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**The problem with government interventions:**

**The wrong banks, inadequate strategies, or ineffective measures?**

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**Abstract:**

The most recent crisis prompted regulatory authorities to implement directives prescribing actions to resolve systemic banking crises. Recent findings show that government intervention results in only a small proportion of bank recoveries. This study examines the reasons for this failure and evaluates the effectiveness of regulatory instruments, demonstrating that weaker banks are more likely to receive government support, that the support extended addresses banks' specific issues, and that supported banks are more likely to face bankruptcy than non-supported banks. Therefore, government interventions must be sufficiently large, and an optimal banking recovery program must include a deep restructuring process.

**\*Keywords:** Bank risk, business models, bank regulation, financial crisis, banking stability

JEL Codes: G21, G15, E58, G32

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## 1. Introduction

The mortgage crisis has demonstrated the weakness of regulatory authorities and countries' institutional systems in responding to and resolving banking sector problems. Many decisions regarding intervention in the banking sector were made too late, and many such decisions were rushed, without proper evaluation of the effectiveness of the chosen mechanisms and their potential consequences for the banking sector (Hoshi and Kashyap, 2010; McCarthy et al., 2010). Indeed, four years after the start of the mortgage crisis, several countries continue to struggle with banking sector problems. In addition, many institutions continue to hold substantial amounts of toxic debt, making their recovery, and thus economic growth, more difficult. The poor record of most countries in resolving the mortgage banking crisis motivated regulators to adopt various recommendations in shaping future regulatory responses to systemic banking crises (see, for example: "Issues and Assumption for the Design of an Upgraded Bank Resolution Framework", The World Bank Report, 2012; "Technical Details of a Possible EU Framework for Bank Recovery and Resolution", Brussels, 2012; "A Special Resolution Regime on UK Banking Act", Bank of England, 2009; "Resolution Policies Acts on Restoring the Distressed Institutions" in Ireland, Germany, and Denmark; Dodd-Frank Act, 2010). Despite some minor differences between national documents, most countries implemented similar approaches. The recommended policy instruments include blanket guarantees and liquidity provisions for the initial stage of the crisis; and capital injections, asset repurchases, and debt restructuring programs for the resolution of banks' balance sheet problems.

Despite regulators' recent initiatives, the existing literature has presented no clear evidence of the effectiveness of recommended government intervention instruments in restoring banking sector stability. This question is further raised by recent empirical evidence in di Patti and Kashyap (2010) that only one-third of banks that received government assistance have recovered. Based on the theoretical literature there are at least three hypotheses. First, the decisions to intervene might be political in nature and not driven by banks' fundamentals. As a result, interventions might be directed toward politically connected institutions rather than those most in need (Braun and Raddatz,

2010; Tahoun and van Lent, 2010; Duchin and Sosyura, 2011). Second, the bailout programs do not address the problems of specific distressed banks. This might be due to an inadequate strategy relative to a bank's problems or the insufficient scale of an intervention, hampering a bank's recovery (Hoshi and Kashyap, 2010; Giannetti and Simonov, 2013). Finally, di Patti and Kashyap's (2010) results may be attributable solely to the ineffectiveness of policy measures. Delays in implementation, the passiveness of regulators in implementing restructuring measures, and the policy of restraint often exercised by politicians may undermine the effectiveness of policy instruments (Kane, 1989; Boot and Thakor, 1993; Dewatripont and Tirole, 1994; Morrison and White, 2013).

On this basis, we argue that government interventions can only be effective in resolving banking sector distress when appropriate and timely support goes to the institutions most in need of assistance. The present study raises these issues and attempts to determine the effectiveness of government interventions in restoring banking sector stability by posing five research questions. First, do the right banks receive government support? Second, does government support address the problems of the banks receiving assistance? Third, does the government deliver support in a timely manner? Fourth, given the banks' problems, do government interventions effectively restore banking sector stability; and finally, if so, which intervention mechanisms are most important to banking sector recovery?

To conduct this research, we employ a novel bank-level database covering the entire set of intervention mechanisms for all banks in 23 countries during their systemic banking crises. In total, we identified 114 banks bailed out during financial crises over the period of 1991-2002. This dataset allows explicit control for the type of policy measure employed and the scale of an intervention in a bank. Additionally, we also control for the timing of government support. The difference-in-differences (DID) approach employed in our analysis offers several advantages. First, it enables us to compare the performance of banks within the same country that received assistance to those of banks that did not receive assistance during the year of the intervention and thereafter. We have identified 118 non-supported banks with similar specializations and size to those covered by the

bailout programs. We analyze the performance of banks over a five-year period, which captures the average duration of the business cycle (NBER, 2010). Moreover, our DID approach allows us to partially control for the supported banks' level of distress and the timing of the policy intervention. If supported banks are highly distressed relative to other banks, this could indicate that support from the government arrived too late, and that such institutions require policy measures different from those undertaken (Acharya and Yorulmazer, 2007; Freixas and Parigi, 2008).

Second, our methodology allows us to examine the supported banks' performance in the post-crisis period relative to their initial performance levels, enabling an assessment of the effectiveness of policy interventions. Should assisted banks' performance improve relative to the initial period, this could indicate that the intervention mechanisms were successful. If the assisted banks' conditions deteriorate relative to the intervention period, and relative to other banks, this might indicate failure in the intervention mechanisms. Finally, under this approach, we can control for endogeneity. Weaker initial positions in the pre-crisis period may result in a worse post-intervention condition compared to other banks. In such cases, recovery requires time, and does not necessarily imply that the intervention mechanisms were ineffective. Our DID approach allows us to control for this problem by assessing supported banks' performance relative to their initial performance, as well as relative to other banks. Additionally, we include country economic variables, enabling us to control for a country's economic environment and its effects on both groups of banks.

The remainder of the paper is organized as follows. Section 2 describes the relevant crisis containment and resolution policies recommended in government documents; Section 3 describes the data and methodology; Section 4 presents the empirical results with respect to the determinants of bailouts; Section 5 discusses the effectiveness of specific policy measures in restoring banks' health; and Section 6 concludes the paper.

## **2. Mechanisms available to governments to support the banking sector**

Beginning in July 2007, the subprime mortgage meltdown in the United States resulted in a systemic banking crisis in many industrial countries prompting the implementation of various strategies to rescue the distressed banking sector. In the aftermath, many governments and international institutions, including the World Bank and IMF, started work on Banking Sector Resolution Plans to establish future government actions to be taken during such crises. These actions are intended to avert, in a timely and effective manner, contagion effects of crises and restore confidence in the financial sector. In later stages, these should promote banking sector restructuring and enable it to regain stability. Apart from minor differences between country-level documents, the recommended strategies are similar and rely on the experiences of countries in previous systemic banking crises. These include blanket guarantees and liquidity provisions for the containment stage of the crisis; and capital injections, asset purchases, and debt restructuring programs for the resolution of banks' balance sheet problems.

In the initial stage of the crisis, uncertainty and a loss of confidence in the financial system may lead to runs on deposits at distressed banks. This depositors' behavior quickly dries up the liquidity of affected banking institutions, and more importantly, increases the risk of contagion to other healthy banks, a situation that may cause the interbank market to freeze. Without a timely and effective intervention from central banks, bank assets deteriorate further, leading to potential bankruptcy at these institutions in the final stage. It is at this stage of the crisis, that central banks tend to step in by offering blanket guarantees and injecting liquidity into banks. These instruments are intended to restore confidence and provide the banking sector with needed liquidity.

The second stage of the crisis requires complex mechanisms to restructure the banks' balance sheets. Most recently, various countries have implemented Resolution Acts to address banking sector problems. These strategies include government-assisted mergers and acquisitions (M&As), debt write-downs, asset separation involving transfers of non-performing assets to newly created institutions, and as a last resort, nationalization of distressed institutions. Government-assisted

M&As involve government help to find an acquirer for a troubled bank. In practice, the government participates in restructuring a bank's debt by taking it over to improve the chance of success of this type of intervention. In addition, the government may guarantee the future losses of an acquired institution, as in case of the transactions between Bear Sterns and JP Morgan, or Merrill Lynch and Bank of America. Sheng (1996) claims that government-assisted M&As are especially popular when the government has limited funds to handle the closure of insolvent institutions, while the financial industry as a whole has sufficient resources to absorb the failing bank. Therefore, this type of intervention is often used in the initial phase of a crisis. In addition, this bailout strategy is psychologically advantageous, as no institution is treated as a loser. Importantly, as government-assisted M&A transactions do not assume shareholder approval, and since the distressed institution operates on a stand-alone basis, this may strengthen market monitoring mechanisms.

When M&A transactions are not possible given the market conditions, many country-level documents suggest the creation of a "bridge bank." The concept of a bridge bank involves splitting a distressed institution into a "bad" part, which includes the affected bank's toxic assets and is subject to restructuring; and a "good" part, including the bank's non-toxic assets, is transferred to the bridge bank, together with the bank's liabilities. The bridge bank then operates under a new banking license under the supervision of the national financial or resolution authority, with the goal of increasing its value possibly resulting in a sale. This strategy enables governments to handle especially large, "too big to fail" institutions when market transactions are not possible while limiting the costs of resolution. The advantage of this strategy is that it does not require the government to capitalize the newly created institution.

Nationalization involves the capitalization of distressed institutions with national funds in exchange for ownership in the institution to prevent the bank's bankruptcy, and thus limiting the negative consequences of its distress for the banking sector. This is especially common with

systemically important banks. However, it is also one of the most costly forms of intervention in the banking sector.

The current Resolution Acts stress the importance of well-conducted restructuring for the recovery of banking sectors, recommending two possible methods to restructure the bad debt of distressed banks: writing it off at a cost to taxpayers, and creating a restructuring fund such as a “Bad Bank” or an “Asset Management Company (AMC).” Under the first strategy, the government takes over the institution’s bad debt to the amount of the fall in value of the bank’s assets, recapitalizing the bank and enabling it to remain in the market. The assumption behind this mechanism is that the government does not participate in any bank operations, allowing the disciplinary mechanisms of the market to work (Dell’Ariccia and Ratnovski, 2012). By contrast, through the AMC mechanism, non-performing loans are transferred from a distressed institution’s balance sheet to a newly created fund. The fund cleans up the bank’s balance sheet and restores the bank’s profitability, then tries to maximize the recovery of bad debt by actively restructuring it. Importantly, it is assumed that the AMC is in the hands of the private sector and that the state does not dispose of managed assets.

