Government interventions - restoring or destructing financial stability in the long-run?

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Abstract:

Recent government interventions in the banking sector has raised a considerable controversy among the academicians, politicians and policymakers. One of the reasons is an increasing concern about long-run effects of government banks' bailouts. The existing academic literature is very mute with this respect. This paper closes the gap and investigates the effect of various bailout strategies on long-term banking sector stability. Investigating the behavior of bailed banks versus non-bailed competitors it also identifies the sources of these effects. Our results show that government interventions destabilize banking sectors in the long-run. Especially, public guarantees, nationalization of private institutions as well as creation of asset management companies (AMCs) (also so-called "The Troubled Asset Relief Funds" or "Bad Banks") increase the risk-taking of bailed institutions several years afterwards. We show that these effects are related to lack of appropriate restructuring changes in the bailed institutions what does not allow them to restore their operating performance. This in turn is a result of state ownership and diminished market control.

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1. Introduction

The ongoing mortgage crisis has witnessed the largest scope of government interventions in the financial sectors since the 1920s. The national authorities had to intervene in almost all continents, starting from the United States, through Europe into Asia. Not only the dimension of government interventions in the subprime crisis was massive, but also the volume of government support. On July 20. 2010, the Bloomberg News reports that cost of government interventions only in the United States may reach almost €50 trillion. In the European Union the governments approved €311.4 billion of capital injections for distressed institutions, €2.92 trillion as liability guarantees, €33 billion for relief of banking impaired assets, and €505.6 billion for liquidity support and bank funding. As a result of these actions, most of the largest banking institutions in the world are either in government hands or have implicit government protection. The massive government interventions as well as the current structure of the world financial system raise the question about the long-run effects of such actions on future functioning of the banking sectors. This paper tries to answer this question and examine the influence of various government policy measures on future behavior of banks.

The government interventions in banking sectors during the subprime crisis has raised a considerable debate among the economists and politicians (see for example*:* "The Support given to EU banks is killing the recovery", The Guardian, 17th July, 2011; "It was a low-down, no-good godawful bailout. But it paid", The Wasington Post, 8th July, 2011; Interim Report of UK Independent Commission on Banking, 2010 and the "Comments to the UK Independent Commission on Banking, 2011; "Bailing out the Bank: Reconciling Stability and Competition", 2010). On the one hand, there is no doubt that early government interventions in the banking sectors are needed because they allow countries to stop the bank runs, reduce the crisis' contagion effects, and bring the confidence in financial system. As a result, the empirical studies document that they allow countries to reduce the fiscal costs of the crises (Sheng, 1996; Honohan and Klingebiel, 2003). On the other hand, the increasing group of economists is getting concerned about the long-run effects of government interventions which in turn may negatively affect the financial and economic fragility afterwards. This is because government interventions give an incentive to banks to increase their risk going forward, and Demirguc-Kunt and Detragische (2002) document that this behavior may increase the likelihood of the next bubble. The increased risk-taking is related to several factors. First, the belief of banking institutions that they are "special" in the economy and government should protect them during their financial distress. The academic studies have widely documented that government protection spreads the moral hazard problem in the banking sector, increasing its risk significantly (Gropp et al., 2004). Especially, this problem is important if a country's banking sector is dominated by large

banking groups which are systemic important or follow similar risky strategies and thus can fall under "too many to fail" (Boyd and Runkle, 1993; Schnabel, 2004, 2009). In addition, government interventions diminish the market discipline due to creditors' anticipation of banks' bailout (Flannery, 1998; Sironi, 2003; Gropp et al., 2006). Second, increasing number of studies point out the role of government interventions in distortion of bank competition and thus increased risk stemming from non-bailed or non-protected banks. Hackenes and Schnabel (2010) document that banks that are protected by the government have lower refinancing costs and therefore outcompete banks that did not receive such a protection. This can have two important consequences. These banks might have a strong incentive to grow by mergers or acquisitions in order to benefit from government guarantees in the future. Also, due to their lower competitiveness, they might be incentivized to increase their risk - the evidence documented by Gropp et al. (2011). Finally, government interventions during the crisis often result in a significant change of a world financial landscape. The increased role of government in the banking sector, greater political influence associated with the empowered role of supervisory authorities, and significant differences between banks' financial performance - all of these have been shown to have a negative influence on the long-run stability of banking sectors (Caprio and Martinez-Peria, 2000; Barth, et al., 2004; Hackenes and Schnabel, 2010; Gropp et al., 2011).

Although the short-term effectiveness of government interventions has been widely analyzed by the academic literature, the literature on the long-term effects of government interventions is mute. This paper tries to analyze the influence of government interventions on future behavior of banks, and thus its role on long-term banking sector stability. On the sample of 23 systemic banking crises we created a novel bank-level database which comprises all distressed and then bailed institutions during these events in 23 countries. In total, we were able to identify 92 banking institutions which either received the public guarantees, or were bailed through central banks' actions, or/and government-assisted restructuring programs. Our data enable us to match a specific government policy measure for each institution. Comparing then the behavior of bailed banks to their non-bailed competitors, we are able to assess the impact of policy intervention measures on the risk-taking behavior of bailed banks several years afterwards. We perform our analysis several years after a particular resolution mechanism was implemented with our final sample covering 183 bailed and non-bailed banking institutions.

The results of our paper closes the gap in the existing academic literature. First, the evidences show that government interventions themselves are not able to restore the banking sector stability in the long-run. In turn, the results show that they have negative impact on future functioning of banking

sectors, contributing to the increased risk several years afterwards. These results even hold once we control for country's individual characteristics, as: rule of law, information disclosure rules, deposit insurance scheme, and other country's features captured by country's unobserved effects. We argue that our results are mainly driven by passive role of government institutions in causing the effective restructuring changes in the bailed institutions. Especially, we document that this effect is strong in banks with political involvement: in the nationalized and in institutions operating with the support of asset management companies (AMCs). As a result, we find that these institutions operate less efficiently as their competitors which incentivize them to increased risk-taking. This effect is probably a result of conflict of interests between various parties, distorting the initiation of needed changes. Banks with public guarantees also show lower operating efficiency than the non-protected banks, but this effect is rather a result of diminished market discipline. Our results seem also to suggest that risk shifting occurs among the same asset class, without influencing closely-monitored capital ratio. This result is consistent with evidences provided by Duchin and Sosyura (2011).

Our paper provides important policy recommendations. The government interventions should be associated with the deep and effective restructuring of distressed institutions allowing bailed banks to restore their operating performance, instead of a poor injection of capital into the banking sectors. Our results document that this is only possible without any political involvement afterwards, yet with the effective functioning of market control. Hence, government interventions based on market forces and regulations strengthening the market discipline should work the best to promote the performance and stability of distressed financial landscape.

The remainder of the paper is organized as follows. In section 2, we describe government bailout policies during recent systemic banking crises in 23 countries, Section 3 presents the literature review and hypothesis testing, Section 4 describes our data and methodology, Section 5 presents the empirical results with the robustness analysis, Section 6 investigates the sources of banks' excessive-risk taking. Finally, Section 7 concludes.

2. The government bailout strategies

Began in July 2007, the subprime mortgage meltdown in the United States has resulted in a systemic banking crisis in many industrial countries that has prompted a substantial injection of capital into financial sectors. Most financial institutions have experienced huge losses and most of them had to struggle with the insolvency. On August 26. 2010, Reuters reports that until now top US and European banks lost more than 1.2 trillion USD on toxic assets and bad loans. In order to protect and stabilize the financial system various bailout strategies were implemented by the governments internationally.

Claessens et al. (2001) divide government bailout policy measures in a banking sector into immediate reactions during the containment phase of the crisis and long-term policies towards restructuring of banking sectors. In the initial stage of the crisis when the markets are frozen and huge uncertainty is governing around, governments tend to implement the policies at restoring the confidence in the financial system and minimize the contagion effects of the crisis. Two important policies implemented during this phase are deposit guarantees and emergency liquidity provisions. In severe crises, with concerns of bank runs, policy makers often extend the guarantees to all creditors. The coverage of blanket guarantees differs from the deposit insurance arrangements. The latter are only limited to the bank deposits. The blanket guarantees are a promise of government to all banks' liabilities, typically with the exception of subordinated debt. Thus, the blanket guarantees offer a coverage which are above existing or pre-existing amount of insurance arrangement. Also, it is possible to grant the government promise only for a single institution and not for the entire banking sector. However in practice they are often extended to the entire system. The offering of blanket guarantees is often associated with the injection of liquidity provisions. Laeven and Valencia (2008) show the more credible is the first measure, the lower the need for implementation of the second one. While the role of blanket guarantees is to restore the confidence in the banking sector and stop the bank runs, the liquidity provisions aim at restoring the liquidity position of banks and unfreezing the interbank market. The central banks do this either by open market operations or direct credit lines extension to distressed banking institutions.

The restructuring phase requires more complex mechanisms, mostly aimed at restoring the banks' balance sheet and allowing the banking sectors to efficient functioning. This phase requires a deep restructuring of financial institutions' debt. The most common measures of achieving these goals by the government are use of government-assisted mergers, nationalization of distressed private institutions, or/and transfer of non-performing asset to asset management companies (AMCs). In the

government-assisted merger, the government helps a troubled bank to find a partner willing to acquire the distressed institution. In practice, to increase a success of this intervention measure, the government participates in restructuring of banks' debt, often by taking it over. Sheng (1996) claims that government-assisted mergers are particularly popular when the government has limited funds to handle the closure of insolvent institutions, and 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 the crisis. In addition, many regulators view this bailout strategy as psychologically advantageous as none institution is treated as a looser. Importantly, the distressed institution after the merger still operates on the market in the competitive environment.

