.1 | 0.0 | 22.4 | 4.3 | 5.1 |
| Nigeria | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.5 | 6.3 | 0.6 | 11.8 | 9.0 | 9.0 |
| Norway | | | 2.0 | 0.2 | 0.0 | 0.0 | 13.8 | 4.8 | 1.7 | 0.9 | 0.0 | 68.3 | 0.8 | 4.8 |
| Pakistan | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.8 | 1.4 | 0.0 | 56.4 | -1.1 | -1.7 |
| Peru | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.1 | 0.4 | 0.8 | 33.2 | 2.5 | 6.9 |
| Philippines | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.4 | 0.0 | 55.4 | 2.3 | 1.5 |
| Poland | | | 0.0 | 0.0 | 0.0 | 3.3 | 0.0 | 0.0 | 1.4 | 2.1 | 0.0 | 47.8 | 1.0 | 4.1 |
| Portugal | | * | 2.5 | 0.0 | 0.0 | 12.6 | 0.0 | 0.0 | 2.8 | 2.4 | 0.1 | 64.7 | 0.8 | 4.0 |
| Russia | | * | 7.1 | 1.9 | 0.0 | 0.0 | 0.4 | 0.4 | 9.8 | -5.7 | 0.0 | 9.1 | 1.7 | 7.2 |
| Singapore | | | 0.0 | 0.0 | 2.2 | 118.0 | 0.0 | 0.0 | 0.7 | 0.8 | 0.7 | 94.0 | 5.6 | 13.5 |
| Slovenia | | * | 0.0 | 0.0 | 3.2 | 83.8 | 2.8 | 2.8 | 3.1 | 2.4 | 0.4 | 26.7 | 2.1 | 1.9 |
| South Africa | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 1.1 | 0.1 | 33.0 | 2.9 | 6.2 |
| Spain | | * | 0.0 | 0.0 | 0.0 | 19.1 | 4.6 | 1.8 | 4.7 | 2.4 | 0.0 | 39.5 | 3.5 | 8.3 |
| Sri Lanka | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 3.5 | -0.3 | 88.7 | -1.6 | -1.6 |
| Sweden | | * | 1.6 | 0.2 | 0.0 | 46.8 | 0.0 | 0.0 | 14.8 | 3.5 | 1.3 | 45.9 | 2.8 | 3.7 |
| Switzerland | | * | 1.1 | 1.1 | 0.0 | 1.1 | 7.9 | 7.9 | 10.8 | 1.7 | 4.6 | 47.2 | 0.5 | 2.4 |
| Taiwan | | | 0.0 | 0.0 | 0.0 | 208.6 | 0.0 | 0.0 | 1.7 | 2.4 | 0.0 | 35.2 | 0.9 | 0.9 |
| Thailand | | | 0.0 | 0.0 | 0.0 | 94.0 | 0.0 | 0.0 | 0.0 | 1.8 | 0.0 | 25.1 | 2.4 | 1.6 |
| Turkey | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.3 | 4.1 | 1.3 | 46.1 | 0.0 | 0.5 |
| UK | * | | 8.2 | 5.0 | 14.5 | 40.0 | 0.0 | 0.0 | 7.9 | 4.7 | 0.0 | 43.2 | 1.4 | 5.2 |
| USA | * | | 5.1 | 3.1 | 0.0 | 10.4 | 2.3 | 1.6 | 3.5 | 1.8 | 0.0 | 60.9 | 5.6 | 7.2 |

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Table 2. External Financial Dependence Across Industries in the U.S., 1980-89 and 1980-06

This table denotes external financial dependence across industries in the U.S. (by ISIC industry code) over the period 1980-89 (exf80) and over the period 1980-06 (exf8006)