### **2.1. How effective are government interventions and their measures – Literature Review**

The academic literature presents mixed evidence regarding the effects of various bailout strategies on banks’ performance. Theory suggests that government interventions should positively affect banks’ performance due to reductions in refinancing costs, the restructuring of distressed debt, and improved capital ratios due to capital injections. Empirically, Hakenes and Schnabel (2010) support this argument, documenting that government interventions increase banks’ profitability due to access to more favorable funding. Similarly, Cordella and Yeyati (2003) argue that liquidity provisions positively affect banks’ capital and improve banks’ charter values. However, Berger and Bouwman (2009), Duchin and Sosyura (2011), and Mehran and Thakor (2011) find that capital injections improve banks’ capital positions. Recently, such findings have received support in research into the



mortgage crisis of 2007-2010. Rose and Wieladek (2012), using bank-level data from the UK, examine the effects of public capital injections and nationalization. The authors find that such measures were successful in restoring market confidence during the mortgage crisis in the UK, and consequently improved banks' financial performance. Harris et al. (2013) examine the impact of the Troubled Asset Relief Program (TARP) capital injections on the operational efficiency of commercial banks. They find that such restructuring methods decreased the operational efficiency of funded banks but improved asset quality. Ding et al. (2012) document that government interventions in Asian economies have improved all six financial indicators in terms of solvency, credit risk and profitability, compared with the pre-crisis period. In addition, regulatory actions may restrict the banking business and thus discipline bank management (Dam and Koetter, 2012). Government interventions are also likely to strengthen banks' monitoring incentives, which should hasten banks' recovery (Dell'Ariccia and Ratnovski, 2012; Mehran and Thakor, 2011). Recently, the empirical literature has found that government interventions are not as effective as initially assumed in the theoretical literature. Di Patti and Kashyap (2010) argue that only one-third of banks recover, given regulatory support. Tahoun and van Lent (2010) and Duchin and Sosyura (2012) show that government interventions might be motivated by political interests. The authors show that, as a result, politically connected institutions are more likely to receive government support than other private institutions. The evidence whether these banks indeed need a help is ambiguous in the existing literature. Faccio et al. (2006) and recently Iannotta (2007) document that though politically connected institutions are more likely to receive government support, they also exhibit weaker performance at the time of intervention than private institutions. On the other hand, Gropp et al. (2011) document that bailouts offer banks the access to cheaper capital and thus banks may want to profit from governmental actions. Thus, we might expect that not necessarily weaker banks will apply for the government money; however we might expect that those with politically connections will be more likely to receive it (Faccio et al., 2006). Indeed, the report IMFGFR (2007, Chapter 3, p.7) shows that more capitalized investment banks, and in some countries also commercial banks with a better financial

performance were subject to government interventions during the mortgage crisis. This may point toward some political aspects involved in the governmental actions for these institutions.

In addition, government support might be ineffective because it comes too late. Such inconsistency in timing suggests a lag between the stage when a bank requires support and the period when such assistance is granted, a period when a bank's liquidity crisis may become transformed into an insolvency crisis. This effect might also be due to a lag in the accounting system. A bank may not recognize its problems at the time when support is offered, while its situation may later deteriorate dramatically (James, 1991; Bennet and Unal, 2009; Hoshi and Kashyap, 2010). In addition, some studies argue that the effectiveness of government interventions depends on the size and design of the government program. Giannetti and Simonov (2013) document that when the amount of government support is not sufficient to resolve a bank's problems and to build a significant capital buffer for the future, such a bank has an incentive to increase its risky activities. Similarly, Brei et al. (2013), examining rescue packages in Western economies during the 1995-2010 period, document that recapitalization helps banks recover only once the injected capital exceeds a critical threshold and a bank's balance sheet is sufficiently strengthened. With respect to the effectiveness of intervention programs, Schnabel (2004) documents that only liquidity provisions combined with blanket guarantees can restore confidence in the banking sector and thus the liquidity of banks. However, House and Masatlioglu (2010) argue that liquidity injection programs will not be effective if a bank has substantial debt overhang, with the bank remaining undercapitalized, although its liquidity position is improved. Nonetheless, cleansing a bank's balance sheet of toxic assets improves a bank's charter value and thus gains the bank more favorable access to capital. However, Bhattacharya and Nyborg (2010) argue that if a bank experiences a debt overhang, equity injections and asset purchase programs should be used to improve the bank's capital position. Finally, the experiences of many countries, especially Japan, Sweden and the U.S., show that the effectiveness of bailout mechanisms depends on a country's institutional structure. Jonung (2009) argues that the reason why several bailout measures did not work during the worldwide mortgage crisis of 2007-

2010, although such measures worked well during the Swedish crisis, relates to differences in countries' institutional environments. Strong transparency and disclosure mechanisms, supervisory authority able to impose needed restructuring in the banking sector, and a limited governmental role in the debt restructuring process, accompanied by large-scale protection of banks by the government, guaranteed the resolution of the distressed Swedish banking sector. The lack of such mechanisms, by contrast, postponed banking sector recovery in other countries during the mortgage crisis (Hoshi and Kashyap, 2010).

### **3. Methodology and Data**

#### **3.1. Methodology**

We analyze the effectiveness of specific government measures in resolving banks' problems. In addition, we examine how the effectiveness of specific bailout strategies depends on a country's institutional infrastructure. Effectiveness refers to the potential for a bank to gain financial strength and thus lowering the probability of bankruptcy in the years following intervention. To this end, we employ a difference-in-differences approach, allowing a comparison of bank performance between those supported by government intervention with those that did not receive such support. The sample of non-supported banks is restricted to domestic institutions with the same specialization and similar asset size as the institutions that received support. This approach will allow us to avoid the identification problem.

The analysis is performed on the unbalanced panel of banks over the five-year period after a specific government intervention in a bank, allowing a comparison of bank performance at the time of intervention, and over the following five years. A five-year period to capture the average length of a business cycle (NBER, 2010). Moreover, we also argue that effective intervention mechanisms require some time.

There are therefore two sources of variation: the time during and following a government intervention, and the cross-section of banks that received support versus those that did not. We estimate the following regression:

$$Y_{i,c,t} = A_c + \alpha_1 * X_{i,c,t} + \alpha_2 * Z_{c,t} + \alpha_3 * (Intervened * After\ the\ crisis) + \alpha_4 * (Non-Intervened * After\ the\ crisis) + \varepsilon_{i,c,t} \quad (1)$$

$A_c$  represents country-fixed effects, and  $Y_{i,c,t}$  represents a distress measure at time “ $t$ ” of a bank “ $i$ ” from country “ $c$ .” We measure bank’s distress using the following indicators: z-score (in logarithms), the liquidity ratio (liquid assets to total deposits and short-term funding), the equity ratio (equity to total assets).  $X_{i,c,t}$  is a variable that includes bank characteristics including size (assets in logarithms), activity defined as the ratio of loans to total assets, and efficiency measured by the ratio of overhead to total revenues. In addition,  $Z_{i,j,t}$  includes country control variables (GDP growth and inflation in logarithms). In particular, a country’s GDP growth rate allows us to control for a country’s degree of distress, which affects both supported and non-supported banks. Below, we control for a country’s institutional environment by including the following variables: a country’s deposit insurance system, a country’s capital requirements, and the power of a country’s supervisory authorities. Intervened is a dummy variable that takes a value of one if a bank has received government support, and Non-intervened is a dummy variable that takes a value of one if a bank has not received government support. After the crisis is a dummy variable that takes a value of one for all years after the government intervention and zero for the year in which a government intervenes. Finally,  $\varepsilon_{i,b,t}$  is an error term. The key variables of interest are the interaction terms Intervened\*After the crisis and Non-Intervened\*After the crisis. We are interested in the difference between these two variables to determine whether the resolution strategies employed allowed supported institutions to recover their initial positions. Our inference is thus based on a comparison of the coefficients  $\alpha_3$  and  $\alpha_4$ .

Since banks in countries more affected by financial shock will exhibit poorer performance than institutions in other countries, to eliminate the effect of the magnitude of financial shock, we cluster the regression standard errors at the country level.

## **3.2. Data**

### **3.2.1. Dependent variables**

To capture the impact of bailout strategies on a bank's performance, we use three variables: z-score measure, capital ratio, and the liquidity ratio. These three ratios have been used widely in the existing literature (Laeven and Levine, 2009; Gropp et al., 2011). We focus on these performance measures as they also determine the probability of a bank's bankruptcy. The aim of government interventions is to restore a bank's financial condition and prevent bankruptcies. Analyzing the change in the level of these measures will provide answers to the question of how effective the intervention measures were to alleviate the bank's distress, and thus limit the probability of the bank's future collapse.

The variable of primary interest is the z-score (Zscore). This variable measures a bank's distance from insolvency and has been used widely in recent literature (e.g., Laeven and Levine, 2009). Specifically, it shows the distance of banks' capital from bankruptcy and is equal to the return on assets plus the capital-asset ratio divided by the standard deviation of asset returns. It is defined as a z-score =  $(ROA + CAR) / \sigma(ROA)$ , where ROA is the rate of return on assets, CAR is the ratio of equity to assets, and  $\sigma(ROA)$  is an estimate of the standard deviation of the rate of return on assets as a moving average. The z-score indicates the number of standard deviations that a bank's return on assets must drop below its expected value before equity is depleted and the bank becomes insolvent (Boyd and de Nicolo, 2005), with a higher z-score indicating greater stability. As the z-score may be highly skewed, we follow Laeven and Levine (2009), and use the natural logarithm of the z-score as the risk measure. In addition, we use the capital ratio (Equity), represented in our study by the ratio of equity to assets, which measures the degree of protection offered to the bank by its equity. We expect that

capital injections, in particular, should positively affect banks' capital ratios. In addition, to evaluate the effectiveness of individual bailout measures, we use the liquidity ratio (Liquidity).

The first stage of the crisis results in a deterioration in banks' liquidity positions. Without adequate mechanisms, liquidity problems can quickly become a capital crisis. Greater liquidity will also positively influence a bank's access to capital. To investigate how injections enable banks to improve their liquidity positions, we include the ratio of liquid assets to short-term borrowing.

### **3.2.2. Control variables**

Our primary interest is in the effects of various intervention mechanisms on a bank's performance. To this end, we include five intervention mechanisms in our regressions, as well as a general intervention dummy. The latter exclusively captures the effect of any kind injection into a distressed institution. The dummy intervention variable is equal to one if any type of intervention, including blanket guarantees, liquidity provisions, government-assisted mergers, or use of an AMC have been employed to restore a distressed bank's financial position and zero for non-assisted banks.

Further analysis examines the effects of specific types of government interventions on the assisted banks' recovery. Therefore, we include a dummy variable equal to one if an assisted bank has been offered government protection and zero otherwise. Similarly, we include a dummy variable equal to one if an assisted bank has either received liquidity provisions, been nationalized, been restructured with government assistance and merged with another institution, or been restructured through the use of an AMC. For all banks not subject to one of these policy applications, we assign a value of zero.