The nationalization of distressed institution is perceived as a last resort. The government recapitalizes the distressed institution in exchange for its ownership. The academic studies argue that nationalization is very ineffective method of restoring bank's financial position when the government has a minority ownership. It is argued that governments do not actively participate in the restructuring process of distressed institution (Waxman, 1998). However, Kane (1986, 1989) suggests that even if government would have a power to influence the banks' behavior, it does not have sufficient incentives to do it. The politicians tend to purse a policy of forbearance, deferring such decisions to later periods due to their relatively short-time horizon of governing. The lack of appropriate restructuring process reduces the incentives of such institutions to change its future behavior.

The last bailout policy – the formation of AMCs aims at transferring the non-performing loans from distressed institutions' balance sheet into created for this purpose fund. The role of the fund is to clean up the banks' balance sheet and restore its profitability. The fund then tries to maximize recovery rate of bad debt through active restructuring of it. Klingebiel (2001) claim that AMCs are very ineffective restructuring method of distressed banks due to lack of necessary know-how, regulations related to these entities, and political involvement.

3. Literature Review and Hypothesis Testing

This section reviews the existing literature on bailout strategies and formulates the hypothesis to be tested.

3.1 Government Interventions

The academic literature presents two distinct views on possible effects of bank interventions on the long-run stability of banking sectors. One set of theoretical models documents that government

interventions have negative effects on the long-run stability of banking sectors due to increased risk taken by the bailed banks. The theoretical literature indicates two possible sources of these effects, not necessarily distinctive. One array of studies points toward greater incentives of bailed banks to engage in more risky activities due to creditor's anticipation of a bailout and reduced market discipline (Flannery, 1998; Sironi, 2003, Gropp et al., 2006). The effect is comparable to that discussed in the deposit insurance (Merton, 1977). Other studies point out the role of charter value as important determinant of bank's behavior. The academic research documents that greater charter value of banks decreases the incentives for excessive risk-taking due to the threat of losing future rents and making bank's capital structure more fragile (Keeley, 1990; Diamond and Rajan, 2000, 2001). According to this view lower profitability and capital decrease bank's charter value contributing to the increased risk in the banking sector (Kwan and Eisenbeis, 1997, Berger and De Young, 1997). Hence, the existing studies document that ineffective bailout strategies which does not allow the distressed institutions to recover in the post-crisis period lead to more risky banks' behavior in the long-run (Bonaccorsi di Patti and Kashyap, 2009; Duchin and Sosyura, 2011). These two views are not necessarily distinctive. Nier and Baumann (2006) document that greater support from the government reduces market discipline and results in lower efficiency and more fragile banks' capital structure incentivizing protected institutions to more risky behavior. These evidences can be however related to the literature pointing out the relevance of charter value as a determinant of bank's behavior. Relatedly, some studies also document that larger banks – which might be perceived as "too big to fail" – have been documented to follow more risky strategies than smaller banks (Boyd and Runkle, 1993; Schnabel, 2004, 2009). Other studies point out the role of ownership structure. State-owned banks are more likely to follow the riskier strategies than the private banks (Caprio and Martinez, 2000; Gropp et al., 2011). Although these studies are not directly related to the role of a bailout in determining banks' behavior they however seem to be compatible with the view that charter value effect is a determinant explaining the risky behavior of protected banks.

There exists also alternative view on the role of government interventions on long-run stability of the banking sectors. It points out the stabilizing role of government interventions. Studies opting for this view show that government support for bailed institutions reduces refinancing costs, hereby increasing banks' operating efficiency. For example, Hackenes and Schnabel (2010) show that public guarantees lowers refinancing costs for protected banks and therefore increase their charter value. Accordingly, Gropp et al. (2011) document that these institutions do not tend to follow risky strategies. However Berger et al. (2010) document a positive effect of capital injections on bank's

capital ratio. Similarly, the authors show that these institutions do not tend to increase their risk afterwards.

The overall effect of government interventions on the long-run banking stability is ambiguous and will depend on the relative weight of market discipline view over charter value view. The dominance of the latter theory will primarily depend on effectiveness of individual government intervention measures in restoring bank's health. Therefore, based on the above discussion we formulate two distinct hypotheses to test the effect of government interventions on long-run banking sector stability:

H1a: *The government interventions have a negative effect on long-run banking stability due to increased risk-taking of bailed institutions.*

H1a: *The government interventions have a positive effect on long-run banking stability.*

Most of the existing literature on government interventions has concentrated on the role of public guarantees on risk-taking behavior of banks. There are however limited evidences on the role of other forms of government bailouts on banking sector fragility. This is surprising given the variety of bailout strategies the governments use to support the distressed institutions and restore long-run banking stability. In addition, these strategies also affect the overall impact of government interventions on banking sector stability. Therefore, from the perspective of regulators it is important to distinguish the effects of various government bailout strategies on bank's behavior and identify their main sources.

3.2 Public guarantees

Although the role of public guarantees on risk-taking behavior of protected banks has been extensively examined in the academic literature, the existing evidences are still very mixed. One array of studies documents the role of reduced market discipline as a result of government protection given the banking sector. Overall these studies provide empirical support that public guarantees negatively affect the long-run banking stability. Gropp et al. (2006) document that public guarantees significantly increase the risk in the banking sector as a result of moral hazard behavior of banks. Kunt and Detragische (2002) show that countries with public guarantees are more fragile to financial crises than countries without such guarantees. However, Gropp and Vesela (2004) find that while explicit deposit insurance scheme reduces bank's risk-taking behavior, the implicit government guarantees significantly increase the risk in the banking sector. Other array of studies points out the role of charter value determining the behavior of banks. These studies claim that protection offered

by a government should result in a decreased refinancing costs and greater charter value of a protected bank relative to their competitors. This should decrease the incentives of protected banks to risk-taking (Schnabel and Hackenes, 2010). In line with this view is a study of Gropp et al. (2011) where the authors do not find any negative effects of implicit guarantees on risk-taking behavior of protected banks. These studies support the evidence that public guarantees are effective in restoring confidence in financial sector hereby reducing the incentives for protected banks to excessive risk-taking. Therefore, we assume that if a charter value effect dominates for protected banks, the public guarantees will have a stabilizing role on long-run functioning of banking sectors. Therefore, our hypotheses are as following:

H2a: *The announcement of blanket guarantees have a negative effect on long-run banking sector stability due to increased risk-taking of protected banks.*

H2b: *The announcement of blanket guarantees have stabilizing impact on a banking sector.*

3.3 Liquidity provisions

The literature on the effects of liquidity provisions on banking fragility is very limited and inconclusive. The studies investigating the role of central banks' actions on the future behavior of banking institutions mostly refer to the potential moral hazard problem stemming from such actions. According to these studies the net effect depends on predictability of central bank's interventions by market participants. If the central banks' actions are less predictable the academic models document that banks do not tend to increase their risk-taking activities (Bageshot, 1982; Freixas, 1999). However, if the institution can be classified as "too big to fail" or there are several institutions following similar risky strategies, they might fall under the principle "too many to fail", the central banks' interventions are more predictable for market participants what increases the incentives for such banks to excessive risk-taking (Freixas, 1999; Goodhart and Huang, 1999; Acharya and Yorulmazer, 2007, 2008). These evidences seem to support the market discipline view. The higher predictability of central banks' interventions would probably reduce the market discipline, whereas less predictable actions should increase the market discipline. In theory, there might be also a charter value effect at play. The central banks' interventions allow banks to lower refinancing costs what might increase their charter value relative to their non-intervened competitors. According to the charter value theory this should reduce the incentives of bailed banks to excessive risk-taking. As already mentioned, Hackenes and Schnabel (2010) have proved such a relationship for banks protected by public guarantees. Based on these two views existing in the academic literature, we formulate our hypothesis as following:

H3a: *The Central Banks' actions as liquidity providers have destabilizing effect on a banking sector, increasing its risk in the future.*

H3b: *The Central Banks' actions as liquidity providers have stabilizing impact on a banking sector stability in the long-run.*

3.4 Capital injections

The capital injections into the banking sectors have been documented to have positive effects on the banking sector stability. These papers relate to the positive role of banks' capital determining bank's behavior (Diamond and Rajan, 2000, 2001; Berger et al., 2010). However, recent academic studies also suggest that capital injections might have a negative effect on bailed banks' risk-taking. Especially, this literature points toward ineffective restructuring of bailed institutions which might result in their lower operating efficiency. Hence, although the capital injections have been proved to have a positive impact on banks' capital ratio and risk behavior, the lower efficiency might lead to excessive risk-taking. Compatible with this view is a study of Duchin and Sosyura (2011) where the authors document that capital injections have a positive result on capital ratio of bailed institutions, yet the authors find that these banks tend to increase their risk afterwards. The authors find that shifting of risk occurs between the same asset class what does not influence banks' capital ratio itself however increases the portfolio risk considerably. In our study we also distinguish among various types of capital injections. We assume that recapitalization of banks in exchange for ownership (nationalization) or through support of AMCs are the bailout strategies involving government participation in the post-crisis period. These bailout measures will have different effects on bank's behavior than government-assisted mergers where the government participation is only limited to restructuring process during transaction period.