| ISIC code | Industrial sector | exf80 | exf8006 |
|---|---|---|---|
| 314 | Tobacco | -0.45 | -2.80 |
| 361 | Pottery | -0.15 | -0.22 |
| 323 | Leather | -0.14 | -1.30 |
| 3211 | Spinning | -0.09 | -0.11 |
| 324 | Footwear | -0.08 | -0.78 |
| 372 | Nonferrous metal | 0.01 | -0.01 |
| 322 | Apparel | 0.03 | -0.08 |
| 353 | Petroleum refineries | 0.04 | -0.11 |
| 369 | Nonmetal products | 0.06 | -0.01 |
| 313 | Beverages | 0.08 | -0.28 |
| 371 | Iron and steel | 0.09 | -0.03 |
| 311 | Food products | 0.14 | -0.03 |
| 3411 | Pulp, paper | 0.15 | -0.07 |
| 3513 | Synthetic resins | 0.16 | -0.14 |
| 341 | Paper and products | 0.18 | -0.27 |
| 342 | Printing and publishing | 0.20 | -0.21 |
| 352 | Other chemicals | 0.22 | -0.18 |
| 355 | Rubber products | 0.23 | -0.23 |
| 332 | Furniture | 0.24 | -0.38 |
| 381 | Metal products | 0.24 | -0.26 |
| 3511 | Basic excluding fertilizers | 0.25 | 0.05 |
| 331 | Wood products | 0.28 | -0.02 |
| 384 | Transportation equipment | 0.31 | -0.32 |
| 354 | Petroleum and coal products | 0.33 | 1.40 |
| 3843 | Motor vehicle | 0.39 | -0.07 |
| 321 | Textile | 0.40 | -0.14 |
| 382 | Machinery | 0.45 | 0.18 |
| 3841 | Ship | 0.46 | -0.12 |
| 390 | Other industries | 0.47 | 0.70 |
| 362 | Glass | 0.53 | 0.04 |
| 383 | Electric machinery | 0.77 | 0.31 |
| 385 | Professional goods | 0.96 | 1.13 |
| 3832 | Radio | 1.04 | 1.14 |
| 3825 | Office and computing | 1.06 | 1.05 |
| 356 | Plastic products | 1.14 | 0.04 |
| 3522 | Drugs | 1.49 | 2.10 |

## Table 3. Summary Statistics

This table presents summary statistics of the main regression variables used in the paper.

| Variable | Definition | Obs | Mean | Std. Dev. | Min | p25 | p75 | Max |
|---|---|---|---|---|---|---|---|---|
| *Firm-level variables* | | | | | | | | |
| Growth | Growth in real value added | 2902 | -4.02 | 34.98 | -99.99 | -24.92 | 15.61 | 98.73 |
| Size | Firms' total assets | 2902 | 5.01 | 2.63 | -9.13 | 3.90 | 6.45 | 12.62 |
| Lev | Firms' leverage (liabilities/assets) | 2902 | 0.49 | 0.25 | 0.02 | 0.32 | 0.62 | 4.28 |
| Ppe | Firms'asset tangibility (fixed assets/total assets) | 2902 | 0.31 | 0.19 | 0.00 | 0.15 | 0.44 | 0.99 |
| *Industry-country level variables* | | | | | | | | |
| exf * fiscal1 | | 771 | 0.50 | 1.83 | -24.31 | 0.02 | 0.77 | 9.55 |
| exf * monpol | | 771 | 0.74 | 1.36 | -14.02 | 0.15 | 0.99 | 10.05 |
| exf * bg | | 771 | 17.35 | 44.00 | -52.15 | 0.00 | 15.42 | 440.29 |
| exf * recapa | | 771 | 0.67 | 1.75 | -3.70 | 0.00 | 0.58 | 23.06 |
| exf * asseta | | 771 | 0.54 | 1.85 | -0.67 | 0.00 | 0.06 | 20.58 |
| exf * liq | | 771 | 1.88 | 4.64 | -6.66 | 0.02 | 1.72 | 62.90 |
| exf * crisis | | 771 | 0.14 | 0.31 | -0.45 | 0.00 | 0.16 | 1.49 |
| exf * tcap | | 754 | 81.28 | 115.31 | -149.74 | 14.07 | 103.44 | 910.94 |
| exf * trade | | 768 | 41.46 | 71.64 | -95.30 | 6.88 | 49.40 | 681.10 |
| exf * pdebt | | 771 | 17.81 | 24.30 | -40.04 | 3.04 | 22.14 | 158.85 |
| *Industry-level variables* | | | | | | | | |
| exf | External finance dependence (1980-1989) | 36 | 0.32 | 0.41 | -0.45 | 0.07 | 0.45 | 1.49 |
| exf8006 | External finance dependence (1980-2006) | 36 | -0.02 | 0.74 | -2.80 | -0.23 | 0.05 | 1.42 |
| *Country-level variables* | | | | | | | | |
| Fiscal1 | Discretionary fiscal policy, announced (percent of GDP) | 50 | 1.02 | 3.90 | -16.30 | 0.25 | 3.00 | 9.00 |
| Fiscal2 | Discretionary fiscal policy, used (percent of GDP) | 50 | 1.96 | 3.19 | -7.20 | 0.70 | 3.20 | 13.90 |
| Monpol | Change in short term rates, percent | 50 | 1.70 | 2.55 | -9.40 | 1.11 | 2.42 | 6.74 |
| Monbase | Change in money base, percent of GDP | 50 | 0.07 | 1.53 | -4.99 | 0.00 | 0.14 | 5.83 |
| Bg | Guarantees of bank liabilities (percent of GDP) | 50 | 36.63 | 64.58 | 0.00 | 0.00 | 46.80 | 295.20 |
| Asset guarantees | Guarantees of bank assets (percent of GDP) | 50 | 0.99 | 2.87 | 0.00 | 0.00 | 0.00 | 14.50 |
| Recapa | Bank recapitalization, announced (percent of GDP) | 50 | 2.03 | 4.00 | 0.00 | 0.00 | 2.20 | 24.00 |
| Recapu | Bank recapitalization, used (percent of GDP) | 50 | 1.20 | 2.62 | 0.00 | 0.00 | 1.10 | 13.00 |
| Asseta | Asset purchases, announced (percent of GDP) | 50 | 1.26 | 2.90 | 0.00 | 0.00 | 0.40 | 13.80 |
| Assetu | Asset purchases, used (percent of GDP) | 50 | 0.92 | 2.02 | 0.00 | 0.00 | 0.30 | 8.20 |
| LiqSupport | Liquidity support (percent of GDP) | 50 | 5.97 | 10.82 | 0.00 | 0.29 | 7.87 | 57.54 |
| Crisis | Systemic banking crisis dummy | 50 | 0.38 | 0.49 | 0.00 | 0.00 | 1.00 | 1.00 |
| Tcap | Private credit plus stock market cap (percent of GDP) | 50 | 191.02 | 128.96 | 35.53 | 88.17 | 260.41 | 610.75 |
| mcap | Stock market capitalization (percent of GDP) | 50 | 98.59 | 83.39 | 13.57 | 41.45 | 120.51 | 471.35 |
| Trade | Sum of exports and imports (Percent of GDP) | 49 | 104.22 | 83.99 | 25.83 | 57.45 | 111.23 | 456.65 |
| PDebt06 | Public Sector debt as of 2006 (Percent of GDP) | 50 | 48.02 | 26.54 | 1.67 | 29.53 | 65.92 | 106.50 |