Moreover, the loans-to-assets ratio (Activity) controls for the volume of banking activity. We assume that banks more heavily involved in traditional banking activities suffer less from the crisis than banks with higher ratios of non-interest activities (De Jonghe, 2010). In addition, the design of the intervention program will vary, depending on the types of activities a bank engages in. Several studies suggest that recovery for less efficient banks requires more time and that such banks tend to

have lower capital ratios (Kwan and Eisenbeis, 1997; Williams, 2004). Following these studies, we include a cost to income ratio (Efficiency) to control for operating efficiency. Additionally, we also include return on assets(ROA) to control for the magnitude of financial shock affecting each financial institution. We expect that intervention is more likely for banks with weaker financial performance and will require more time to recover. We also control for bank size, defined as total assets (in logarithmic form) (Asset), a variable used to measure a bank's market power, returns to scale, and diversification benefits. Larger banks are more likely to be heavily affected by the crisis than smaller banks, and thus require more complex resolution measures (Dam and Koetter, 2012). Additionally, they are more likely to receive support, due to their systemic importance. We control for a country's macroeconomic environment by including GDP growth (Gdpgrowth) and the inflation rate (in logarithm) (CPI). We assume that bank recovery will be negatively affected as a crisis worsens. Finally, we capture the differences between countries' institutional structures by including institutional variables, including explicit deposit protection, capital adequacy requirements, and strength of domestic supervisors in imposing changes. Existing research has shown that stronger institutional environments may increase the effectiveness of regulatory intervention measures due to the role of market mechanisms (Dam and Koetter, 2012; Dell'Ariccia and Ratnovski, 2012). Finally, we include the level of concentration of the banking sector(Concentration), measured as the percentage of banking system assets held by the three largest banks. We expect that systemic crises will have a greater effect with the increasing concentration of the banking sector, due to the appearance of "too big to fail" institutions.

### **3.3. Sample**

#### **3.3.1. Country-level Statistics**

Table I presents country-level summary statistics. Additionally, it shows the timing of systemic banking crises together with their locations.

**[Table I]**

The countries differ with respect to development stage, the nature and depth of their crises, the structure of their banking sectors, and government reactions to systemic banking crises. Most of sample consists of developing countries, with only five out of twenty-five classified as developed. This is not surprising, as Kaminsky and Reinhart (1999) document that crises are much more prevalent in emerging economies than in developed economies. Moreover, regarding the extent of government involvement in banking crises, intervention was more common in developing nations. In particular, in countries such as Indonesia, Columbia, or Malaysia, the government support covered the majority of the banking sector, a consequence of the high concentration of these countries' banking sectors. However, with respect to the types of government support, there are no significant differences between developing and developed countries.

### **3.3.2. Differences in banks' performance – bivariate test**

Table II presents bivariate DID estimations of performance of supported and non-supported banks over two time-periods: the year of intervention, and the five consecutive years following the intervention. The results are grouped by intervention measure.

#### **[Table II]**

In general, we find statistically significant differences in performance between supported and non-supported institutions after the intervention period. At the time of intervention, there are no observed differences between these two banking groups. This is not surprising, given the systemic nature of such crises, which normally affect the entire banking sector. This evidence also confirms recent studies suggesting that it is very difficult for policymakers to distinguish between distressed and non-distressed institutions (Freixas and Parigi, 2008). Interestingly, the results suggest that the gap in the banks' financial performance increases as the crises continues. As our results show, supported institutions suffer more than non-supported institutions, a surprising finding given that intervention measures aim to restore the financial performance of distressed banks. This result might suggest the ineffectiveness of regulatory actions. Specifically, we find that following the intervention



period, banks that receive support are less capitalized and have lower profitability ratios and riskier portfolios than other institutions. Importantly, we observe significant differences in these indicators, depending on the policy instruments applied to banks.

We observe the largest differences in bank performance among banks that were offered government protection, both in the cases of nationalized banks and banks that participate in debt restructuring programs involving AMCs. More specifically, the results suggest that institutions supported by such measures have lower z-scores, lower capital ratios, lower liquidity ratios, and larger proportions of impaired loans among their assets following interventions (specification I, III, V). This result might suggest that banks that receive aid tend to engage in more risky projects than control group banks. In addition, the results suggest that supported institutions become less efficient than their non-supported competitors following intervention. These results appear to support the literature, which argues that politically dominated instruments decrease the efficiency of banks due to lower governance standards and lack of a proper restructuring process, resulting from a policy of restraint and the limited expertise of national regulators with respect to debt restructuring (Kane, 1989; Klingebiel, 2000; Morrison and White, 2013).

In terms of bank activity, there is no statistically significant difference between supported and non-supported banks, although supported banks have lower capital ratios than non-supported banks. The only exception is nationalization, where the activity of nationalized banks significantly decreases compared to both the intervention period and other banks. This finding might suggest that political involvement hampers banking sector recovery, a result that is consistent with the literature on the state-ownership of banks, which suggests that politicians might use banks to pursue their own interests (Shleifer and Vishny, 1994; Iannotta et al., 2007).

Our evidence suggests that liquidity provisions tend to improve banks' financial indicators (specification II). Although there are statistically significant differences in the ratios between supported banks and banks in the control group, this difference appears to decrease relative to the

intervention period. This evidence suggests that liquidity provision might be an effective way to improve banks' financial ratios, in agreement with studies documenting that liquidity provision improves banks' liquidity, giving banks access to additional capital (Hakenes and Schnabel, 2010). Improved performance in the supported banks following government-assisted merger transactions is due to the nature of this measure, and reflects the superior financial performance of the acquirer compared with that of the acquired bank.

#### **4. Empirical results**

##### **4.1. Do the right banks receive government support during the crises?**

To assess the effectiveness of regulatory policy measures in restoring banks' health, the right banks must be subject to intervention and the bailout instruments should address the problems of such banks. Thus, in this section, we estimate the probability of receiving a specific policy measure, given a bank's and country's characteristics. We run probit, and alternatively, logit regressions on the sample of non-supported and supported banks to investigate the determinants of government intervention. We assign a dummy variable equal to one to a bank that was supported at time  $t$  and zero for all other banks. To avoid simultaneity bias, we include control variables as one-year lags ( $t-1$ ). We also include the country's dummies in the regression. We assume that banks with weaker performance and capital ratios are more likely to receive appropriate government support. Table III presents the results. The first column lists the general determinants of government support. However, the additional estimations refer to the determinants of the use of specific policy instruments defined as: blanket guarantee, liquidity provision, government-assisted merger, nationalization, and AMC, respectively.

#### **[Table III]**

The regression results in the first column present important implications. Specifically, they suggest that less capitalized banks are more likely than more capitalized banks to receive government support. This result appears to suggest that regulatory aid goes to the institutions that need it most,

in line with Dam and Koetter' (2012) study. Further, this result is consistent with evidence provided by Faccio et al. (2006), who show that while bailouts go to politically connected firms, these firms exhibit significantly worse financial performance than their non-connected peers at the time of and following the bailout. Thus, the authors conclude that, for some countries, the allocation of capital through connected firms may alleviate distressed economies.

Moreover, we find that larger institutions are more likely than smaller institutions to receive government support during crises, reflecting the systemic importance of such banks, and consistent with such studies from Gropp et al. (2011) or Dam and Koetter (2012). The estimations suggest that less liquid banks are more likely than others to receive liquidity support such as public protection and central bank funding (specification (2) and (3)). The result is promising, as the purpose of such measures is to restore banking sector confidence by improving the sector's liquidity. Thus, such a result justifies regulatory actions.

The findings for restructuring programs suggest that banks with balance-sheet problems are more likely to receive capital support. The equity coefficient on nationalization is negative and statistically significant (specification (4)). Again, the results justify the use of these measures in cases of highly distressed banks. Additionally, the regression results suggest that less profitable banks are more likely than others to be nationalized, suggesting that nationalization is used as a last resort for banks in deep financial and capital distress. We expected that government-assisted mergers were more likely to be used in countries less affected by the financial crisis, or in the initial stages of a crisis. Accordingly, we observe a positive sign for the GDP growth coefficient. Finally, the data suggest that the use of the restructuring programs is reserved for larger banks. However, we do not observe significant coefficients for other measures taken to support banks. The results may indicate that objective criteria do not always drive the decision to assign a bank to a restructuring program. This could also explain why most research finds that this measure is not very effective in restoring banking sector stability (Klingebiel, 2000; Hoshi and Kashyap, 2010).

## **5. How effective are government interventions in restoring banks' health?**

The aim of government interventions is to ensure that banks survive and operate competitively, which requires improvements in banks' liquidity, capital, and profitability ratios. The empirical results from this study have shown that bailout measures target distressed banks, and that the appropriate types of policy instruments were employed to address banks' specific problems. This section investigates whether these measures assist distressed banks recover from their distressed positions.

### **5.1. Probability of recovery, given government intervention instruments**

We first assess the effectiveness of intervention mechanisms by estimating the probit model to evaluate the likelihood that a bank that receives government support survives over the following five years, and thus recovers from distress. This type of analysis provides a first impression of the effectiveness of intervention measures. We run the regression on the sample of supported banks, assigning a dummy variable with a value of one to a bank that fails within five years following government intervention, and zero to a bank that survives. Hence, a positive coefficient indicates a higher probability of a bank failure. This analysis uses the same explanatory variables in the regression as previous sub-section, including the dummies for the types of intervention instruments employed. Similarly, we include country fixed effects to explicitly control for countries' institutional differences, which might affect banks' recoveries. Table IV presents the regression results.

#### **[Table IV]**

The estimation results have interesting implications. In general, the estimation results show that government intervention increases the probability of a bank's failure, a result that is highly statistically significant. In addition, the magnitude of the effect is large. In the previous section, we showed that government support goes to the banks most in need. Therefore, we would expect that government actions, if effective, should improve a bank's financial condition and increase the probability of a bank's recovery. These findings suggest the opposite. Government interventions may be ineffective because they occur too late, the financial support provided is too weak to sufficiently

improve the banks' conditions, or the intervention is poorly implemented. Findings with regard to specific bailout measures present a more detailed picture.

Liquidity provisions and government-assisted mergers are positively correlated with bankruptcy in the years following the intervention. The results might suggest that liquidity provisions were implemented too late, and did not address the bank's actual problems, in that these banks may have already experienced capital-related problems before the crisis. Alternatively, the liquidity provisions may not have been sufficiently large to restore banks' liquidity positions, leading to insolvency. The effect of government-assisted mergers seems to be due to the nature of this policy measure, which involves the absorption of a distressed bank.