3.4.1 Nationalization and AMCs

The evidences on the effects of nationalization and AMCs on banks' future behavior can be traced to the literature examining the political involvement in the banking sector. Most of these studies document negative relationship pointing toward the conflict of interest between the politicians and shareholders. As a result, it has been documented that public banks operate less efficiently and have greater incentives to excessive risk-taking (Shleifer and Vishny, 1994; Iannota et al., 2007). Also, Berger et al. (2010) document that public banks tend to increase their risk after capital injections. Accordingly, Caprio and Marinez (2000) provide evidences that government ownership has negative effect on banking sector stability. Although these studies are difficult to reconcile with the evidences

on the impact of government interventions, they seem to be compatible with the charter value effect suggesting that lower operating efficiency encourages banks to excessive risk-taking. Based on the existing literature, our next hypothesis is formulated as following:

H4: *The political involvement in restructuring of banking institutions in the form of nationalization and creation of asset management companies is ineffective in restoring banking sector stability, encouraging bailed banks to excessive risk-taking.*

3.4.2. Government-assisted mergers

Finally, the government intervention in the form of government-assisted mergers is a different form of government involvement in restructuring process of distressed institutions. However, as already mentioned, this measure has a different nature than nationalization and AMCs since after the capital injection government does not actively assist in managing the new institution. The government participates in a deep restructuring of a distressed institution but only at the initial stage. The new created institution operates then on stand-alone basis afterwards. Hence, we would expect that both effects might be at play: greater operating efficiency as a result of restructuring process, and more effective market discipline due to lack of any government protection. Barth et al. (2004) and Beck et al. (2006) document that market mechanisms are the most effective in disciplining banks' behavior. Therefore, we would expect that government-assisted mergers are effective in restoring banking sector stability without increased risk going forward. Our hypothesis states:

H5: *Government-assisted mergers are successful policy measures in restoring a long-run banking sector stability.*

4. Empirical analysis

4.1. Empirical model

In the empirical analysis, we explain banks' risk-taking as a function of bank-specific and country-specific characteristics. The empirical specification is based on the theoretical literature on the effects of various government intervention measures on banks' risk-taking presented in the previous section. Since the bailout affects the monitoring incentives, risk premium, operating efficiency, and charter value (Cordella and Yeyati, 2003; Hackenes and Schnabel, 2010), the risk-taking is expected to depend on the type, extent and effectiveness of a bailout strategy.

We control for other important determinants of bank's risk-taking suggested by the theoretical and empirical literature, such as size, the intensity of bank competition, efficiency, economic

environment, and institutional structure. Hence, we model the risk-taking of bank *i* in country *j* as a function the bank's bailout measure, as well as some control variables, $X_{ij.}$

$$Risk_{ij} = \alpha_0 + \alpha_1 * X_{i,j} + \varepsilon_{ij} \quad (1)$$

The construction of all variables is explained in detail below.

4.2. Data

Our major data source is Bureau van Dijk/IFCA's Bankscope database, which contains the balance sheet and other bank-specific information for large number of banks from a broad set of countries. Our analysis is based on the cross-section of banks from countries which experienced the systemic banking crises, based on the data from Laeven and Valencia (2008). The authors provide the guidance on timing of systemic banking crises in individual countries as well as the government intervention measures implemented in these countries. The disadvantage of the data of Laeven and Valencia (2008) is that the sample covers only the data on country level. Therefore, we extend this dataset by identifying the distressed institutions during the systemic country's crises and match the intervention policies used by the governments to bail out these institutions. The data on bank names and particular government policies used come from the national banks' reports and survey conducted among the central banks. From the collected data we had to exclude the countries for which we were either not able to identify any distressed institution or to find a bailout strategy used by a government. This happened for countries we did not get any response from the central bank or we were not able to identify this information from the public available sources. The most difficult task with constructing this dataset is to avoid the selection bias. This problem may result from the fact that our empirical analysis would be based on the sample including only institutions which "survived" the crisis and would eliminate these which despite a government support became insolvent in the consecutive years. This problem might be especially true because we investigate the behavior of bailed institutions several years after a particular intervention has taken place. Because it is almost impossible to control in our empirical framework for the exit of institutions, we perform two tests to make sure that these events do not affect our estimated results. First, we include into our regressions all insolvent institutions with the latest data and keep them as they would be existing on the market. Second, we also perform the analysis for different time frameworks, which allow us to include the exited institutions.[1] Our main results do not change however we observe an increasing

[1] Most of the exits in our sample occurred two and three years after a particular intervention.

statistical significant of our effects with the time passage, especially for bailed institutions associated with the state participation.[2]

Additionally, we had to exclude from our initial sample the observations with the missing financial data. Our final sample shrank from 114 bailed financial institutions from 27 developed and developing countries into 92 banks coming from 23 countries which have received any government support and 102 their non-bailed competitors. For the period of *t+4*, where *t* is a year of a bank's bailout, we were also forced to exclude additional observations from Jamaica and Sweden due to missing concentration ratio and inflation rate. At the period of our interest, *t+4,* our final sample includes 183 banking bailed and non-bailed institutions.[3]

In the following, we will describe the construction of our major variables of interest, as well as other control variables, and present descriptive statistics of the data used in the analysis.

4.3. Risk measures

As dependent variables we use the following broad set of variables found in the literature to capture different aspects of risk-taking[4]: (i) *Z-score measure at t+4*. The z-score is defined as the ratio of the sum of a bank's average return on asset and capitalization (equity/total asset) and the standard deviation of the return on assets. The z-score indicates the number of standard deviations that a bank's return on asset has to drop below its expected value before equity is depleted and the bank becomes insolvent. The z-score measure is estimated as a 4-year moving average. This type of measure has been widely used in the banking literature by Boyd et al. (1993), Boyd and DeNicolo (2005) and recently by Laeven and Levine (2009). The second risk measure which we use is (ii) *Standard deviation measure* at *t+4*, defined as number of standard deviations of bank's return on asset. Higher number indicates greater volatility of the ratio and thus greater risk of insolvency. The standard deviation is estimated as a 4-year moving average, (iii) *Loan loss reserves to total loans at t+3*[5]*,* defined as total value of reserves on risk loans over total asset, (iv) *Liquidity ratio* at *t+4,* defined as liquid assets over short-term liabilities, (v) *Equity to total asset* at *t+4,* defined as book capital over total assets.

[2] The results are available upon request.

[3] The number of observations may vary for different time periods due to data availability. We investigate in the robustness analysis whether the results remain the same, independently the period chosen.

[4] All variables are calculated from balance-sheet data from the Bankscope.

[5] We regress loan loss reserves on other explanatory variables at t+3 due to greater data availability, as compared to t+4 time framework.

The effect of banks' increased risk-taking behavior would be in place if we find a negative correlation of government bailout strategies with z-score measure, liquidity ratio and equity ratio, and positive with earnings' volatility and loan loss reserves (due to the inverse relationship between the variables).

4.4. Control variables

We use a standard set of bank-specific and country-specific control variables.[6]

Total assets (in logarithmic form) are used to measure a bank's market power, returns to scale, and diversification benefits. The inclusion of this variable is particularly important because it allows to distinguish between the risk effects of diversification and those of expected bailout.

Additionally, we use *net loans* to *asset* ratio to control for the riskiness of a bank's loan portfolio. Consistent with other studies we expect a negative relationship between this variable and bank's risk measure as greater ratio suggests better portfolio quality.

Several studies claim that less efficient banks may be tempted to take on additional risk to increase their financial performance. Indeed, Kwan and Eisenbeis (1997) and Williams (2004) document that inefficiency positively affects banks' risk-taking. Following these studies, we include *cost to income ratio* to control for operating efficiency.

At the country level, we also control for *concentration* of the banking sector, measured as the percentage of banking systems assets held by the three largest banks. We expect a positive relationship as greater power of a few banks pushes up lending rates, and hence reduces the credit risk (Martinez-Miera and Rupullo, 2008). We also control for the macroeconomic environment of a country by including *gdp growth* and *inflation rate (in logarithm).* Additionally, we include a *dummy variable= 1,* and zero otherwise if a systemic banking crisis was accompanied by a currency crisis. A number of studies claims that banks in the developing countries are more exposed to moral hazard behavior than in the developed ones due to less effective market discipline (Nier and Baumann, 2006; Laeven and Levin, 2009). We control for this factor by including the *dummy variable = 1*, if a country is a developing one, and zero otherwise.

Behavior of bailed institutions might be different under different institutional structure. The risk-shifting should be more difficult if the regulations and information disclosure requirements are

[6] See Table 1 in the Appendix for a detailed descriptions of data sources.

stricter. Therefore, in later stage of our analysis we also control for *rule of law* and *disclosure requirements* (see again Table 1 in the Appendix for details). The risk-taking might be also strengthened by additional *explicit government guarantees*. Demirguc-Kunt and Detragische (2002) find that deposit insurance increases the likelihood of banking crises, which suggests a risk-taking effect of deposit insurance. Therefore, we include dummy=1 for existence of explicit insurance deposit network (again, see Table 1 in the Appendix for details). In the robustness check we also include country fixed effects to be sure that our results are not driven by any other country's characteristics.

4.5. Descriptive statistics

Table 1 presents the descriptive statistics at the bank level for two groups of banks: bailed versus their non-bailed competitors four years after specific intervention measure offered to a bank. The comparison is also made based on the mean test.

[Table 1]

The data suggest that the largest differences in performance and risk behavior between the non-bailed banks and their bailed peers occur for banks protected by public guarantees, and bailed through nationalization and AMCs. In general, the data reveal that bailed institutions tend to engage in more risky activities than their non-bailed peers several years after the bailout. The z-score measure which evaluates the risk of bank's insolvency (the lower the z-score, the higher the risk) is significantly lower in the bailed banks than other domestic banks. Accordingly, the volatility of banks' earnings are significantly higher for bailed banks than for the non-bailed. Also, the mean test suggests that the bailed institutions have significantly higher proportion of non-performing loans as well as loan loss reserves in their asset than their non-bailed peers. The findings also suggest that non-bailed banks are better capitalized than their bailed competitors. The equity to total assets – a measure of banks' capitalization is significantly higher for non-bailed banks than for the bailed ones. Also, the non-bailed institutions had better loan portfolio quality in the post-crisis period, and were more liquid relative to their bailed peers. The data also prove that larger in size institutions are more likely to be bailed by the government. The result is not surprising given the systemic relevance of larger banks. Interestingly, this result is valid for almost all intervention policy measures.

Tables 2 and 3 present the descriptive statistics at the country level as well as correlation matrix.

[Table 2]

[Table 3]

Note that our data exhibit significant variations not only across banks but also across countries. In particular, the data document significant differences in government policy measures between the countries. The data reveal that the most common intervention measures in our sample were public guarantees and AMCs. In our sample 58 and 62 institutions out of 114 were offered such a help, respectively. The data also reveal that these policy measures were common for both groups of countries: developing and developed. However, the greatest coverage we can observe in the developing economies. This fact is not surprising since the period of 90s resulted in severe systemic crises in the developing countries. Also, this was the period when developing countries' governments were forced to take over significant amount of distressed debt form domestic banks to rescue their national banking systems.