Table 4. Correlations Between Financial Dependence and Policy Intervention Measures

This table reports country-level correlations between the median of financial dependence (exf) of firms in the country and country-level policy measures, with the p-value of statistical significance reported between brackets. For each firm, financial dependence is computed using US data for the period 1980-89.

| Policy intervention measure | Correlation with the median financial dependence of firms in the country |
|---|---|
| Fiscal1 | -0.022 |
| | (0.878) |
| Fiscal2 | -0.066 |
| | (0.646) |
| MonPol | 0.203 |
| | (0.153) |
| MonBase | 0.223 |
| | (0.116) |
| Bg | 0.169 |
| | (0.236) |
| Recapa | 0.073 |
| | (0.610) |
| Recapu | 0.018 |
| | (0.900) |
| Asseta | 0.183 |
| | (0.199) |
| Assetu | 0.180 |
| | (0.206) |

Table 5. Government Interventions, Financial Dependence, and Real Growth in Value Added

Dependent variable is the firm's real growth in value added during 2009 (in percentages). Size is the natural logarithm of the firm's total assets expressed in millions of U.S. dollars. Exf is external financial dependence during 1980's. Fiscal policy (fiscal1) is the change in the fiscal structural balance as announced for the period 2008-2010 normalized by GDP in 2008. Monetary policy (monpol) is the absolute decrease in nominal interest rates between Sep 2008 and Mar 2009. Recapitalization (recapa) is announced bank recapitalizations. Guarantees (bg) is guarantees on bank assets plus guarantees on bank liabilities. Asset purchases (asseta) is asset purchases announced. All regressions include country and industry fixed effects (not included). Standard errors are corrected for clustering at the country level. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

| VARIABLES | (1) growth | (2) Growth | (3) growth | (4) growth |
|---|---|---|---|---|
| size | 1.333*** | 1.331*** | 1.329*** | 1.329*** |
| | (0.291) | (0.292) | (0.292) | (0.338) |
| exf *fiscal1 | 1.280** | 1.291** | 1.357*** | 1.357*** |
| | (0.516) | (0.513) | (0.516) | (0.441) |
| exf * monpol | -0.0737 | -0.0522 | 0.0660 | 0.0660 |
| | (0.937) | (0.942) | (0.956) | (1.074) |
| exf * recapa | 1.336** | 1.348** | 1.290** | 1.290*** |
| | (0.603) | (0.601) | (0.605) | (0.373) |
| exf * bg | | 0.00539 | 0.00841 | 0.00841 |
| | | (0.0190) | (0.0195) | (0.00926) |
| exf * asseta | | | 0.509 | 0.509 |
| | | | (0.614) | (0.446) |
| Constant | -3.531 | -3.595 | -3.690 | -3.690 |
| | (2.626) | (2.621) | (2.626) | (2.685) |
| | | | | |
| Clustering | No | No | No | Country |
| Observations | 2,903 | 2,903 | 2,903 | 2,903 |
| R-squared | 0.140 | 0.140 | 0.141 | 0.141 |