Blanket guarantees and nationalizations are positively related to bank survival following an intervention, with both coefficients highly significant and negative. There might be several explanations for this. First, both public guarantees and nationalization offer government protection against bankruptcy. Second, it is relatively more likely that such banks will receive additional support if the crisis continues and their situation deteriorates. This also explains why these measures have correlated with banks' risk-taking behavior (Dam and Koetter, 2012; Hryckiewicz, 2014). The results do not show a significant effect of AMC on the probability of bank failure. This result is consistent with the findings of Klingebiel (2000), who shows that the effectiveness of this measure is mixed and mainly depends on the institutional mechanisms of a country.

Coefficients for other financial variables are largely consistent with the existing literature. Higher profitability and bank capital decreases the probability of failure. The results also suggest that larger institutions tend to collapse less frequently than smaller ones. This result could be expected, given the various measures and public protection targeting large institutions due to their systemic importance (Brown and Dinc, 2009). Finally, the results show that probability of bank failure decreases as the sector becomes more concentrated. This result is consistent with the explanation

that more concentrated banking systems are more easily monitored (Beck et al., 2006). Alternatively, the larger institutions are more likely to be rescued because they are “too big to fail.”

## **5.2. The effectiveness of government intervention measures**

### **5.2.1. Difference in differences approach – supported versus non-supported banks**

In the previous sub-section, we demonstrated that banks in more distressed positions are more likely than others to receive government support. However, our evidence also shows that such banks are more likely to collapse afterwards. This result is surprising, given that intervention measures are implemented to save distressed banks. Given the previous analysis, we examine the reasons behind the increased probability of failure for banks that receive support by examining the effectiveness of government interventions in improving the performance of distressed banks. To this end, we use the DID approach to compare the performance of supported banks with that of non-supported banks at the time of intervention, and thereafter. This methodology allows us to test our hypotheses regarding the timing, scale, and effectiveness of government intervention instruments and to control for endogeneity resulting from the fact that supported banks have a weakened position at the time of intervention, and therefore show weaker performance after government intervention compared to other banks.

Comparing supported banks with non-supported banks at the time of intervention allows us to examine the supported banks' financial conditions. A highly significant difference between these two banking groups might indicate that supported banks were already highly distressed, suggesting time inconsistency with respect to government support. Macroeconomic factors are included to partially control for external factors that might also cause bank distress at the time of intervention. If we find significant improvements in supported banks following the intervention program, as compared with the previous period, we may conclude that the intervention measures are effective in restoring banks' financial performance.

We will also compare relative bank performance under different intervention programs. This analysis will allow us to evaluate the effectiveness of various bailout programs, where we allow for the simultaneous implementation of several policy measures for one bank. We can then test our hypotheses regarding the importance of scale and structure of government interventions in determining the effectiveness of intervention instruments. Table V presents the results of our analysis, grouped by intervention policy measures, for the following performance measures: (log)zscore, equity ratio, and liquidity ratio, respectively.<sup>1</sup>

#### [Table V]

The estimation results present several interesting findings. First, they show that, in general, supported banks' performance deteriorated in the period following intervention compared to the intervention period. It is possible that intervention measures were unable to significantly improve bank performance. By contrast, non-supported bank performance improved or just slightly deteriorated during the same sample period. This result is consistent with the literature presented by opponents of government intervention, suggesting that government actions are ineffective in restoring long-term banking sector stability (di Patti and Kashyap, 2010).

More importantly, the results document that differences in performance between supported and non-supported banks is significant following intervention but not at the time of intervention. This finding appears to preclude the hypothesis that interventions occur too late and thus go to bankrupt banks, rather than to distressed banks that require government support. Our previous findings also suggest that regulators are able to select the institutions that most require government assistance. These findings further suggest that the timing and types of institutions subject to government actions are consistent with theoretical background.

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<sup>1</sup> We also check the robustness of our analysis, using such measures as the ratio of loan loss reserves to total assets and the ratio of impaired loans to total assets. The main results remain the same and this additional analysis is available upon request.

However, we observe heterogeneity in our results, depending on the intervention instrument and the bank performance measure used. The largest performance decreases occurred among banks offered blanket guarantees, were nationalized, or used an AMC as a debt restructuring mechanism. These results are also in line with our summary statistics. For all measures, we observe that bank performance deteriorated relative to both the intervention period and to competitors. These findings are independent of the bank performance measure used. However, for non-supported banks, we observe only a slight decrease in performance compared with the intervention period, and significantly smaller than that for supported banks.

The results have several important implications. First, they suggest that blanket guarantees are ineffective in providing liquidity for banks that already have liquidity problems. Accordingly, the evidence suggests that blanket guarantees do not effectively restore confidence during a liquidity crisis. This finding is consistent with evidence provided by Honohan and Klingebiel (2003) and Kane and Klingebiel (2004), who show that blanket guarantees are only effective if they are credible, a condition that is difficult to fulfill during systemic banking crises. Similarly, Schnabel (2004) shows that only a combination of blanket guarantees and significant liquidity provision can restore the liquidity of distressed banks. Additionally, our results regarding liquidity provisions show that this measure is effective in improving banks' performance. In particular, we do not observe any significant deterioration in the ratios used here to measure performance among supported banks following this type of intervention. We find an improvement in the capital ratio following liquidity injections when that ratio is used as our endogenous variable. This most likely suggests that improved liquidity grants banks access to favorable capital funding. However, taking into consideration the results of the previous sub-section suggesting that these banks are also more likely to fail, we argue that the scale of financial support granted to these banks may have been insufficient to build a significant capital buffer against the future consequences of the crisis. Thus, as our results suggest, the scale of financial support appears to be important in enabling a bank to recover.



Second, we observe that the z-score and liquidity ratios significantly decreased for nationalized banks, compared with the initial period, whereas the capital ratio slightly increased for these institutions. These results might indicate that, despite increases in the capital ratio, pure capital injections cannot restore a bank's balance sheet. Deep restructuring is required to clean up a bank's toxic assets and restore its long-term sustainability (House and Masatlioglu, 2010; Bhattacharya and Nyborg, 2010). Importantly, this also explains the ineffectiveness of the AMC intervention instrument. Politicians' reluctance to undertake restructuring often renders these measures ineffective (Kane, 1989; Boot and Thakor, 1993; Morrison and White, 2013). The results regarding government-assisted mergers show that the financial performance of banks participating in this type of rescue program improved following the intervention period, an unsurprising result, given that the distressed institution must be restructured before a takeover.

### **5.2.2. Exploring heterogeneity among supported banks**

Generally, we have shown that supported banks underperformed relative to their non-supported counterparts, as well as to their own performance at the time of intervention period, controlling for country-specific economic conditions. These results imply that government interventions are ineffective in restoring banking sector stability. In this section, we examine how the effectiveness of government interventions might change, as we control for the scale and structure of bailout programs. By the structure of a bailout program, we refer to the combination of various regulatory measures applied to a given bank. By the scale of intervention, we refer to the number and type of intervention measures. We assume that, among interventions, various forms of capital injection are largest in scale and thus should significantly improve a bank's charter value. To answer this question, we run the same types of regressions as in the previous sub-section, limiting the sample to supported institutions. This approach allows us to evaluate the relative effectiveness of various bailout programs. In other words, we compare the effectiveness of individual mechanisms to other available intervention mechanisms, or to intervention packages. We examine the relative effectiveness of the

following structures: 1) guarantees with liquidity provisions, 2) nationalization with the use of an AMC, 3) government-assisted mergers with the use of an AMC, 4) guarantees with nationalization and use of an AMC, 5) liquidity provisions with nationalization, and 6) liquidity provisions and government-assisted mergers with the use of an AMC. We then compare the financial performance of banks supported by a single policy measure (PART I) and by a combination of instruments (PART II), in both cases relative to banks supported by other measures. Table VI presents the results, grouped into two parts: banks supported by a single policy measure and banks supported by a combination of different measures.

**[Table VI]**

The first part of the analysis demonstrates that the financial performance of almost all supported banks deteriorated relative to the initial period. However, the regression results also show that, under a given specific intervention program, this drop was less significant. This finding suggests distinct degrees of effectiveness of various intervention measures. We find that the greatest drops in performance occurred in banks that were offered blanket guarantees, nationalized, and employed the AMC strategy. We also find that differences in the financial performance of these banks, compared to other supported banks and with their own performance in the initial period, remain statistically significant. For other intervention measures, the differences disappear. For government-assisted mergers, we observe an improvement in financial performance compared with that of other supported banks. However, this result is due to the integration of a distressed bank into a stronger institution. The evidence suggests that blanket guarantees and nationalization are the least effective bank performance restoration measures, supporting our previous conclusions.

The second part of the table presents the estimation results for various bailout programs. In general, these results provide a similar picture. All supported banks experienced significant drops in financial performance (except in cases of government-assisted mergers) relative to the intervention period. The results, however, indicate that the largest drops occurred in cases of blanket guarantees,

nationalization, and the AMC strategy. The results appear to suggest that this combination of policies is the least effective in restoring banking sector stability. However, we also observe that declines in z-scores are lowest for the combination of liquidity provisions with nationalization and AMC.

This result suggests two important conclusions. Given a significant scale of intervention, it appears that the scale of government support affects a bank's recovery. It also appears that the design of a bailout program plays a role in facilitating a bank's recovery. We show that liquidity provisions accompanied by appropriate resolution mechanisms are the most effective policy combination in achieving banking sector recovery. This conclusion is consistent with studies that find that pure capital injections are insufficient to restore banking sector stability. Restructuring mechanisms are therefore needed, a conclusion in line with the evidence from House and Masatlioglu (2010) and Bhattacharya and Nyborg (2010). In addition, our results suggest the ineffectiveness of politically dominated intervention instruments in restoring banking sector stability, in accordance with findings from Berger and Bouwman (2009), Gropp et al. (2011), and Dam and Koetter (2012).

### **5.2.3. Impact of a country's institutional environment on the effectiveness of regulatory intervention measures**

As shown previously, the scale and design of a bailout program influences its effectiveness. Existing theory also suggests that appropriate institutional infrastructure may enhance the effectiveness of intervention. Sweden is an example where strong regulatory mechanisms and limited state partnership in banking sector restructuring led to the success of most of the policy actions implemented.