The liquidity provisions were also quite common intervention measure. Interestingly, in almost one third of our sample – thirty two banks were offered either public guarantees or central bank's help, but not by both measures at the same time. This observation has been supported empirically by Laeven and Valencia (2008) who find that the announcement of blanket guarantees decreases the probability of providing the liquidity injections afterwards. The data also suggest that there is no unified measure for governments to restructure their banking sectors. The total number of bailed institutions distributes almost equally among government assisted-mergers and nationalization. It is not surprising since the relevance of specific intervention measures also depends on the severance of the crisis, its scope and government budget. The data however suggest that AMCs were the most frequent policy. The nationalizations were very rare in the past due to involvement of significant amount of government funds.

Also, other country variables exhibit significant variation. The within country standard deviation of z-score measure ranges from 2.9 in Thailand to 30.4 in Ecuador. These differences are even higher when we consider only the variation between the bailed institutions. We also note considerable differences between banking structures of individual countries. For example, the concentration ratio, defined as the ratio of asset of three largest institutions to domestic banking sector asset ranges from 37 % in Japan, 65 % in Bulgaria, 89% in Norway, and 96% in Turkey. We do not however observe the significant correlation between concentration ratio and probability of bailout except from the case (see table 3). We find a significant correlation between concentration ratio and nationalization. The result is not surprising. It seems to document "too big to fail" policy. Interestingly, we also

observe that explicit guarantees increase the probability of introduction of implicit guarantees. We also find that disclosure requirements are positively correlated with implicit public guarantees and government assisted-mergers. The result might indicate that these policy measures are used more frequently in countries with more developed institutional infrastructure.

5. Estimation results

5.1. Main results

Tables 4-8 present the regression results for z-score, earnings' volatility, loan loss reserves, liquidity ratio and equity ratio as risk measures, respectively.

[Table 4]

[Table 5]

[Table 6]

[Table 7]

[Table 8]

The estimation results are consistent with the existing literature as well as with the results of t-test performed in summary statistics. They ambiguously document that government interventions in the banking sectors have negative influence on banking sector stability in the long-run. The results show that bailed banks tend to increase their risk several years after government interventions. The economic significance of this effect is also large. It suggests that the bailout reduces the possible change in profits by four standard deviations before the equity must be depleted (see Table 4). The effect is even higher once we use the liquidity ratio as a risk measure (see Table 7). Interestingly, the mean of the z-score measure amounts to 12.8 for non-intervened banks. The result is line with the study of Bonaccorsi di Patti and Kashyap (2009) and Duchin and Sosyura (2011) who document that bailed banks tend to increase their risk to improve their operating performance.

Particularly, the estimation results show that public guarantees and capital injections are associated with greater risk-taking of bailed institutions going forward. This is confirmed by the regression results while using the z-score, volatility of earnings, problem loan ratio as well as liquidity ratio as dependent variables. With respect to the equity ratio we only find a negative effect of public guarantees on risk-taking behavior of banks. This evidence is consistent with the recent studies which show that capital injections are successful in bank's capital ratio improvement (Berger et al, 2010;

Duchin and Sosyura, 2011). According to the financial fragility view documented by Diamond and Rajan (2000, 2001), safer capital ratio should discourage bailed banks from increased risk-taking. However we find a negative effect of capital injections on other risk measures. This result seems to be in line with a study of Duchin and Sosyura (2011) who document that bailed banks tend to shift their risk within the same asset class increasing their credit risk significantly, yes without influencing banks' closely-monitored capital level.

The negative effects of public guarantees and capital injections are also economically significant. The largest effect exhibits coefficient of public guarantees. It suggests that blanket guarantees increase the probability of bankruptcy of a protected bank by seven times, according to table 4 and 7, and by 8 times while the earnings' volatility is used as a risk measure (see table 5). These effects are substantial given a mean of 12 for non-intervened banks. The result is consistent with the existing literature which documents the negative effect of public guarantees on banks' risk-taking behavior pointing out the role of diminished market discipline (Flannery, 1998; Sironi, 2003; Gropp et al., 2006).

Among the capital injection measures, the coefficients of nationalization and AMCs exhibit statistical and economic significance. The effects suggest that nationalizations and AMCs increase the probability of banks' insolvency by five and three times, respectively, as a result of increased risk taking behavior, according to table 4. Some effects are even larger when we use different risk measures (see for example table 5 and 7). This result is consistent with our prediction and with most of the existing studies. It documents that political involvement in banking sector increases the risk in the banking sector in the long-run (Caprio and Marinez, 2000). The negative impact of these bailout strategies is probably an effect of lower operating efficiency of these institutions relative to their competitors. These effects might be additionally strengthened by the diminished market discipline. The creditors might perceive nationalized banks as being protected by the government‘s faith and therefore will have lower incentives to monitor their behavior. The result is similar to the risk-taking effect of public banks documented in existing studies (Berger et al, 2010; Gropp et al., 2011). Both effects seem to support the charter value view that weak operating efficiency motivate banks to additional risk-taking.

We also notice a lower statistical significance of nationalization and AMCs while the liquidity ratio is used as a risk measure (see table 7). The reason might be the that this variable measures a liquidity risk rather than a true credit risk. Because the government capital injections improve banks' liquidity

position, this variable might underestimate the probability of banks' insolvency.[7] We also cannot observe a significant effect of AMCs on loan loss reserves ratio (see table 8). This might be a result of intentional accounting strategy used by management, transferring doubtful loans to AMCs.

Interestingly, our results suggest that government-assisted mergers as well as central banks' actions do not exert any negative effects on banks' behavior. This result holds for all risk measures. The dummies proxying for these types of government interventions appear in the regressions as statistically insignificant. The former result is consistent with our predictions. Barth et al. (2004) document that the most effective way in restricting banks' risk-taking behavior is effective market discipline. Therefore, we assume that lack of any government protection (a new created institution has to operate on its stand-alone basis) and political influence will only strengthen this effect.

The insignificant coefficient of liquidity provision on banks' risk-taking behavior might be a result of two alternative effects. First, lower refinancing costs of bailed banks might increase banks' charter value and reduce the incentives to excessive risk-taking (Hackenes and Schnabel, 2010). Second, the market discipline is strengthened since the actions of central banks are less predictable by market participants (Freixas, 1999).

The remaining coefficients are largely as expected. The coefficient of banks' credit activity has a positive influence on our measures of risk. It means that institutions which have higher proportion of healthy loans in their portfolio lowers the probability of their bankruptcy. Furthermore, banks which are less efficient tend to engage in more risky activities, probably to compensate the weak performance by higher yield projects. This result is consistent with the existing literature (Eisenbeis and Kwan, 1997; Williams, 2004). Concentration is positively correlated with our measures of risk. The result means that higher concentration has a positive effect on the long-run stability of the banking sectors. The result is consistent with Beck et al. (2006) who show that greater concentration is associated with lower frequency of financial crises. The negative coefficient of gdp growth is probably a result of "income smoothing". The banks are more willing to take on additional risk during an economic expansion to increase its profitability and decrease their risk during economic contraction. Finally, the coefficient of dummy controlling for the developing region is statistically significant and negatively correlated with the increased risk-taking. The result shows that banks in the developing countries calculate their risk more carefully than in the developed economies. This result is consistent with Barth et al. (2004) and Levine and Laeven (2009)

[7] BIS (2011) also indicates the disadvantages of this variable as a liquidity risk measure.

5.2. Robustness check

We perform several regressions to check the robustness of our results. First, we include into our regressions the variables controlling for legal environment. The existing studies claim that banks' risk taking is also influenced by country specific institutional factors, including the market discipline (Barth et al., 2004; Beck et al., 2011). For this reason we include the rule of law, information disclosure regulations, and explicit deposit insurance scheme. Furthermore, we also add the country fixed effect to be sure that banks' behavior is not determined by any unobserved cross-country differences. Tables 9-11 present the results for the former specifications and table 12 presents the results after including the fixed-effect.

[Table 9]

[Table 10]

[Table 11]

[Table 12]

The estimation results show that all effects of interest remain the same after controlling for individual countries' characteristics. They support our main results suggesting that public guarantees and capital injections in exchange for ownership and formation of AMCs significantly contribute to the banking sector instability in the long-run. We conclude that banks' risk-taking behavior is partially a result of government bailout.

As already mentioned, we also perform the robustness analysis to make sure our results are not time-dependent. Therefore, we run the regressions for t+1, t+2, t+3, and t+5 periods. Our main effects remain the same, yet we observe the increasing significance of our effects with the time passage. For example, for nationalization and AMCs we observe the statistical significance of the effect for t+1 and t+2 at ten percent, whereas for t+3 the effect is statistical significant for five percent significance level. Interestingly, at the early time periods we also observe statistical significance of liquidity provision dummy. The effect however disappears after t+2 time period. We note however the stable effect of public guarantees on our risk-measures for all time periods. The result suggests that creditors anticipate the implicit public guarantees.[8]

[8] All estimation results are available upon request.

6. Sources of excessive-risk taking - estimation results

So far, we have shown which government intervention measures have a destabilizing effect on banking sectors in the long-run, as a result of increased risk taken by bailed banks. We have argued, not documented yet, that the source of risk might come from two different channels: first - according to the charter value view less efficient and less capitalized banks tend to increase their risk. We assume that this effect will be primarily a result of ineffective bailout policies not allowing distressed institutions to restore their financial performance; second – the effect might be a result of diminished market discipline if creditors can anticipate a bank's bailout. These two effects do not have to be necessarily exclusive. The lower market discipline might also contribute to lower banking efficiency and/or lower capital ratios and hence risk-taking behavior. Because operating efficiency and level of capital have been shown to be crucial determinants of banks' behavior, in this subsection we investigate the impact of bailout policies on bank's risk-taking, controlling for banks' financial condition. In addition, we also examine how banks' performance is affected by specific government intervention measures.