## Table 6. Alternative Specifications

Dependent variable is the firm's real growth in value added during 2009 (in percentages). Size is the natural logarithm of the firm's total assets expressed in millions of U.S. dollars. Lev is the debt to asset ratio of the firm. Ppe is the ratio of fixed assets to total assets of the firm. Exf is external financial dependence during 1980's. Fiscal policy (fiscal1) is the change in the fiscal structural balance as announced for the period 2008-2010 normalized by GDP in 2008. Monetary policy (monpol) is the absolute decrease in nominal interest rates between Sep 2008 and Mar 2009. Recapitalization (recapa) is announced bank recapitalizations. Asset purchases (asseta) is announced asset purchases. Fiscal impulse (fiscal2) is the fiscal impulse over 2009. Monetary base (monbase) is the change in money base or reserve money between Sep 2008 and Mar 2009, as percent of 2008 GDP. Recapitalization (recapu) is bank recapitalizations used. Guarantees (bg) is guarantees on bank assets plus guarantees on bank liabilities. Asset purchases (assetu) is asset purchases used. Liquidity support(liq) is the change in central bank claims against financial institutions during Sep 2008 and Mar 2009 scaled by 2008 GDP. Regression in Column (1) includes firm leverage and tangibility as additional firm-level control variables. All regressions include country and industry fixed effects (not included). Standard errors are corrected for clustering at the country level. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

| VARIABLES | (1) growth | (2) growth | (3) growth | (4) growth | (5) growth |
|---|---|---|---|---|---|
| size | 1.342*** | 1.338*** | 1.335*** | 1.331*** | 1.322*** |
|  | (0.342) | (0.339) | (0.339) | (0.337) | (0.339) |
| lev | -2.578 |  |  |  |  |
|  | (2.631) |  |  |  |  |
| ppe | -9.351 |  |  |  |  |
|  | (6.902) |  |  |  |  |
| exf * fiscal1 | 1.352*** |  | 1.315*** | 1.456*** | 1.322*** |
|  | (0.461) |  | (0.442) | (0.429) | (0.427) |
| exf * monpol | -0.0311 | 0.0334 |  | -0.0802 | 0.0878 |
|  | (1.081) | (1.025) |  | (1.153) | (1.077) |
| exf * recapa | 1.279*** | 0.896** | 1.320*** |  | 1.670*** |
|  | (0.369) | (0.419) | (0.345) |  | (0.465) |
| exf * bg | 0.0107 | 0.0140 | 0.00894 | 0.00656 | 0.00744 |
|  | (0.00903) | (0.00973) | (0.00837) | (0.00937) | (0.00926) |
| exf * asseta | 0.514 | 0.340 | 0.419 |  | 0.677 |
|  | (0.449) | (0.580) | (0.440) |  | (0.472) |
| exf * fiscal2 |  | 1.495*** |  |  |  |
|  |  | (0.446) |  |  |  |
| exf * monbase |  |  | 0.538 |  |  |
|  |  |  | (0.589) |  |  |
| exf * recapu |  |  |  | 1.978*** |  |
|  |  |  |  | (0.554) |  |
| exf * assetu |  |  |  | 0.415 |  |
|  |  |  |  | (0.668) |  |
| exf * liq |  |  |  |  | -0.294 |
|  |  |  |  |  | (0.213) |
| Constant | 0.939 | -3.536 | -3.722 | -3.566 | -3.515 |
|  | (4.193) | (2.718) | (2.593) | (2.713) | (2.667) |
| Observations | 2,903 | 2,903 | 2,903 | 2,903 | 2,903 |
| R-squared | 0.143 | 0.141 | 0.141 | 0.141 | 0.141 |