To analyze which regulatory measures should work best, given a country's institutional infrastructure, we again employ a DID approach. However, we now differentiate banks according to the institutional infrastructure of the country in which the banks reside. To this end, we create a dummy variable equal to one if an institutional variable is above its median and zero otherwise. This allows us to distinguish countries according to the stringency of its regulatory environment. We then

interact the specific intervention measure with an institutional dummy, enabling us to compare the performance of banks supported by a specific policy measure but located in countries with strong regulatory environments with banks supported by the same measure but located in less institutionally developed countries. We expect that strong institutional infrastructure facilitates bank recovery. Table VII presents results examining the following institutional mechanisms: explicit deposit state guarantees, strength of capital requirements, and power of supervisory authorities.

#### [Table VII]

In general, the results show that, at the time of intervention, banks in countries with stronger institutional environments exhibit better financial ratios than their counterparts in less developed countries. This is seen in the coefficients for almost all banks that receive support. Interestingly, the evidence shows that this situation changes following regulatory intervention. The performance of supported banks in countries with highly developed institutional infrastructure deteriorates more than in countries with less developed institutional environments. This result holds for almost all intervention measures and is most significant for such politically dominated measures as nationalization and use of an AMC. This result appears to suggest that, in countries with strong regulations and powerful regulators, an increase in state ownership in the banking sector might result in misuse of banks for political purposes (Beck et al., 2010; Barth et al., 2009). Alternatively, a stronger institutional infrastructure may place supported banks in less competitive positions than for their counterparts in weaker institutional environments.

#### **4. Conclusions**

The paper analyzes the effectiveness of regulatory interventions intended to enhance banking sector stability. In our paper, we test four important questions. First, does government support go to the institutions that need it most? Second, do the regulatory measures employed address banks' specific problems? Third, how effective are government interventions in enhancing banking sector stability? Finally, how is the effectiveness of government intervention influenced by a country's institutional

environment? The regression results demonstrate that weak banks are most likely to receive government support and that the type of support extended addresses banks' specific problems. However, our results indicate that supported banks are weaker than their non-supported counterparts. We attribute this to the insufficient scale of liquidity provisions and the ineffectiveness of regulators in implementing the necessary restructuring. We also find that strengthening the market disciplining mechanisms in the post-crisis period may enhance the effectiveness of intervention measures.

The results offer several contributions to the existing literature. We find that government support goes to banks with relatively weak financial performance, in accordance with the theoretical literature arguing that government interventions are justified because they allow distressed institutions to recover from crisis, helping to stabilize the banking sector (Bagehot, 1873; Acharya and Yorulmazer, 2006; Berger and Bouwman, 2009; Hakenes and Schnabel, 2010). Our regression analysis also shows that less liquid banks are likely to receive liquidity support, and undercapitalized banks are likely to receive capital support. In this respect, our study contributes to the literature on the determinants of bank bailouts by rejecting the hypothesis that government interventions are ineffective because they do not address banks' actual problems.

However, although government support goes to the right banks, and that the types of injections employed address banks' problems, the third part of our analysis suggests that government interventions are ineffective in restoring banking sector stability. Our analysis shows that the z-score, a measure of distance of a bank from bankruptcy, deteriorates more significantly among institutions that receive assistance than among institutions that do not receive assistance, controlling for a country's economic conditions. We argue that this is because of a lack of necessary restructuring in the institutions that received assistance, a finding in line with the literature advocating mandatory bank bail-ins before the implementation of bailout mechanisms (see for example Financial Stability Board, 2011; Huertas, 2011; European Commission Act, 2011; Dodd-Frank Act, 2010). The scale of

liquidity support is also important. Sufficiently large liquidity provisions are necessary to steer banks away from insolvency risk. Finally, we find that appropriate institutional mechanisms may enhance the effectiveness of some of regulatory measures.

Our results have important policy implications. First, they show that the design and scale of an intervention program determines its success in facilitating banking sector recovery. Our results demonstrate that liquidity provision accompanied by a strategy of bank resolution significantly improves a bank's financial condition. Second, we find that the implementation of intervention measures is crucial to the effectiveness of government intervention. A deep restructuring process is required for banks to recover from distress, as pure liquidity provisions are not sufficient to avert bank failure, especially if the crisis persists. Finally, the evidence reveals that policy measures that rely on market disciplining mechanisms perform better than measures involving the participation of the state. Thus, regulators may improve the effectiveness of intervention measures by strengthening market disciplining mechanisms.

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**Table I: Descriptive statistics at the country level**

The data present statistics for sample countries for which we could identify institutions subject to intervention

Country	Year of systemic crisis	Number of banks'bankruptcies	Number of non-bailed banks	Number of bailed banks	Guarantee dummy	Liquidity dummy	Nation. dummy	Merger dummy	AMC dummy
Argentina	2001	1	6	8	0	7	2	1	3
Bulgaria	1996	0	7	2	0	1	2	0	2
Colombia	1998	2	4	9	0	5	2	5	2
Croatia	1998	1	8	6	0	0	4	3	4
Czech Republic	1996	1	1	1	0	0	0	1	0
Ecuador	1998	0	8	2	2	1	0	0	2
Estonia	1992	0	2	4	0	2	1	3	3
Finland	1991	0	3	1	1	1	1	0	1
Indonesia	1997	2	1	12	11	5	10	1	8
Jamaica	1996	0	4	3	3	3	3	2	2
Japan	1997	2	4	13	11	0	2	8	9
Korea	1997	0	7	6	3	1	2	4	2
Lithuania	1995	0	1	2	2	0	2	1	2
Malaysia	1997	5	8	7	3	2	1	4	2
Mexico	1994	1	3	5	4	3	1	3	2
Nicaragua	2000	3	4	1	1	1	0	0	1
Norway	1991	0	5	7	7	6	2	0	4
Paraguay	1995	0	6	1	0	1	0	0	0
Russia	1998	0	6	2	0	1	0	1	1
Sweden	1991	0	4	3	2	1	0	2	1
Thailand	1997	2	5	5	5	2	3	1	3
Turkey	2000	0	5	8	3	4	1	6	4
Ukraine	1998	0	6	2	0	2	0	0	2
Uruguay	2002	4	6	2	0	2	2	0	1
Venezuela	1994	1	4	2	0	1	1	0	1
<b>Total</b>	-	<b>25</b>	<b>118</b>	<b>114</b>	<b>58</b>	<b>52</b>	<b>42</b>	<b>46</b>	<b>62</b>

**Table II: Differences in the banks' performance as a result of government interventions (bivariate test)**

The table presents difference-in-differences (DID) estimates of bank performance: (log)zscore, equity ratio, and liquidity ratio, respectively. Banks are grouped into banks supported by policy injections (blanket guarantee, liquidity provisions, nationalization, and use of an AMC) and non-supported. The estimates show differences in bank performance at the time of intervention and in the five-year period following government intervention. The DID estimates are presented in the last column. The robust standard errors are clustered at the country level. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

Intervention measure	At the intervention			After intervention			Diff-in-diff
	Non-intervened	Intervened	Difference	Non-intervened	Intervened	Difference	
<b>BLANKET GUARANTEES (I)</b>							
<b>Activity</b>	51.828 (4.401)	65.541 (4.637)	<b>13.713**</b> <b>(5.548)</b>	46.696 (2.467)	51.876 (6.666)	<b>5.179</b> <b>(5.981)</b>	<b>-8.534</b> <b>(6.262)</b>
<b>Size</b>	6.693 (0.316)	8.373 (0.823)	<b>1.680**</b> <b>(0.786)</b>	6.955 (0.356)	8.637 (0.755)	<b>1.682**</b> <b>(0.644)</b>	<b>0.001</b> <b>(0.232)</b>
<b>Zscore</b>	22.298 (15.578)	38.810 (19.116)	<b>16.512</b> <b>(27.517)</b>	25.192 (6.735)	5.831 (1.820)	<b>-19.361***</b> <b>(6.857)</b>	<b>-35.873</b> <b>(29.155)</b>
<b>(Log)zscore</b>	1.822 (0.890)	4.062 (0.000)	<b>2.240**</b> <b>(0.890)</b>	2.219 (0.182)	1.110 (0.395)	<b>-1.109***</b> <b>(0.389)</b>	<b>-3.349***</b> <b>(1.179)</b>
<b>Equity</b>	8.772 (3.459)	5.062 (1.007)	<b>-3.711</b> <b>(3.572)</b>	12.054 (1.059)	-1.270 (3.574)	<b>-13.324***</b> <b>(3.653)</b>	<b>-9.614</b> <b>(5.633)</b>
<b>Loss Reserves</b>	12.132 (3.579)	18.722 (14.843)	<b>6.590</b> <b>(14.991)</b>	11.013 (2.211)	15.242 (4.505)	<b>4.229</b> <b>(4.571)</b>	<b>-2.362</b> <b>(11.965)</b>
<b>Liquidity</b>	38.527 (6.484)	19.601 (3.179)	<b>-18.926***</b> <b>(6.420)</b>	39.042 (4.441)	22.174 (4.038)	<b>-16.868***</b> <b>(5.237)</b>	<b>2.058</b> <b>(3.548)</b>
<b>Profitability (ROA)</b>	-1.814 (2.739)	-0.998 (0.802)	<b>0.815</b> <b>(2.820)</b>	0.953 (0.342)	-5.276 (2.834)	<b>-6.229**</b> <b>(2.869)</b>	<b>-7.045</b> <b>(4.178)</b>
<b>Efficiency</b>	77.184 (8.609)	77.315 (8.735)	<b>0.131</b> <b>(10.518)</b>	73.036 (4.321)	89.036 (8.161)	<b>15.999*</b> <b>(8.076)</b>	<b>15.869</b> <b>(11.775)</b>
<b>LIQUIDITY PROVISIONS (II)</b>							
<b>Activity</b>	54.732 (3.538)	59.338 (5.430)	<b>4.606</b> <b>(3.558)</b>	47.664 (2.415)	49.223 (5.766)	<b>1.559</b> <b>(4.406)</b>	<b>-3.047</b> <b>(2.902)</b>
<b>Size</b>	7.188 (0.597)	7.387 (0.443)	<b>0.199</b> <b>(0.664)</b>	7.349 (0.561)	7.574 (0.424)	<b>0.225</b> <b>(0.611)</b>	<b>0.026</b> <b>(0.230)</b>
<b>Zscore</b>	43.052 (22.807)	23.903 (11.603)	<b>-19.149</b> <b>(25.588)</b>	23.374 (6.631)	10.525 (2.550)	<b>-12.848</b> <b>(7.510)</b>	<b>6.300</b> <b>(26.516)</b>
<b>(Log)Zscore</b>	3.377 (0.676)	2.165 (0.471)	<b>-1.213</b> <b>(0.824)</b>	2.080 (0.186)	1.586 (0.259)	<b>-0.495**</b> <b>(0.219)</b>	<b>0.718</b> <b>(0.897)</b>
<b>Equity</b>	11.134 (1.813)	1.497 (5.030)	<b>-9.638*</b> <b>(5.099)</b>	9.987 (1.740)	4.512 (2.173)	<b>-5.475***</b> <b>(1.750)</b>	<b>4.163</b> <b>(5.302)</b>
<b>Loss Reserves</b>	7.827 (2.130)	24.638 (14.137)	<b>16.811</b> <b>(14.216)</b>	9.447 (1.500)	19.365 (5.921)	<b>9.918*</b> <b>(5.731)</b>	<b>-6.893</b> <b>(10.043)</b>
<b>Liquidity</b>	38.822 (6.351)	20.968 (3.226)	<b>-17.855***</b> <b>(6.060)</b>	38.134 (4.437)	25.228 (3.459)	<b>-12.905***</b> <b>(4.169)</b>	<b>4.949</b> <b>(4.088)</b>
<b>Profitability (ROA)</b>	0.525 (1.310)	-4.962 (4.082)	<b>-5.487</b> <b>(4.242)</b>	-0.004 (0.738)	-2.678 (2.020)	<b>-2.674</b> <b>(1.839)</b>	<b>2.812</b> <b>(4.789)</b>
<b>Efficiency</b>	73.058 (7.841)	84.738 (11.147)	<b>11.679</b> <b>(11.907)</b>	73.981 (4.376)	85.289 (6.450)	<b>11.308</b> <b>(6.914)</b>	<b>-0.372</b> <b>(13.569)</b>
<b>NATIONALIZATION (III)</b>							
<b>Activity</b>	56.702 (3.668)	55.643 (7.024)	<b>-1.059</b> <b>(5.634)</b>	50.218 (2.779)	39.683 (4.034)	<b>-10.535***</b> <b>(2.933)</b>	<b>-9.475</b> <b>(6.282)</b>
<b>Size</b>	7.146 (0.480)	7.653 (0.550)	<b>0.506</b> <b>(0.556)</b>	7.361 (0.508)	7.608 (0.431)	<b>0.247</b> <b>(0.507)</b>	<b>-0.259</b> <b>(0.192)</b>
<b>Zscore</b>	28.942	29.699	<b>0.757</b>	23.045	7.329	<b>-15.716**</b>	<b>-16.473</b>