6.1. OLS results

In order to investigate one of our prevailing views that bailed institutions which are less efficient tend to increase their risk to a greater extent that their non-bailed competitors, we regress the z-score measure on the interaction variable consisting of an intervention measure and cost to income ratio – a proxy for the banks' efficiency, controlling for other effects from our basic specification. We also include the cost to income ratio as well as government intervention measures as separate explanatory variables in our regressions. Consistent with our charter value theory, we assume that weak performance of bailed institutions incentivize banks to increase their risk-taking behavior.[9]

We perform the analysis on a panel of cross-section data covering the period from t+1 to t+4, where t is a year of bank's bailout. All regressions include information disclosure requirements which proxy for the strength of market discipline. We also include country dummies to control for countries heterogeneity which additionally might drive bank's behavior. Table 13 presents the regression results.

[9] Alternatively, we use the interest margin as a measure of banks' operating performance. Our results remain robust. We also perform the same analysis with the capital ratio, defined as book capital to asset. The results confirm our previous estimations suggesting no statistical significant difference in banks' behavior between bailed and non-bailed institutions affecting the capital ratio. This result is line with Duchin and Sosyura (2011), as already discussed. The results are available upon request.

[Table 13]

The regression results clearly indicate that weaker performing bailed institutions tend to take additional risk compared to their non-bailed competitors. The cost to income variable interacted with government intervention dummy is statistically significant. The coefficient of this variable has a positive sign, whereas the signs of cost to income ratio and intervention dummy are negative. The result seems to indicate that government interventions are not effective in initiating the restructuring changes in bailed banks aimed at improving banks' performance. This incentivize less efficient banks to increased risk-taking. The evidence is in line with the charter value theory, discussed earlier. Alternatively, government guarantees also weaken the market discipline, motivating less efficient banks to take on greater risk. We also find that the former effect holds for banking institutions with political involvement, especially for nationalized institutions and for banks bailed through AMCs (see specifications 4 and 6). Probably, the conflict of interests between various involved parties distorts the run of restructuring changes resulting in the lower operating efficiency of these institutions. However the effect that less efficient banks protected by government guarantees tend to increase their risk seems to stem from diminished market discipline, probably also contributing to the lower efficiency of these banks (see specification 2). We also observe large economic significance of these effects. As one can expect, the largest coefficient is for public guarantees. This evidence is in line with Nier and Baumann (2006).

6.2. Instrumental variable results

In the previous subsection we have shown that government interventions without appropriate strengthening of corporate control and restructuring changes in bailed institutions are not effective and lead to banks' excessive risk-taking, especially by less efficient institutions. In this subsection, as a robustness check we document that causality of the effects runs from bailout strategies to lower efficiency of the bailed institutions. We perform this analysis since in theory weaker performance of banks might also be a result of banks' increased risk-taking, however OLS regression does not control for this. Therefore, we consider the following simultaneous equations model:

$$Risk_{ij} = \alpha_0 + \alpha_1 * d_{ij} + \alpha_2 * Cost\ to\ income_{ij}\ (Capital\ Ratio_{ij}) + \alpha_3 * X_{i,j} + \varepsilon_{ij} \quad (2)$$

$$Cost\ to\ income_{ij}\ (Capital\ Ratio_{ij}) = \beta_0 + \beta_1 * d_{ij} + \beta_2 * Risk_{ij} + \beta_4 * Z_{ij} + \beta_3 X_{i,j} + \mu_{ij} \quad (3)$$

Here, *X* is a vector of exogenous variables that enter both equations. *Z* is instrument for our variables of interest (cost to income - a proxy for bank's efficiency and capital ratio - a proxy for capital level) which are assumed to be orthogonal to the error term in the risk equation. We use the government

intervention measures as our instruments. The key identifying assumption is that government bailout should affect risk-taking of banks through operating performance. The assumption seems to be very plausible. In the previous subsection we have documented that bailed banks which are less efficient tend to increase their risk. Moreover, for the instrument to be relevant, the government bailout has to be correlated with operating efficiency, which can be checked empirically. Using government bailout strategies as instruments the equation (2) is just identified which is of our interest. The analysis covers the period from t+1 to t+4, where t is a year of a bailout. The rest of explanatory variables is the same as in the previous subsection. The regressions include country dummies to control for countries' heterogeneity.

Table 14 displays the results for the first-stage regressions, and table 15 for the second-stage.

[Table 14]

[Table 15]

We find that the public guarantees, nationalizations and AMCs have highly significant negative effects on bank's operating efficiency.[10] In case of two latter bailout strategies, the effects are line with the existing literature which suggests that political involvement negatively affects the banks' performance. More surprising is the negative effect of public guarantees on bank's efficiency. The result seems to confirm our previous findings that diminished market control does not discipline banks to implement necessary restructuring changes and results in lower efficiency of these institutions. The t-statistics also suggest that the instruments are not weak. The effects are also economically large: Depending on the intervention measure, a bailout lowers the bank's efficiency by between 11 and 25 times (the mean of the cost to income ratio for non-intervened banks on this sample is 75). Again, we do not find any impact of liquidity provisions and mergers on banks' efficiency – the result which is also consistent with our previous estimations.

Table 15 presents the results for the second-stage estimations. We find that lower efficiency give rise to banks' risk -taking – the result consistent with our previous estimations. Again, all effects of our interest are statistically significant. These results strongly support our previous predictions that government interventions, especially in the form of public guarantees, nationalizations and AMCs

[10] We could not however confirm these results for capital ratios. The result indeed suggests that capital injections are effective in capital ratio improvement however the banks shift their risk among the same asset class.

exert negative impact on bank's efficiency and hence incentivize banks' to increased risk-taking, without influencing closely-monitored capital ratio.

7. Conclusions

This article analyzes the impact of government interventions on long-run stability of banking sectors. To this end, we construct the novel bank-level database of institutions bailed during financial crises in 23 countries. This database allows us to investigate the behavior of bailed banks several years after specific policy measure was undertaken. We then compare the behavior of these institutions to their non-bailed competitors in the same country. Importantly, our database allows us to distinguish the differences in government policy measures and access their impact individually. We test whether and which government intervention measures, out of widely used, have destabilizing effects on long-run functioning of banking sectors, as suggested by theoretical literature.

The regression results are striking: Government interventions significantly increase the risk in the banking sector several years afterwards, and the estimated increase in risk is substantial. Our results document that this effect stems from increased risk-taking by bailed institutions. The results prove to be robust to a number of modifications, including the use of large number of risk measures, chosen time-periods, and country characteristics which might influence banks' behavior. We further show that public guarantees, nationalizations and AMCs as government intervention measures negatively impact the banking sector stability in the long-run. We document that this effect comes from charter value theory which suggests that weaker performing banks tend to increase their risk. In line with this theory, our results suggest that above mentioned bailout strategies are not effective in restoring banks' performance. The political influence as well as diminished market discipline strengthen these effects incentivizing these institutions to increase their risk afterwards. Our results clearly indicate that corporate control and market forces are much more effective in restoring long-run banking sector stability.

These results have important policy implications. First, they show that pure government interventions are ineffective in restoring the long-run banking stability. The more active role of governmental authorities in restructuring of distressed banks is needed for efficient and healthy functioning of banking sectors. These evidences contribute to the undertaken initiatives to adopt the legal procedures for an orderly resolution of systemic banking crises and distressed banking institutions (see for example: "Technical Details of a Possible EU Framework for Bank Recovery and Resolution", 2011; "A Special Resolution Regime on UK Banking Act", 2009; Resolution Policies Acts on Restoring the Distressed Institutions in Ireland, Germany and Denmark). Second, the evidences

contribute to the current debate on expected possible effects of government interventions on future functioning of banking sectors and thus on the shape of banking regulation (see for example: Interim Report of UK Independent Commission on Banking, 2010). And finally, our results contribute to debate on the role of state and its exit possibilities from the banking sectors (OECD, 2009; IMF, 2010). The results clearly indicate that government role should limit to the restructuring of a bailed institution and after then stepping back from its ownership. The corporate control works at most efficiently in disciplining the long-run banks' behavior, restoring the banking sectors' stability.