## Table 7. Other Country Characteristics

Dependent variable is the firm's real growth in value added during 2009 (in percentages). Size is the natural logarithm of the firm's total assets expressed in millions of U.S. dollars. Exf is external financial dependence during 1980's. Fiscal policy (fiscal1) is the change in the fiscal structural balance as announced for the period 2008-2010 normalized by GDP in 2008. Monetary policy (monpol) is the absolute decrease in nominal interest rates between Sep 2008 and Mar 2009.  Recapitalization (recapa) is bank recapitalizations announced. Guarantees (bg) is guarantees on bank assets plus guarantees on bank liabilities. Asset purchases (asseta) is asset purchases announced. Crisis is a dummy variable that denotes whether or not the country experienced a (systemic or borderline systemic) banking crisis. Tcap is total financial sector capitalization computed as the sum of private credit to GDP and stock market capitalization to GDP in 2006. Privo is private credit to GDP in 2006. Mcap is stock market capitalization to GDP in 2006. Pdebt is government debt to GDP in 2006. All regressions include country and industry fixed effects (not included). Standard errors are corrected for clustering at the country level. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

| VARIABLES | (1) growth | (2) growth | (3) growth | (4) growth | (5) growth |
|---|---|---|---|---|---|
| Size | 1.329*** | 1.339*** | 1.331*** | 1.322*** | 1.329*** |
|  | (0.338) | (0.338) | (0.338) | (0.340) | (0.339) |
| exf * fiscal1 | 1.356*** | 1.299*** | 1.403*** | 1.277*** | 1.365*** |
|  | (0.441) | (0.472) | (0.486) | (0.381) | (0.428) |
| exf * monpol | 0.0669 | -0.190 | -0.0965 | 0.234 | 0.0750 |
|  | (1.066) | (1.082) | (1.055) | (1.112) | (1.070) |
| exf * recapa | 1.296*** | 1.197*** | 1.488*** | 1.394*** | 1.290*** |
|  | (0.461) | (0.386) | (0.398) | (0.405) | (0.371) |
| exf * bg | 0.00836 | -0.0329 | -0.0315 | -0.00786 | 0.00742 |
|  | (0.00990) | (0.0238) | (0.0242) | (0.0155) | (0.0138) |
| exf * asseta | 0.510 | 0.108 | 0.191 | 0.444 | 0.513 |
|  | (0.457) | (0.456) | (0.457) | (0.430) | (0.437) |
| exf * cri | -0.0519 |  |  |  |  |
|  | (2.622) |  |  |  |  |
| exf * tcap |  | 0.0294** |  |  |  |
|  |  | (0.0141) |  |  |  |
| exf * mcap |  |  | 0.0350** |  |  |
|  |  |  | (0.0173) |  |  |
| exf * trade |  |  |  | 0.0143 |  |
|  |  |  |  | (0.0126) |  |
| exf * pdebt |  |  |  |  | -0.00593 |
|  |  |  |  |  | (0.0481) |
| Constant | -3.687 | -4.332 | -4.097 | -3.957 | -3.647 |
|  | (2.684) | (2.595) | (2.598) | (2.677) | (2.701) |
| Observations | 2,903 | 2,903 | 2,903 | 2,900 | 2,903 |
| R-squared | 0.141 | 0.142 | 0.142 | 0.140 | 0.141 |

Table 8. Other Industry Characteristics

Dependent variable is the firm's real growth in value added during 2009 (in percentages). Size is the natural logarithm of the firm's total assets expressed in millions of U.S. dollars. Exf is external financial dependence during 1980's. Eqf80 is industry-level dependence on equity financing during 1980's. Exf8006 is external financial dependence during 1980-2006. Eqf8006 is dependence on equity financing during 1980-2006. Liqn is liquidity needs, computed as median ratio of inventories to sales during 2000-06. Ccc is working capital needs, computed using cash conversion cycle method as ratio of inventories to sales plus ratio of receivables to sales minus accounts payables to cost of goods sold, during 2000-06. Sales growth is industry sales growth during 2000-06. Fiscal policy (fiscal1) is the change in the fiscal structural balance as announced for the period 2008-2010 normalized by GDP in 2008. Monetary policy (monpol) is the absolute decrease in nominal interest rates between Sep 2008 and Mar 2009. Recapitalization (recapa) is announced bank recapitalizations. Guarantees (bg) is guarantees on bank assets plus guarantees on bank liabilities. Asset purchases (asseta) is asset purchases. All regressions include country and industry fixed effects (not included). Standard errors are corrected for clustering at the country level. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