	(19.233)	(18.130)	<b>(31.355)</b>	(6.002)	(3.300)	<b>(6.546)</b>	<b>(33.497)</b>
<b>(Log)zscore</b>	2.143 (1.125)	2.995 (1.029)	<b>0.853</b> <b>(1.884)</b>	2.132 (0.164)	1.111 (0.504)	<b>-1.022**</b> <b>(0.482)</b>	<b>-1.874</b> <b>(2.288)</b>
<b>Equity</b>	8.250 (3.050)	5.051 (0.847)	<b>-3.198</b> <b>(3.045)</b>	10.078 (1.356)	2.096 (4.214)	<b>-7.982*</b> <b>(4.080)</b>	<b>-4.783</b> <b>(5.466)</b>
<b>Loss Reserves</b>	10.642 (3.191)	26.217 (21.486)	<b>15.574</b> <b>(21.444)</b>	10.456 (2.079)	18.918 (5.099)	<b>8.462</b> <b>(5.186)</b>	<b>-7.112</b> <b>(17.234)</b>
<b>Liquidity</b>	32.698 (5.390)	30.306 (4.373)	<b>-2.392</b> <b>(4.927)</b>	34.857 (4.253)	32.339 (4.586)	<b>-2.518</b> <b>(4.580)</b>	<b>-0.125</b> <b>(3.569)</b>
<b>Profitability (ROA)</b>	-1.991 (2.306)	-0.021 (0.898)	<b>1.970</b> <b>(2.292)</b>	-0.070 (0.645)	-3.400 (2.824)	<b>-3.330</b> <b>(2.768)</b>	<b>-5.300</b> <b>(3.537)</b>
<b>Efficiency</b>	76.096 (7.408)	80.946 (10.588)	<b>4.850</b> <b>(10.069)</b>	73.760 (4.655)	91.125 (6.159)	<b>17.366**</b> <b>(7.587)</b>	<b>12.516</b> <b>(11.078)</b>
<b>MERGER (IV)</b>							
<b>Activity</b>	55.152 (4.636)	60.333 (3.848)	<b>5.181</b> <b>(4.629)</b>	47.320 (3.303)	50.791 (4.473)	<b>3.472</b> <b>(4.684)</b>	<b>-1.710</b> <b>(3.218)</b>
<b>Size</b>	6.863 (0.333)	8.435 (0.836)	<b>1.572**</b> <b>(0.702)</b>	7.068 (0.373)	8.624 (0.763)	<b>1.556**</b> <b>(0.589)</b>	<b>-0.016</b> <b>(0.275)</b>
<b>Zscore</b>	34.150 (14.034)	0.721 (0.000)	<b>-33.429**</b> <b>(14.034)</b>	21.721 (6.144)	12.944 (1.960)	<b>-8.778</b> <b>(6.639)</b>	<b>24.651</b> <b>(15.800)</b>
<b>(Log)zscore</b>	3.148 (0.660)	-0.327 .	<b>-3.475***</b> <b>(0.660)</b>	1.940 (0.209)	1.989 (0.154)	<b>0.049</b> <b>(0.166)</b>	<b>3.524***</b> <b>(0.671)</b>
<b>Equity</b>	8.033 (3.119)	5.991 (1.001)	<b>-2.042</b> <b>(3.150)</b>	8.870 (2.019)	7.241 (1.010)	<b>-1.628</b> <b>(1.869)</b>	<b>0.413</b> <b>(3.659)</b>
<b>Loss Reserves</b>	17.767 (7.762)	5.442 (0.909)	<b>-12.325</b> <b>(7.704)</b>	13.248 (2.549)	8.530 (1.350)	<b>-4.718*</b> <b>(2.290)</b>	<b>7.607</b> <b>(6.003)</b>
<b>Liquidity</b>	33.866 (5.881)	27.007 (4.388)	<b>-6.859</b> <b>(6.764)</b>	36.437 (4.445)	27.061 (4.133)	<b>-9.377*</b> <b>(5.301)</b>	<b>-2.518</b> <b>(4.010)</b>
<b>Profitability (ROA)</b>	-1.725 (2.429)	-0.985 (0.677)	<b>0.740</b> <b>(2.432)</b>	-0.842 (1.046)	-0.322 (0.559)	<b>0.520</b> <b>(0.771)</b>	<b>-0.220</b> <b>(2.531)</b>
<b>Efficiency</b>	77.949 (7.583)	75.178 (9.427)	<b>-2.771</b> <b>(9.224)</b>	79.252 (4.544)	68.927 (3.608)	<b>-10.325*</b> <b>(5.028)</b>	<b>-7.554</b> <b>(9.902)</b>
<b>AMC (V)</b>							
<b>Activity</b>	55.208 (3.892)	59.045 (5.066)	<b>3.838</b> <b>(3.658)</b>	49.139 (2.741)	45.470 (5.290)	<b>-3.669</b> <b>(4.464)</b>	<b>-7.506</b> <b>(4.922)</b>
<b>Size</b>	6.689 (0.374)	8.475 (0.676)	<b>1.786***</b> <b>(0.608)</b>	7.013 (0.405)	8.418 (0.625)	<b>1.405***</b> <b>(0.477)</b>	<b>-0.381</b> <b>(0.232)</b>
<b>Zscore</b>	43.052 (22.807)	23.903 (11.603)	<b>-19.149</b> <b>(25.588)</b>	24.352 (6.429)	8.306 (2.615)	<b>-16.045**</b> <b>(6.809)</b>	<b>3.103</b> <b>(27.167)</b>
<b>(Log)zscore</b>	3.377 (0.676)	2.165 (0.471)	<b>-1.213</b> <b>(0.824)</b>	2.181 (0.173)	1.289 (0.345)	<b>-0.892**</b> <b>(0.327)</b>	<b>0.321</b> <b>(1.011)</b>
<b>Equity</b>	8.591 (3.416)	5.236 (0.589)	<b>-3.355</b> <b>(3.322)</b>	10.695 (1.494)	2.893 (2.319)	<b>-7.802***</b> <b>(1.891)</b>	<b>-4.447</b> <b>(4.086)</b>
<b>Loss Reserves</b>	84.768 (16.173)	69.763 (9.951)	<b>-15.005</b> <b>(14.076)</b>	100.295 (9.910)	103.468 (13.847)	<b>3.173</b> <b>(15.204)</b>	<b>18.177</b> <b>(19.021)</b>
<b>Liquidity</b>	34.775 (5.934)	26.674 (4.442)	<b>-8.101</b> <b>(6.105)</b>	36.855 (4.173)	28.455 (4.161)	<b>-8.399**</b> <b>(3.534)</b>	<b>-0.299</b> <b>(4.082)</b>
<b>Profitability (ROA)</b>	-2.178 (2.621)	-0.183 (0.605)	<b>1.995</b> <b>(2.536)</b>	0.295 (0.518)	-3.345 (1.938)	<b>-3.640**</b> <b>(1.571)</b>	<b>-5.636</b> <b>(2.963)</b>

<b>Efficiency</b>	77.316 (8.750)	77.060 (7.612)	<b>-0.256</b> <b>(9.601)</b>	73.067 (4.417)	87.312 (6.655)	<b>14.244**</b> <b>(6.888)</b>	<b>14.500</b> <b>(8.916)</b>
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**Table III: Probability of receiving government support given all banks' and countries' individual characteristics**

The table presents probit and logit estimations, showing the probability of receiving government support, given the bank and country financial conditions. The control variables are included as first-year lags. In all regressions, we include country dummies. The robust standard errors are clustered at the country's level. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