Table 1
Descriptive statistics at bank-level

	Intervened banks					Non-intervened banks (peer group)					
Guarantee	**Mean**	**Std.dev**	**Min.**	**Max.**	**N**	**Mean**	**Std.dev.**	**Min.**	**Max.**	**N**	**t-test**
z-score	4.635	6.117	-5.310	23.900	45	12.131	11.769	-0.100	90.750	149	4.103***
loan quality	45.576	22.817	3.770	89.340	45	50.203	16.916	0.130	84.630	147	0.143*
cost to inc.	89.547	76.298	42.500	457.940	42	69.291	62.328	3.580	735.640	149	-1.767*
asset size	8.834	2.302	3.030	14.010	45	7.027	2.147	0.520	13.980	149	-4.864***
stand. dev.	8.765	12.163	0.200	44.040	43	2.712	4.121	0.100	36.290	149	-5.160***
ROA	-0.447	4.056	-20.660	2.460	43	1.724	4.025	-23.150	31.580	149	3.111***
equity/asset	6.673	2.659	1.18	13.81	44	12.931	12.612	2.130	97.650	149	8.908***
liquidity ratio	26.071	19.205	1.690	75.560	35	41.167	25.666	0.520	146.650	127	1.978**
loan loss res. ratio	7.780	24.036	-112.690	86.090	41	6.109	6.010	0.500	43.920	142	-0.755
non-perf.	13.083	16.752	0.820	95.620	34	9.515	28.167	0.030	266.150	93	-0.694
Liquidity											
z-score	9.103	9.793	-5.310	37.360	44	10.770	11.548	-0.480	90.750	150	0.870
loan quality	48.610	21.946	3.770	89.340	44	49.269	17.437	0.130	84.630	148	0.836
cost to inc.	73.697	67.873	3.580	457.940	43	73.760	65.652	13.520	735.640	148	0.006
asset size	7.866	2.004	3.030	10.820	44	7.323	2.382	0.520	14.010	150	-1.374
stand. dev.	4.991	8.487	0.200	40.670	44	3.793	6.803	0.100	44.040	148	-0.966
ROA	1.650	6.478	-20.660	31.580	44	1.116	3.121	-23.150	16.300	148	-0.753
equity/asset	9.391	4.550	1.980	29.480	44	12.128	12.742	1.180	97.650	149	2.832***
liquidity ratio	29.238	20.395	0.630	97.070	40	40.747	25.966	0.520	146.650	122	2.555**
loan loss res. ratio	5.895	22.695	-112.690	86.090	43	6.664	6.911	0.500	43.920	140	0.353
non-perf.	17.754	48.341	0.620	266.150	32	8.017	9.143	0.030	57.330	95	-1.880*
National											
z-score	5.556	7.757	0.120	35.420	37	11.532	11.561	-5.310	90.750	157	2.986***
loan quality	39.723	20.621	3.770	82.180	37	51.361	17.296	0.130	89.340	155	3.539***
cost to inc.	87.603	79.073	3.580	457.940	35	70.636	62.541	13.520	735.640	156	-1.378
asset size	8.216	1.586	4.150	11.230	37	7.265	2.416	0.520	14.010	157	-2.279**
stand. dev.	9.469	11.663	0.420	44.040	36	2.821	5.013	0.100	40.670	156	-5.326***
ROA	1.730	6.308	-12.130	31.580	36	1.125	3.448	-23.150	16.300	156	-0.794
equity/asset	8.837	4.635	3.300	29.480	36	12.116	12.431	1.180	97.650	157	5.585***
liquidity ratio	34.255	23.168	0.630	97.070	31	38.769	25.598	0.520	146.650	131	0.898
loan loss res. ratio	4.701	21.621	-112.690	24.310	34	6.890	9.275	0.500	86.090	149	0.924
non-perf.	18.590	50.893	0.820	266.150	26	8.380	12.514	0.030	95.620	101	-1.831*
Merger											
z-score	11.106	8.610	0.490	37.360	42	10.195	11.799	-5.310	90.750	152	-0.467
loan quality	47.642	17.878	0.250	69.040	42	49.532	18.717	0.130	89.340	150	0.584
cost to inc.	61.100	19.279	34.850	136.320	42	77.310	73.669	3.580	735.640	149	1.410
asset size	8.999	2.423	4.150	14.010	42	7.018	2.088	0.520	13.980	152	-5.251***
stand. dev.	2.517	5.928	0.200	36.290	41	4.488	7.492	0.100	44.040	151	1.557
ROA	1.555	2.757	-3.170	16.300	41	1.152	4.425	-23.150	31.580	151	-0.553
equity/asset	8.984	7.694	3.400	52.190	41	12.184	12.200	1.180	97.650	152	1.076
liquidity ratio	28.823	19.424	0.520	72.800	32	40.141	25.941	0.630	146.650	130	2.312**
loan loss res.	7.122	8.332	0.710	43.920	38	6.316	13.360	-112.690	86.090	145	-0.354
non-perf. ratio	19.162	52.941	0.710	266.150	24	8.445	12.473	0.030	95.620	103	-1.865*
AMC											
z-score	6.811	8.080	-5.310	37.360	50	11.635	11.833	-0.100	90.750	144	2.673***
loan quality	43.395	21.325	0.250	86.010	50	51.133	17.036	0.130	89.340	142	2.580**
cost to inc.	76.673	65.807	3.580	457.940	48	72.763	66.236	13.520	735.640	143	-0.355
asset size	8.620	2.150	4.270	14.010	50	7.039	2.227	0.520	13.980	144	-4.365***
stand. dev.	6.841	10.512	0.260	44.040	49	3.117	5.399	0.100	36.290	143	-3.191***
ROA	1.221	6.059	-20.660	31.580	49	1.244	3.233	-23.150	16.300	143	0.034
equity/asset	8.545	4.584	1.180	29.480	49	12.511	12.844	2.130	97.650	144	5.382***
liquidity ratio	31.463	22.535	0.520	97.070	43	40.233	25.717	1.690	146.650	119	1.978**
loan loss res.	6.884	22.804	-112.690	86.090	45	6.353	6.279	0.500	43.920	138	-0.248
non-perf. ratio	17.266	45.507	0.620	266.150	36	7.782	9.290	0.030	57.330	91	-1.901*

Table 2
Descriptive statistics at country-level

Country	Year of systemic crisis	Total no. of banks	No of bailed banks	Guaran. dum	Liquid. dum	Nat. dum	Merg. dum	AMCs dum	No of non-bailed banks	zscore (within country stand. dev.) (%)	Conc. ratio (%)	Curr. crisis	Gdp growth (%)	Trans. index	Exp. dep. insur.	Rule of law	Infl. (%)
Argentina	2001	14	8	0	7	2	1	3	6	5.21	42.5	1	8.1	7	1	0.04	8.8
Bulgaria	1996	9	2	0	1	2	0	2	7	14.2	65.3	1	4.2	7	1	-0.02	7.4
Colombia	1998	13	9	0	5	2	5	2	4	4.8	34.6	0	3.9	7	1	-0.92	7.1
Croatia	1998	14	6	0	0	4	3	4	8	11.2	61.2	0	5.0	7	1	0.06	1.8
Czech Republic	1996	2	1	0	0	0	1	0	1	17.1	64.7	0	2.5	7	1	0.77	4.7
Equador	1998	10	2	2	1	0	0	2	8	30.4	49.5	2	3.6	n.a.	1	-0.66	7.9
Estonia	1992	6	4	0	2	1	3	3	2	11.3	71.3	0	10.8	7	0	0.51	10.6
Finland	1991	4	1	1	1	1	0	1	3	2.1	89.2	1	3.6	7	1	1.93	3.8
Indonesia	1997	13	12	11	5	10	1	8	1	4.1	58.6	1	4.5	7	1	-1.01	11.9
Jamaika	1996	7	3	3	3	3	2	2	4	21.6	n.a.	1	1.3	7	1	-0.49	7.0
Japan	1997	17	13	11	0	2	8	9	4	6.1	36.7	0	0.3	8	1	1.25	-0.9
Korea	1997	13	6	3	1	2	4	2	7	4.1	46.7	1	7.2	8	1	0.84	2.8
Lithuania	1995	3	2	2	0	2	1	2	1	7.4	84.0	0	3.25	8	1	0.29	1.0
Malaysia	1997	15	7	3	2	1	4	2	8	12.6	40.4	1	5.4	8	1	0.42	1.8
Mexico	1994	8	5	4	3	1	3	2	3	9.1	57.5	1	3.9	8	1	-0.36	16.6
Nicaragua	2000	5	1	1	1	0	0	1	4	19.6	84	0	4.3	8	1	-1.36	9.9
Norway	1991	12	7	7	6	2	0	4	5	10.8	81.8	0	5.1	7	1	2.0	1.3
Paraguay	1995	7	1	0	1	0	0	0	6	6.8	43.8	0	-3.4	n.a.	0	-0.97	9.0
Russia	1998	8	2	0	1	0	1	1	6	7.0	14.8	1	7.3	6	0	-0.92	13.7
Sweden	1991	7	3	2	1	0	2	1	4	7.5	n.a.	1	n.a.	7	0	1.81	n.a.
Thailand	1997	10	5	5	2	3	1	3	5	2.9	49.2	0	5.3	8	1	0.25	0.7
Turkey	2000	13	8	3	4	1	6	4	5	5.3	96.2	1	8.4	n.a	1	0.11	10.1
Ukraine	1998	8	2	0	2	0	0	2	6	11.4	43.0	1	5.2	n.a	1	-0.9	5.2
Uruguay	2002	8	2	0	2	2	0	1	6	15.3	74.7	1	7.1	7	1	0.49	7.9
Venezuela	1994	6	2	0	1	1	0	1	4	6.6	40.3	1	-6.0	5	1	-0.8	23.6
Total	**-**	**232**	**114**	**58**	**52**	**42**	**46**	**62**	**118**	**-**	-	-	-	-	-	-	-

Table 3
Correlation matrix

	Interv. dum	Guaran. dum	Liquid. dum	Nat. dum	AMCs dum	Merg. dum	Z-score	Infl. rate	Gdp growth	Conc. ratio	Discl. index	Dep. ins.
Interv. dum	1											
Guaran.dum	0.579*	1										
Liquid.dum	0.570*	0.315*	1									
Nat.dum	0.511*	0.510*	0.364*	1								
AMCs dum	0.621*	0.570*	0.441*	0.584*	1							
Merg.dum	0.545*	0.164*	0.112	0.070	0.215*	1						
Z-score	-0.227*	-0.284*	-0.082	-0.211*	-0.189*	0.039	1					
Infl. rate	-0.055	-0.088	0.161*	0.030	-0.026	-0.103	-0.034	1				
Gdp growth	0.097	-0.106	0.095	-0.027	-0.018	0.072	-0.060	-0.085	1			
Conc. ratio	0.064	0.117	0.112	0.173*	0.107	0.030	0.042	-0.014	0.242*	1		
Discl. index	0.090	0.233*	-0.118	-0.045	0.021	0.211*	0.046	-0.594*	0.151	0.104	1	
Deposit ins.	0.098	0.192*	0.030	0.127	0.054	0.018	0.016	-0.295*	-0.006	0.257*	0.385*	1
Rule of law	0.077	0.148*	-0.041	-0.026	0.076	0.131	-0.057	-0.602*	0.199*	0.313*	0.383*	0.217*

* denote statistical significance at least at the 5% level.