| VARIABLES | (1) growth | (2) growth | (3) growth | (4) growth | (5) growth |
|---|---|---|---|---|---|
| Size | 1.193*** | 1.353*** | 1.315*** | 1.319*** | 1.251*** |
|  | (0.252) | (0.339) | (0.328) | (0.330) | (0.392) |
| eqf80 * fiscal1 | 1.833*** |  |  |  |  |
|  | (0.647) |  |  |  |  |
| eqf80 * monpol | 1.317 |  |  |  |  |
|  | (0.923) |  |  |  |  |
| eqf80 * recapa | 1.923*** |  |  |  |  |
|  | (0.603) |  |  |  |  |
| eqf80 * bg | 0.00961 |  |  |  |  |
|  | (0.0146) |  |  |  |  |
| eqf80 * asseta | -0.311 |  |  |  |  |
|  | (0.717) |  |  |  |  |
| exf 8006* fiscal1 |  | 0.991* |  |  |  |
|  |  | (0.520) |  |  |  |
| exf 8006* monpol |  | 0.435 |  |  |  |
|  |  | (0.951) |  |  |  |
| exf 8006* recapa |  | 0.924** |  |  |  |
|  |  | (0.352) |  |  |  |
| exf 8006* bg |  | -0.000767 |  |  |  |
|  |  | (0.00854) |  |  |  |
| exf 8006* asseta |  | 0.447 |  |  |  |
|  |  | (0.470) |  |  |  |
| liqn00 * fiscal1 |  |  | -10.45 |  |  |
|  |  |  | (9.057) |  |  |
| liqn00 * monpol |  |  | 5.244 |  |  |
|  |  |  | (8.147) |  |  |
| liqn00 * recapa |  |  | 13.79* |  |  |
|  |  |  | (6.930) |  |  |
| liqn00 * bg |  |  | 0.248 |  |  |
|  |  |  | (0.184) |  |  |
| liqn00 * asseta |  |  | -6.276 |  |  |
|  |  |  | (4.807) |  |  |
| ccc00 * fiscal1 |  |  |  | 1.490 |  |
|  |  |  |  | (4.460) |  |
| ccc00 * monpol |  |  |  | 5.565 |  |
|  |  |  |  | (6.155) |  |

| VARIABLES | (1) growth | (2) growth | (3) growth | (4) growth | (5) growth |
|---|---|---|---|---|---|
| ccc00 * recapa | | | | 7.598** | |
| | | | | (3.489) | |
| ccc00 * bg | | | | 0.128 | |
| | | | | (0.103) | |
| ccc00 * asseta | | | | 0.353 | |
| | | | | (2.510) | |
| exf * fiscal1 | | | | | 1.435*** |
| | | | | | (0.456) |
| exf * monpol | | | | | 0.480 |
| | | | | | (1.023) |
| exf * recapa | | | | | 1.093** |
| | | | | | (0.447) |
| exf * bg | | | | | 0.0217* |
| | | | | | (0.0118) |
| exf * asseta | | | | | 0.982** |
| | | | | | (0.473) |
| tobinq * fiscal1 | | | | | -0.196 |
| | | | | | (0.294) |
| tobinq * monpol | | | | | -0.0821 |
| | | | | | (0.170) |
| tobinq * recapa | | | | | 0.477** |
| | | | | | (0.184) |
| tobinq * bg | | | | | 0.0140** |
| | | | | | (0.00678) |
| tobinq * asseta | | | | | -0.287** |
| | | | | | (0.126) |
| Constant | -6.827*** | -2.787 | -5.622 | -8.055** | -6.436* |
| | (2.122) | (2.634) | (4.542) | (3.464) | (3.496) |
| | | | | | |
| Observations | 6,581 | 2,903 | 2,903 | 2,903 | 2,479 |
| R-squared | 0.077 | 0.141 | 0.141 | 0.141 | 0.156 |