	Intervention											
	Dummy		Guarantee		Liquidity		Nationalization		Merger		AMC	
	Logit	Probit	Logit	Probit	Logit	Probit	Logit	Probit	Logit	Probit	Logit	Probit
Profit <sub>t-1</sub>	0.036 (0.065)	0.023 (0.041)	0.127* (0.074)	0.073* (0.043)	0.018 (0.059)	0.011 (0.036)	-0.139* (0.073)	-0.077** (0.039)	0.040 (0.076)	0.020 (0.044)	-0.039 (0.074)	-0.022 (0.041)
Equity <sub>t-1</sub>	-0.074** (0.032)	-0.043** (0.018)	-0.072 (0.054)	-0.044 (0.031)	-0.055 (0.041)	-0.035 (0.024)	-0.125* (0.070)	-0.075* (0.040)	-0.026 (0.034)	-0.014 (0.018)	-0.069 (0.056)	-0.044 (0.030)
Liquidity <sub>t-1</sub>	-0.015 (0.010)	-0.009* (0.006)	-0.054*** (0.020)	-0.031*** (0.010)	-0.036*** (0.013)	-0.021*** (0.007)	0.013 (0.016)	0.007 (0.009)	0.008 (0.015)	0.005 (0.008)	0.001 (0.017)	0.000 (0.009)
Efficiency <sub>t-1</sub>	-0.001 (0.003)	-0.000 (0.002)	.0051085 .0038947	0.003 (0.002)	-0.004 (0.005)	-0.002 (0.003)	0.002 (0.006)	0.001 (0.003)	-0.003 (0.005)	-0.002 (0.003)	-0.002 (0.003)	-0.001 (0.002)
Size <sub>t-1</sub>	0.365** (0.117)	0.220*** (0.069)	0.451*** (0.155)	0.259*** (0.082)	0.021 (0.149)	0.012 (0.090)	0.114 (0.172)	0.066 (0.112)	0.426*** (0.109)	0.253*** (0.062)	0.429*** (0.134)	0.257*** (0.077)
GDP growth	0.043 (0.052)	0.024 (0.031)	0.116 (0.077)	0.071 (0.044)	-0.007 (0.054)	-0.004 (0.032)	0.078 (0.054)	0.045 (0.033)	0.140*** (0.041)	0.082*** (0.023)	0.077 (0.054)	0.046 (0.031)
CPI	0.611* (0.366)	0.344* (0.204)	-0.201 (0.495)	-0.119 (0.263)	0.493 (0.340)	0.302 (0.202)	0.490 (0.319)	0.280 (0.201)	0.418 (0.304)	0.255 (0.169)	0.604* (0.362)	0.362* (0.206)
Concen.	0.013 (0.013)	0.008 (0.007)	0.040* (0.022)	0.022** (0.011)	0.018** (0.009)	0.011** (0.005)	0.004 (0.010)	0.002 (0.006)	-0.005 (0.017)	-0.003 (0.010)	0.021* (0.012)	0.013* (0.007)
Constant	-3.224** (1.476)	-1.893** (0.875)	-5.281** (2.171)	-2.983*** (1.111)	-1.060 (1.605)	-0.651 (0.954)	-2.551 (1.858)	-1.453 (1.204)	-5.498*** (1.179)	-3.233*** (0.659)	-5.727*** (1.874)	-3.397*** (1.027)
<b>R2</b>	<b>0.162</b>	<b>0.162</b>	<b>0.343</b>	<b>0.346</b>	<b>0.126</b>	<b>0.126</b>	<b>0.121</b>	<b>0.124</b>	<b>0.151</b>	<b>0.154</b>	<b>0.170</b>	<b>0.173</b>
<b>Number of obs.</b>	<b>144</b>	<b>144</b>	<b>144</b>	<b>144</b>	<b>144</b>	<b>144</b>	<b>144</b>	<b>144</b>	<b>144</b>	<b>144</b>	<b>144</b>	<b>144</b>

**Table IV: Probability of bank failure, given banks' and countries' individual characteristics**

The table shows the probit estimations, indicating the probability of a bank's failure in the five years following specific regulatory actions. In all regressions, we include country dummies. The robust-standard errors are clustered at the country level. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

Variable	Intervention Dummy	Guarantee	Liquidity	Nationalization	Merger	AMC
Intervention Dummy	2.147*** (0.665)	-2.519** (1.031)	1.818** (0.707)	-1.758** (0.893)	1.704*** (0.553)	0.301 (0.439)
Profitab.(ROA)	-0.134* (0.081)	-0.108 (0.099)	-0.107 (0.103)	-0.058 (0.072)	-0.051 (0.052)	-0.092 (0.075)
Equity	-0.166*** (0.037)	-0.142** (0.069)	-0.081** (0.032)	-0.146*** (0.039)	-0.141*** (0.041)	-0.116*** (0.036)
Liquidity	-0.019 (0.017)	-0.035* (0.019)	-0.006 (0.015)	-0.009 (0.016)	-0.020 (0.019)	-0.015 (0.016)
Efficiency	0.003 (0.003)	0.007*** (0.003)	0.009*** (0.003)	0.008*** (0.003)	0.008*** (0.003)	0.005* (0.003)
Size	-0.537*** (0.139)	-0.345*** (0.142)	-0.482*** (0.147)	-0.471** (0.194)	-0.649*** (0.196)	-0.523*** (0.124)
Gdpgrowth	-0.101 (0.073)	-0.097 (0.078)	-0.114 (0.074)	-0.018 (0.071)	-0.099 (0.074)	-0.115 (0.071)
CPI	0.054 (0.184)	-0.059 (0.245)	-0.257 (0.249)	0.052 (0.226)	0.011 (0.258)	0.044 (0.190)
Concen.	-0.052*** (0.012)	-0.082*** (0.029)	-0.090*** (0.017)	-0.075*** (0.021)	-0.098*** (0.026)	-0.085*** (0.021)
Constant	6.749*** (2.502)	9.641*** (2.454)	8.060*** (2.290)	8.326*** (2.994)	10.152*** (2.909)	9.319*** (2.255)
<b>R2</b>	<b>0.281</b>	<b>0.284</b>	<b>0.409</b>	<b>0.397</b>	<b>0.385</b>	<b>0.285</b>
<b>Number of obs.</b>	<b>74</b>	<b>74</b>	<b>74</b>	<b>74</b>	<b>74</b>	<b>74</b>

**Table V: Effectiveness of policy measures in improving banks' performance, using the DID approach**

The table presents difference-in-differences (DID) estimations of bank performance: (log)zscore, equity, and liquidity ratio, respectively. Banks are grouped into banks that received support, depending on the policy employed (blanket guarantee, liquidity provisions, nationalization, and use of an AMC), and non-supported. The estimates show differences in bank performance at the time of intervention and over the next five years following government intervention. The DID estimates are presented in the last column. All regressions include bank and country control variables (not reported): activity, efficiency, bank size, gdpgrowth, log(inflation), and the banking sector's concentration ratio. In all regressions, we include country dummies. The robust standard errors are clustered at the country level. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

Performance measure	At intervention			After intervention			
	Non-intervened	Intervened	Difference	Non-intervened	Intervened	Difference	Diff-in-Diff
<b>(LOG)ZSCORE (I)</b>							
<b>GUARANTEE</b>	1.569 (0.862)	4.296 (0.515)	<b>2.727***</b> <b>(0.828)</b>	1.924 (0.442)	0.650 (0.416)	<b>-1.274***</b> <b>(0.220)</b>	<b>-4.001***</b> <b>(0.996)</b>
R2=0.448 Number of obs.=757							
<b>LIQUIDITY</b>	2.593 (0.917)	2.313 (1.141)	<b>-0.280</b> <b>(1.118)</b>	1.488 (0.555)	1.036 (0.654)	<b>-0.452*</b> <b>(0.244)</b>	<b>-0.172</b> <b>(1.142)</b>
R2= 0.374 Number of obs.=757							
<b>NATIONALIZATION</b>	1.669 (1.236)	3.060 (1.438)	<b>1.391</b> <b>(1.933)</b>	1.529 (0.462)	0.722 (0.507)	<b>-0.807**</b> <b>(0.311)</b>	<b>-2.198</b> <b>(2.096)</b>
R2=0.227 Number of obs.=1010							
<b>MERGER</b>	3.190 (1.220)	0.099 (0.648)	<b>-3.090***</b> <b>(0.777)</b>	1.624 (0.540)	1.541 (0.606)	<b>-0.083</b> <b>(0.198)</b>	<b>3.007***</b> <b>(0.802)</b>
<b>AMC</b>	2.705 (0.935)	2.443 (1.075)	<b>-0.262</b> <b>(1.122)</b>	1.597 (0.522)	1.000 (0.512)	<b>-0.597**</b> <b>(0.225)</b>	<b>-0.335</b> <b>(1.220)</b>
R2= 0.381 Number of obs.=757							
<b>EQUITY RATIO (II)</b>							
<b>GUARANTEE</b>	32.901 (7.227)	30.251 (6.812)	<b>-2.650</b> <b>(1.772)</b>	32.810 (6.903)	28.954 (6.428)	<b>-3.857**</b> <b>(1.591)</b>	<b>-1.206</b> <b>(1.703)</b>
R2= 0.266 Number of obs.= 1057							
<b>LIQUIDITY</b>	32.015 (7.178)	27.752 (6.837)	<b>-4.263***</b> <b>(1.398)</b>	31.348 (6.797)	28.107 (6.623)	<b>-3.241**</b> <b>(1.212)</b>	<b>1.022</b> <b>(1.668)</b>
R2= 0.270 Number of obs.=1057							
<b>NATIONALIZATION</b>	32.544 (7.417)	28.670 (7.253)	<b>-3.873*</b> <b>(2.079)</b>	32.046 (7.136)	28.913 (6.711)	<b>-3.134**</b> <b>(1.322)</b>	<b>0.740</b> <b>(2.086)</b>
R2=0.263 Number of obs.=1057							
<b>MERGER</b>	32.869 (7.343)	32.163 (6.797)	<b>-0.706</b> <b>(1.395)</b>	32.618 (6.953)	31.925 (6.635)	<b>-0.693</b> <b>(1.154)</b>	<b>0.013</b> <b>(1.208)</b>
R2=0.252 Number of obs.=1057							
<b>AMC</b>	32.290 (7.077)	29.471 (6.552)	<b>-2.819*</b> <b>(1.503)</b>	31.929 (6.678)	28.624 (6.423)	<b>-3.305**</b> <b>(1.346)</b>	<b>-0.486</b> <b>(1.698)</b>
R2=0.266 Number of obs.=1057							



**LIQUIDITY RATIO (III)****GUARANTEE**

73.337 (13.159)	65.999 (12.207)	<b>-7.338</b> <b>(8.313)</b>	73.445 (12.246)	61.392 (10.637)	<b>-12.053*</b> <b>(5.869)</b>	<b>-4.715</b> <b>(3.962)</b>
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R2=0.486

Number of obs.=997

**LIQUIDITY**

70.746 (12.880)	61.471 (12.921)	<b>-9.275</b> <b>(6.963)</b>	69.794 (11.968)	60.737 (11.932)	<b>-9.056**</b> <b>(3.981)</b>	<b>0.218</b> <b>(4.103)</b>
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R2=0.486

Number of obs.=997

**NATIONALIZATION**

70.924 (12.469)	63.369 (11.409)	<b>-7.555</b> <b>(6.300)</b>	71.073 (11.889)	57.936 (10.846)	<b>-13.137**</b> <b>(5.550)</b>	<b>-5.582</b> <b>(5.062)</b>
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R2= 0.491