Table 4
Government intervention and risk-taking of banks using z-score measure as dependent variable

intervention dummy (1)
guarantee dummy (2)
liquidity dummy (3)
national. dummy (4)
merger (5)
AMC (6)

	(1)	(2)	(3)	(4)	(5)	(6)
resolution policy	-3.921***	-6.989***	-1.499	-4.745***	2.191	-3.393**
	(1.455)	(1.528)	(1.705)	(1.687)	(1.603)	(1.546)
loan quality	0.126***	0.124***	0.128***	0.109**	0.127***	0.114**
	(0.044)	(0.042)	(0.044)	(0.043)	(0.044)	(0.045)
cost to income ratio	-0.019*	-0.012	-0.028**	-0.022*	-0.028**	-0.025**
	(0.011)	(0.012)	(0.012)	(0.013)	(0.012)	(0.013)
asset (log)	0.160	0.155	-0.233	-0.083	-0.506	-0.078
	(0.484)	(0.484)	(0.487)	(0.486)	(0.494)	(0.491)
concentration ratio	0.074**	0.096***	0.069**	0.085***	0.064**	0.078**
	(0.031)	(0.033)	(0.032)	(0.033)	(0.033)	(0.032)
gdp growth	-0.320	-0.507**	-0.412**	-0.432**	-0.461	-0.423**
	(0.211)	(0.206)	(0.202)	(0.214)	(0.201)	(0.211)
inflation (log)	-1.395	-1.747*	-1.312	-1.307	-1.394	-1.552
	(1.000)	(0.994)	(1.085)	(1.011)	(1.022)	(1.012)
dummy for developing country=1	7.815***	6.672***	6.889***	7.036***	6.246**	7.116***
	(2.566)	(2.455)	(2.520)	(2.466)	(2.455)	(2.569)
dummy for currency crisis=1	1.488	2.589	2.041	1.919	2.386	1.990
	(2.560)	(2.544)	(2.623)	(2.589)	(2.627)	(2.586)
constant	-1.502	-1.752	1.360	0.500	3.676	1.100
	(6.647)	(6.686)	(6.664)	(6.702)	(6.586)	(6.759)
R2	0.117	0.144	0.096	0.117	0.098	0.108
Number of countries	23	23	23	23	23	23
Number of observations	183	183	183	183	183	183

The t-statistics based on robust standard errors appeared in the brackets and ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 5
Government intervention and risk-taking of banks using standard deviation of ROA as dependent variable

intervention dummy (1)
guarantee dummy (1)
liquidity dummy (2)
national. dummy (3)
merger dummy (4)
AMC dummy (5)

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
resolution policy	3.541***	7.833***	1.578	7.644***	-1.906	3.111**
	(1.168)	(1.934)	**(1.454)**	(2.019)	(1.622)	(1.454)
loan quality	-0.100***	-0.098***	-0.102***	-0.074**	-0.101***	-0.084***
	(0.030)	(0.028)	(0.032)	(0.028)	(0.032)	(0.030)
cost to income ratio	-0.011	-0.021**	-0.004	-0.013	-0.003	-0.006**
	(0.010)	(0.011)	(0.009)	(0.009)	(0.009)	(0.009)
asset (log)	-0.095	-0.190	0.242	-0.057	0.495	0.118
	(0.277)	(0.210)	(0.267)	(0.200)	(0.375)	(0.259)
concentration ratio	-0.003	-0.029	0.001	-0.025	0.006	-0.007
	(0.024)	(0.024)	(0.024)	(0.024)	(0.026)	(0.024)
gdp growth	-0.227	-0.044**	-0.144	-0.118**	-0.096	-0.134
	(0.172)	(0.129)	(0.163)	(0.174)	(0.145)	(0.167)
inflation (log)	1.338***	1.677***	1.252**	1.169**	1.367**	1.471***
	(0.498)	(0.563)	(0.521)	(0.509)	(0.552)	(0.534)
dummy for developing country=1	-1..089	-0.016***	-0.278	-0.590***	0.295**	-0.457
	(1.231)	(1.241)	(1.077)	(1.130)	(1.378)	(1.071)
dummy for currency crisis=1	0.886	-0.181	0.398	0.654	0.067	0.440
	(1.275)	(1.317)	(1.410)	(1.477)	(1.318)	(1.418)
constant	7.953	9.090**	5.531	7.520*	3.319	5.621
	(4.964)	(4.600)	(4.783)	(4.477)	(5.560)	(4.708)
R2	0.305	0.145	0.147	0.295	0.145	0.108
Number of countries	23	23	23	23	23	23
Number of observations	182	182	182	182	182	182

The t-statistics based on robust standard errors appeared in the brackets and ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 6
Government intervention and risk-taking of banks using loan loss reserves to total loans as dependent variable

intervention dummy (1)
guarantee dummy (2)
liquidity dummy (3)
national. dummy (4)
merger (5)
AMC (6)

	(1)	(2)	(3)	(4)	(5)	(6)
resolution policy	2.473*	4.302**	1.662	3.786**	-0.212	2.426
	(1.254)	(1.639)	(1.462)	(1.709)	(1.617)	(1.639)
loan quality	-0.166***	-0.164***	-0.167**	-0.147***	-0.165***	-0.157***
	(0.039)	(0.041)	(0.040)	(0.039)	(0.040)	(0.040)
cost to income ratio	0.008	0.003	0.012*	0.010	0.014	0.012
	(0.026)	(0.024)	(0.027)	(0.024)	(0.026)	(0.026)
asset (log)	-0.235	-0.294	-0.039	-0.144	0.058	-0.124
	(0.441)	(0.422)	(0.462)	(0.415)	(0.458)	(0.463)
concentration ratio	0.052	0.024	0.055	0.043	0.059	0.048
	(0.062)	(0.062)	(0.061)	(0.060)	(0.062)	(0.062)
gdp growth	-0.260	-0.137	-0.241	-0.191	-0.250	-0.239
	(0.354)	(0.351)	(0.357)	(0.325)	(0.361)	(0.349)
inflation (log)	0.489	0.589	0.352	0.360	0.541	0.595
	(0.856)	(0.913)	(0.825)	(0.816)	(0.877)	(0.865)
dummy for developing country=1	0.032	0.608	0.498	0.134	0.673	0.262
	(3.115)	(3.088)	(3.080)	(3.118)	(3.056)	(3.159)
dummy for currency crisis=1	-2.961	-3.166	-3.149*	-2.816	-3.234*	-3.095
	(1.780)	(1.867)	(1.785)	(1.749)	(1.838)	(1.797)
Constant	14.744	16.007	13.520*	13.757*	12.419*	13.633
	(6.710)	(6.621)	(7.270)	(6.715)	(7.002)	(6.981)
Number of obs.	214	214	214	214	214	214
Number of countries	24	24	24	24	24	24
R2	0.185	0.202	0.173	0.193	0.167	0.181

The t-statistics based on robust standard errors appeared in the brackets and ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 7
Government intervention and risk-taking of banks using liquidity ratio as dependent variable

intervention dummy (1)						
guarantee dummy (2)						
liquidity dummy (3)						
national. dummy (4)						
merger (5)						
AMC (6)						
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
resolution policy	-5.921*	-6.996**	-6.096*	-5.235	-1.409	-6.712*
	(3.167)	(3.360)	(3.365)	(4.291)	(4.524)	(3.685)
loan quality	-0.689***	-0.699***	-0.680***	-0.715***	-0.692***	-0.725***
	(0.129)	(0.133)	(0.133)	(0.141)	(0.129)	(0.126)
cost to income ratio	-0.001	-0.001	-0.009	-0.009	-0.014	-0.008**
	(0.034)	(0.031)	(0.034)	(0.032)	(0.033)	(0.033)
asset (log)	-3.381***	-3.698***	-3.752***	-3.897***	-4.108***	-3.642***
	(1.140)	(1.014)	(1.061)	(0.974)	(1.145)	(1.046)
concentration ratio	0.083	0.104	0.084	0.099	0.073	0.099
	(0.071)	(0.077)	(0.070)	(0.073)	(0.071)	(0.072)
gdp growth	-0.136	-0.406	-0.221	-0.327	-0.291	-0.298**
	(0.565)	(0.629)	(0.604)	(0.615)	(0.579)	(0.599)
inflation (log)	-1.395**	-5.114***	-4.083**	-4.723**	-4.953***	-4.956***
	(1.000)	(1.868)	(1.960)	(1.858)	(1.859)	(1.875)
dummy for developing country=1	14.225***	12.148***	13.466***	13.028***	13.291**	13.247***
	(4.290)	(4.251)	(4.187)	(4.256)	(4.505)	(4.125)
dummy for currency crisis=1	1.271	2.731	1.611	2.007	2.201	1.812
	(3.994)	(4.034)	(4.010)	(4.027)	(3.971)	(3.982)
constant	90.917***	94.009***	92.167***	95.404***	96.636***	94.937***
	(17.282)	(16.230)	(16.863)	(15.961)	(17.487)	(16.384)
R2	0.507	0.507	0.507	0.503	0.498	0.509
Number of countries	23	23	23	23	23	23
Number of observations	158	158	158	158	158	158

The t-statistics based on robust standard errors appeared in the brackets and ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 8
Government resolution policy and risk-taking of banks using equity to total asset as dependent variable

intervention dummy (1)						
guarantee dummy (2)						
liquidity dummy (3)						
national. dummy (4)						
merger dummy (5)						
AMC (6)						
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
resolution policy	-0.892	-2.220**	-0.386	-0.433	1.330	-0.456
	(1.312)	(0.879)	(1.083)	(1.138)	(1.743)	(0.996)
loan quality	-0.020	-0.020	-0.019	-0.021	-0.019	-0.021
	(0.044)	(0.044)	(0.044)	(0.045)	(0.043)	(0.044)
cost to income ratio	-0.018	-0.015	-0.020	-0.019	-0.020	-0.020
	(0.014)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
asset size (log)	-1.181**	-1.139**	-1.267**	-1.270**	-1.400**	-1.258**
	(0.566)	(0.503)	(0.508)	(0.500)	(0.573)	(0.508)
concentration ratio	-0.005	0.002	-0.007	-0.006	-0.009	-0.006
	(0.033)	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)
gdp growth	-0.251	-0.301	-0.272	-0.276	-0.298	-0.275
	0.174	(0.189)	(0.184)	(0.186)	(0.181)	(0.186)
inflation (log)	0.199	0.097	0.224	0.195	0.235	0.170
	0.787	(0.792)	(0.830)	(0.801)	(0.803)	(0.789)
dummy	1.915	1.647	1.709	1.704	1.358	1.726
	(1.717)	(1.523)	(1.523)	(1.513)	(1.783)	(1.518)
currency crisis	0.698	0.986	0.819	0.830	1.984	0.829
	(2.255)	(2.317)	(2.311)	(2.308)	(2.231)	(2.310)
constant	21.315***	20.880***	21.934***	22.035***	22.963***	22.031***
	(7.641)	(6.897)	(6.909)	(6.791)	(7.389)	(6.810)
R2	0.187	0. 193	0.184	0.184	0.187	0.184
Number of countries	23	23	23	23	23	23
Number of observations	183	183	183	183	183	183