## Figure 1. Financial Policies [1]
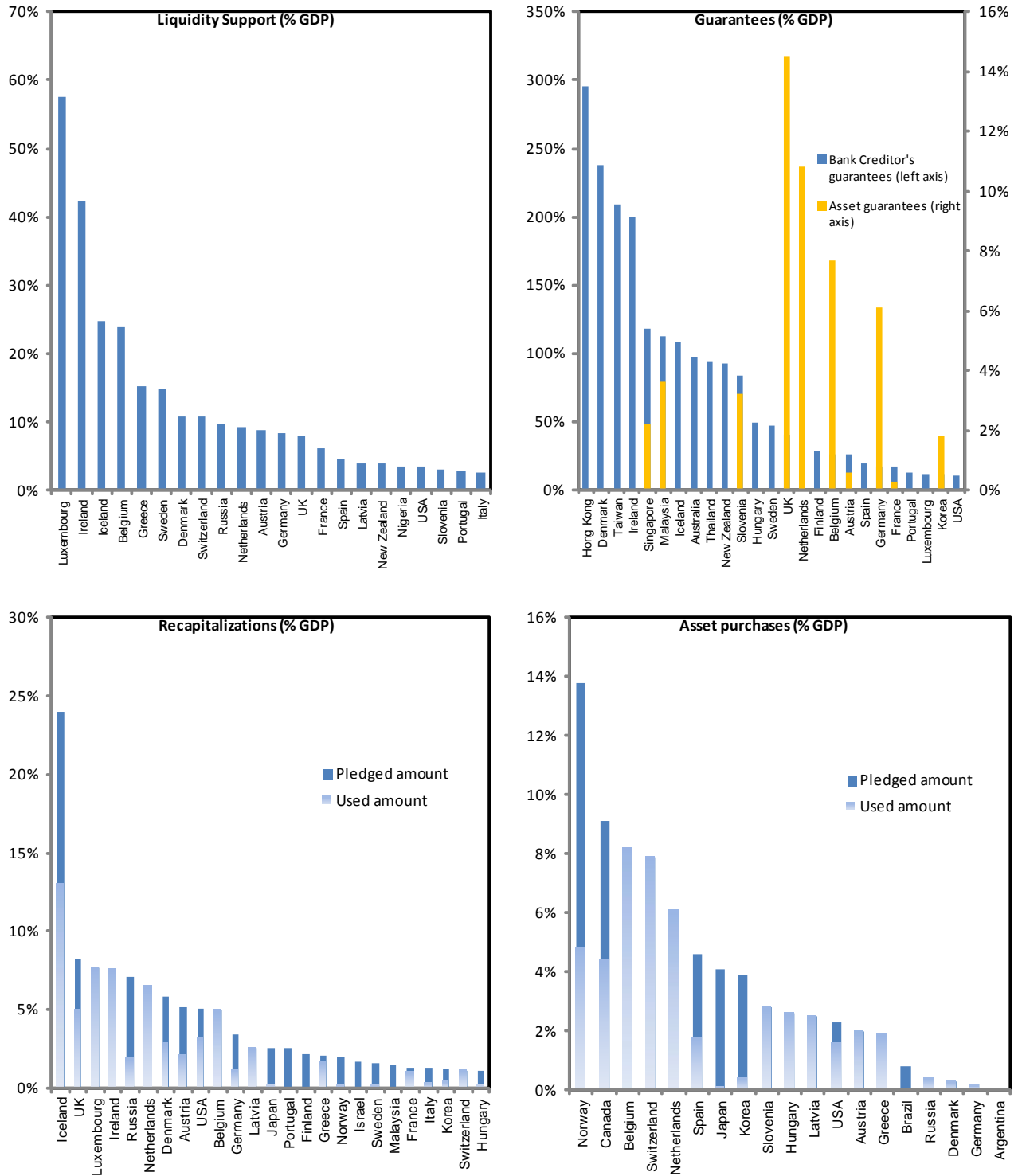


Source: WEO, Official Websites, IMF IFS, and authors' calculations.
[1] Countries not included in the figures are those with amounts below the smallest number included.