Number of obs.=997

**MERGER**

72.524 (13.343)	73.153 (13.114)	<b>0.629</b> <b>(5.999)</b>	72.811 (12.553)	69.401 (12.366)	<b>-3.411</b> <b>(3.177)</b>	<b>-4.040</b> <b>(4.288)</b>
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R2=0.470

Number of obs.=997

**AMC**

71.712 (12.546)	68.742 (12.679)	<b>-2.970</b> <b>(5.072)</b>	72.058 (11.902)	63.941 (10.917)	<b>-8.116***</b> <b>(2.449)</b>	<b>-5.147</b> <b>(4.795)</b>
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R2=0.479

Number of obs.=997

**Table VI: Effectiveness of policy measures in improving banks' performance under various intervention programs**

The table presents difference-in-difference (DID) estimations of banks performance measured by the log(zscore). Banks are grouped into those supported by a single policy measure (blanket guarantee, liquidity provisions, nationalization, and the use of AMC) and those supported by a combination of policy measures as: 1) guarantee with liquidity provisions, 2) nationalization with use of an AMC, 3) government-assisted mergers with use of an AMC, 4) guarantee with nationalization and AMC, 5) liquidity provisions with nationalization, and 6) AMC, liquidity provisions with government-assisted mergers. The estimates show differences in bank performance at the time of intervention and over the next five years following government support. The DID estimates are presented in the last column. All regressions include bank and country control variables (not reported): activity, efficiency, bank size, gdpgrowth, log(inflation), and the banking sector's concentration ratio. In all regressions, we include the country dummies. The robust standard errors are clustered at the country level. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

(LOG)ZSCORE	At intervention			After intervention			Diff-in-Diff
	Other intervened banks	Intervened by a specific policy	Difference	Other intervened banks	Intervened by a specific policy	Difference	
<b>PART I</b>							
<b>GUARANTEE</b>							
	-0.385 (1.085)	3.693 (1.054)	<b>4.078***</b> (0.632)	0.619 (0.887)	-0.347 (0.871)	<b>-0.965***</b> (0.264)	<b>-5.044***</b> (0.575)
R2=0.488 Number of obs.=366							
<b>LIQUIDITY</b>							
	-0.388 (0.987)	1.486 (1.264)	<b>1.875**</b> (0.788)	-0.388 (0.987)	-0.338 (0.935)	<b>0.050</b> (0.322)	<b>-1.824**</b> (0.735)
R2=0.434 Number of obs.=366							
<b>NATIONALIZATION</b>							
	-1.356 (1.254)	2.010 (1.427)	<b>3.366***</b> (1.146)	-0.291 (0.946)	-0.796 (0.981)	<b>-0.505*</b> (0.245)	<b>-3.871***</b> (1.187)
R2=0.45575 Number of obs.=366							
<b>MERGER</b>							
	2.193 (1.607)	-1.136 (1.368)	<b>-3.329**</b> (1.192)	-0.481 (1.075)	-0.093 (1.092)	<b>0.388*</b> (0.199)	<b>3.717***</b> (1.207)
R2=0.454 Number of obs.=366							
<b>AMC</b>							
	-0.279 (0.969)	1.476 (1.250)	<b>1.755**</b> (0.729)	-0.279 (0.969)	-0.530 (0.985)	<b>-0.250</b> (0.195)	<b>-2.005**</b> (0.800)
R2=0.438 Number of obs.=366							
<b>PART II</b>							
<b>GUARANTEE</b>							
<b>*LIQUIDITY</b>							
	-0.437 (0.951)	4.070 (1.033)	<b>4.506***</b> (0.424)	0.139 (0.935)	-0.240 (0.808)	<b>-0.379</b> (0.311)	<b>-4.886***</b> (0.376)
R2=0.463 Number of obs.=366							
<b>NATIONALIZATION*</b>							
<b>AMC</b>							
	-1.213 (1.242)	2.081 (1.524)	<b>3.294**</b> (1.193)	-0.421 (0.985)	-0.753 (0.989)	<b>-0.332</b> (0.273)	<b>-3.627***</b> (1.256)
R2=0.448 Number of obs.=366							
<b>MERGER*AMC</b>							
	2.230 (1.622)	-1.122 (1.342)	<b>-3.352***</b> (1.186)	-0.377 (1.043)	0.021 (1.081)	<b>-0.356</b> (0.256)	<b>3.708***</b> (1.232)
R2=0.449 Number of obs.=366							

<b>GUARANTEE*</b>							
<b>NATIONALIZATION*</b>							
<b>AMC</b>							
	-0.382	3.966	<b>4.348***</b>	0.432	-0.401	<b>-0.833</b>	<b>-5.180***</b>
	(1.199)	(1.295)	<b>(0.460)</b>	(1.286)	(1.325)	<b>(0.265)</b>	<b>(0.504)</b>
R2=0.468							
Number of obs.=339							
<b>LIQUIDITY*</b>							
<b>NATIONALIZATION*</b>							
<b>AMC</b>							
	-0.853	2.501	<b>3.354**</b>	0.049	-0.141	<b>-0.189</b>	<b>-3.543***</b>
	(1.363)	(1.722)	<b>(1.210)</b>	(1.276)	(1.301)	<b>(0.315)</b>	<b>(1.178)</b>
R2=0.443							
Number of obs.=339							
<b>LIQUIDITY*</b>							
<b>MERGER</b>							
	2.758	-0.629	<b>-3.388**</b>	0.278	0.609	<b>0.331</b>	<b>3.718***</b>
	(1.786)	(1.424)	<b>(1.204)</b>	(1.353)	(1.481)	<b>(0.221)</b>	<b>(1.233)</b>
R2=0.448							
Number of obs.=339							

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**Table VII: Effectiveness of regulatory intervention measures under various institutional structures**

The table presents difference-in-differences estimations of bank performance measured by (log)z-scores. Banks are grouped into banks supported by single policy measures (blanket guarantee, liquidity provisions, nationalization, and use of an AMC). We differentiate countries based on level of institutional development, using following variables: existence of explicit deposit protection, level of capital requirements, and power of supervisory authorities. Countries are then divided into those with strong institutional infrastructure (institutional variable above the median) and those with weak institutional structures (institutional variable below the median). The estimates show the differences in the banks' performance at the time of intervention and as an average over the five-year period following government support. The DID estimates are presented in the last column. All regressions include bank and country control variables (not reported here) as: activity, efficiency, bank's size, gdpgrowth, log(inflation), and the banking sector's concentration ratio. The robust standard errors are clustered at the country level. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

Log(zscore)	At intervention			After intervention			Diff-in-Diff
	Non-intervened	Intervened	Difference	Non-intervened	Intervened	Difference	
<b>DEPOSIT INSURANCE SYSTEM</b>							
<b>GUARANTEE</b>							
	0.160 (1.317)	4.443 (1.387)	4.283*** (0.300)	0.160 (1.317)	0.037 (0.951)	-0.122 (0.453)	-4.406*** (0.538)
R2= 0.601 Number of obs.=165							
<b>LIQUIDITY</b>							
	-2.275 (1.378)	-1.416 (1.439)	3.691 (0.830)	-3.207 (1.659)	-3.073 (1.458)	0.134 (0.416)	-3.557 (0.416)
R2= 0.478 Number of obs.=165							
<b>NATIONALIZATION</b>							
	-0.976 (1.568)	-1.732 (2.438)	-0.755 (1.116)	-0.976 (1.568)	-4.113 (1.991)	-3.136*** (0.560)	-2.381** (0.985)
R2=0.644 Number of obs.=165							
<b>MERGER</b>							
	-0.443 (1.218)	0.233 (1.220)	0.676 (0.527)	-0.443 (1.218)	0.455 (1.347)	0.898*** (0.293)	0.222 (0.472)
R2= 0.553 Number of obs.=165							
<b>AMC</b>							
	0.889 (1.771)	3.414 (2.550)	2.525* (1.343)	0.889 (1.771)	0.679 (1.738)	-0.211 (0.331)	-2.736** (1.210)
R2= 0.552 Number of obs.=165							
<b>CAPITAL REQUIREMENTS</b>							
<b>GUARANTEE</b>							
	0.505 (1.363)	4.911 (2.111)	0.505*** (1.361)	0.405 (1.275)	0.813 (1.382)	0.407 (0.286)	0.098*** (0.398)
R2= 0.604 Number of obs.=168							
<b>LIQUIDITY</b>							
	-2.512 (1.410)	0.368 (2.015)	2.880** (1.132)	-2.667 (1.652)	3.744 (1.692)	1.077** (0.434)	-1.803 (1.206)
R2=0.499 Number of obs.=213							

**NATIONALIZATION**

-3.879	3.386	7.265***	-2.460	-0.704	1.757**	-5.508***
(1.654)	(1.608)	(1.497)	(1.733)	(1.178)	(0.653)	(1.654)

R2=0.671  
Number of obs.=141

**MERGER**

-1.055	0.256	1.310**	-0.798	0.545	-1.334**	-0.024
(1.096)	(1.013)	(0.593)	(1.207)	(1.148)	(0.593)	(0.191)

R2=0.549  
Number of obs.=159

**AMC**

0.591	6.144	5.553***	1.842	2.012	0.169	-5.384***
(1.398)	(1.942)	(0.787)	(1.565)	(1.599)	(0.362)	(0.883)

R2=0.576  
Number of obs.= 189

**POWER OF SUPERVISORY****GUARANTEE**

0.496	6.044	5.548***	0.496	1.668	1.172*	-4.376***
(1.215)	(1.012)	(0.457)	(1.215)	(0.753)	(0.633)	(0.397)

R2=0.602  
Number of obs.=168

**LIQUIDITY**

-2.275	-2.139	0.136	-2.449	-4.337	-1.888***	-2.024
(1.378)	(1.954)	(1.247)	(1.643)	(1.598)	(0.262)	(1.191)

R2=0.487  
Number of obs.=179

**NATIONALIZATION**

-3.879	4.634	8.513	-2.460	0.545	3.005***	-5.508***
(1.654)	(1.857)	(1.671)	(1.733)	(1.438)	(0.551)	(1.654)

R2=0.670  
Number of obs.=141

**MERGER**

-0.519	1.443	3.136***	-0.336	-0.154	0.182	-2.954
(2.438)	(2.115)	(0.560)	(1.210)	(1.476)	(0.449)	(0.449)

R2=0.528  
Number of obs.=159

**AMC**

0.601	4.000	3.399***	1.839	-0.162	-2.001***	-5.400***
(1.375)	(1.386)	(0.441)	(1.534)	(1.011)	(0.581)	(0.853)

R2=0.576  
Number of obs.=189