# Figure 2. Monetary and Fiscal Policies
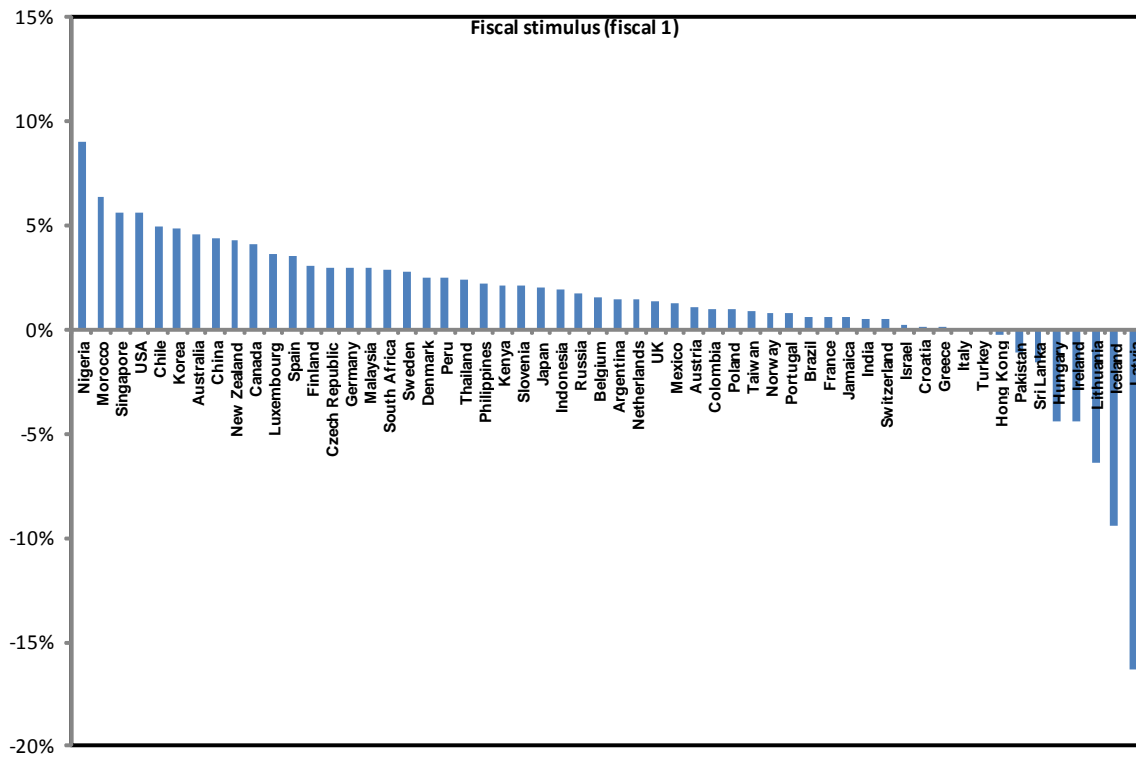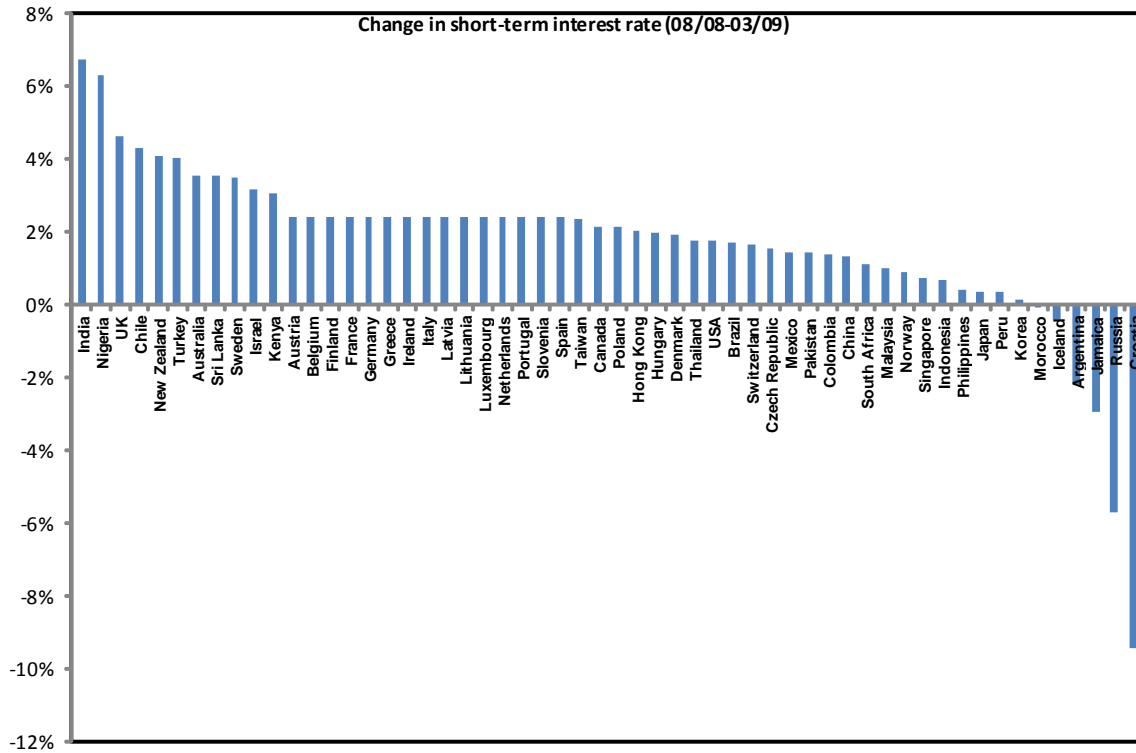


Source: OECD, WEO, Official Websites, IMF IFS, and authors' calculations.