The t-statistics based on robust standard errors appeared in the brackets and ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 9
Government resolution policy and risk-taking of banks after controlling for rule of law

intervention dummy (1) guarantee dummy (2) liquidity dummy (3) national. dummy (4) merger dummy (5) AMC (6)	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
resolution policy	-3.916***	-7.016***	-1.532	-4.734***	2.174	-3.377**
	(1.470)	(1.606)	(1.658)	(1.746)	(1.580)	(1.584)
rule of law	0.371	-0.203	0.514	0.114	0.350	0.226
	(2.082)	(2.036)	(2.077)	(2.065)	(2.086)	(2.095)
loan quality	0.125***	0.124***	0.127***	0.109***	0.126***	0.113***
	(0.044)	(0.043)	(0.044)	(0.044)	(0.044)	(0.045)
cost to income ratio	-0.019*	-0.012	-0.028**	-0.022*	-0.028**	-0.026**
	(0.011)	(0.012)	(0.012)	(0.013)	(0.012)	(0.013)
asset size (log)	0.176	0.147	-0.207	-0.078	-0.489	-0.069
	(0.500)	(0.506)	(0.513)	(0.510)	(0.521)	(0.513)
concentration ratio	0.069	0.099**	0.063	0.083*	0.059	0.075
	(0.046)	(0.048)	(0.047)	(0.048)	(0.047)	(0.048)
gdp growth	-0.340	-0.496**	-0.440**	-0.438**	-0.480**	-0.436**
	(0.222)	(0.206)	(0.207)	(0.217)	(0.204)	(0.214)
inflation (log)	-1.268	-1.814	-1.131	-1.268	-1.274	-1.474
	(1.116)	(1.160)	(1.147)	(0.217)	(1.126)	(1.132)
dummy	8.236**	6.441*	7.477**	7.166**	6.648*	7.372**
	(3.674)	(3.560)	(3.717)	(3.660)	(3.627)	(3.735)
currency crisis	1.417	2.630	1.938	1.898	2.316	1.947
	(2.580)	(2.583)	(2.640)	(3.660)	(2.643)	(2.607)
constant	-1.748	-1.630	0.987	0.427	3.430	0.953
	(6.869)	(6.941)	(6.982)	(7.004)	(6.926)	(7.082)
R2	0.118	0.145	0.096	0.117	0.099	0.108
Number of countries	23	23	23	23	23	23
Number of observations	183	183	183	183	183	183

The t-statistics based on robust standard errors appeared in the brackets and ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 10
Government resolution policy and risk-taking of banks after controlling for information disclosure index

intervention dummy (1)						
guarantee dummy (2)						
liquidity dummy (3)						
national. dummy (4)						
merger dummy (5)						
AMC (6)						
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
resolution policy	-3.414**	-7.972***	-0.562	-5.950***	2.801	-3.191*
	(1.528)	(1.705)	(1.896)	(1.739)	(1.759)	(1.549)
Disclosure rule	0.759	1.546	0.881	0.404	0.707	0.515
	(1.540)	(1.576)	(1.577)	(1.499)	(1.586)	(1.582)
Loan quality	0.132***	0.140***	0.130***	0.112**	0.131***	0.122***
	(0.044)	(0.042)	(0.045)	(0.044)	(0.045)	(0.046)
cost to income ratio	-0.024**	-0.008	-0.031**	-0.022*	-0.030**	-0.028**
	(0.012)	(0.010)	(0.013)	(0.013)	(0.013)	(0.014)
asset size (log)	0.706	0.826	0.293	0.692	0.046	0.551
	(0.546)	(0.520)	(0.550)	(0.524)	(0.530)	(0.556)
concentration ratio	0.124**	0.156***	0.114**	0.160***	0.115**	0.134**
	(0.049)	(0.052)	(0.051)	(0.051)	(0.051)	(0.052)
gdp growth	-0.195	-0.451**	-0.277	-0.272	-0.316	-0.259
	(0.231)	(0.214)	(0.218)	(0.236)	(0.208)	(0.228)
inflation (log)	-0.802	-0.905	-0.772	-0.785	-0.789	-1.024
	(1.133)	(1.135)	(1.223)	(1.143)	(1.165)	(1.142)
dummy	9.180***	8.510***	8.143***	9.119***	7.536***	8.695***
	(2.784)	(2.700)	(2.756)	(2.693)	(2.715)	(2.811)
currency crisis	0.247	1.270	0.672	0.746	1.074	0.667
	(2.375)	(2.236)	(2.400)	(2.357)	(2.401)	(2.350)
constant	-16.141	-24.452**	-13.396	-14.928	-10.691	-12.980
	(11.952)	(12.433)	(11.807)	(11.385)	(11.531)	(11.947)
R2	0.174	0.214	0.149	0.200	0.160	0.167
Number of countries	19	19	19	19	19	19
Number of observations	150	150	150	150	150	150

The t-statistics based on robust standard errors appeared in the brackets and ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 11
Government intervention and risk-taking of banks after controlling for deposit insurance scheme

intervention dummy (1)
guarantee dummy (2)
liquidity dummy (3)
national. dummy (4)
merger dummy (5)
AMC dummy (6)

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
resolution policy	-3.922***	-7.008***	-1.501	-4.758***	2.225	-3.419**
	(1.463)	(1.541)	(1.717)	(1.704)	(1.632)	(1.549)
deposit insurance scheme	0.106	0.465	0.094***	0.331	0.370	-0.394
	(1.698)	(1.679)	(1.651)	(1.689)	(1.646)	(1.719)
loan quality	0.126***	0.124***	0.128***	0.109**	0.127***	0.113***
	(0.044)	(0.042)	(0.044)	(0.043)	(0.044)	(0.046)
cost to income ratio	-0.019*	-0.012**	-0.028**	-0.022*	-0.028**	-0.026**
	(0.011)	(0.012)	(0.012)	(0.013)	(0.012)	(0.013)
asset (log)	0.158	0.147	-0.234	-0.088	-0.516	-0.068
	(0.497)	(0.498)	(0.502)	(0.501)	(0.519)	(0.511)
concentration ratio	0.073**	0.093***	0.069**	0.083**	0.062*	0.081**
	(0.033)	(0.034)	(0.033)	(0.034	(0.034)	(0.034)
gdp growth	-0.319	-0.502**	-0.411**	-0.429**	-0.458**	-0.428**
	(0.207)	(0.203)	(0.198)	(0.210)	(0.197)	(0.208)
inflation (log)	-1.385	-1.697*	-1.303	-1.273**	-1.355**	-1.592***
	(0.975)	(0.968)	(1.069)	(0.988)	(0.997)	(0.986)
dummy for developing country=1	7.808***	6.637***	6.882***	7.012***	6.210**	7.149***
	(2.565)	(2.464)	(2.252)	(2.474)	(2.461)	(2.572)
dummy for currency crisis=1	1.473	2.524	2.027	1.871	2.337	2.045
	(2.503)	(2.484)	(2.567)	(2.534)	(2.568)	(2.528)
constant	-1.558	-2.006	1.309	0.321	3.502	1.296
	(6.511)	(6.479)	(6.477)	(6.465)	(6.384)	(6.577)
R2	0.118	0.145	0.096	0.117	0.099	0.109
Number of countries	23	23	23	23	23	23
Number of observations	183	183	183	183	183	183

The t-statistics based on robust standard errors appeared in the brackets and ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 12
Government intervention and risk-taking of banks after including the fixed-effect

intervention dummy (1)
guarantee dummy (2)
liquidity dummy (3)
national. dummy (4)
merger dummy (5)
AMC dummy (6)

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
resolution policy	-3.027**	-9.067***	-1.778	-3.952**	2.276	-2.749*
	(1.501)	(2.047)	(1.662)	(1.896)	(1.608)	(1.573)
loan quality	0.089*	0.083*	0.096*	0.085*	0.101**	0.087*
	(0.052)	(0.048)	(0.052)	(0.051)	(0.052)	(0.052)
cost to income ratio	-0.012	0.002	-0.016	-0.013	-0.018*	-0.014
	(0.011)	(0.012)	(0.011)	(0.011)	(0.011)	(0.011)
asset (log)	0.456	0.456	0.153	0.275	-0.166	0.283
	(0.553)	(0.513)	(0.528)	(0.545)	(0.552)	(0.560)
dummy for currency crisis=1	0.168	11.156	7.240	8.377	-5.596	-3.376
	(3.976)	(9.842)	(10.116)	(10.054)	(7.201)	(7.984)
constant	8.290	8.959	11.970	11.256	13.035	11.259
	(6.335)	(9.149)	(9.225)	(9.268)	(8.708)	(9.282)
R2	0.296	0.334	0.285	0.293	0.286	0.289
Number of countries	24	24	24	24	24	24
Number of observations	189	189	189	189	189	189

The t-statistics based on robust standard errors appeared in the brackets and ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 13
Government intervention and risk-taking of banks using z-score measure as dependent variable

intervention dummy (1)
guarantee dummy (2)
liquidity dummy (3)
national. dummy (4)
merger dummy (5)
AMC dummy (6)

	(1)	(2)	(3)	(4)	(5)	(6)
resolution policy	-7.579**	-11.761***	-4.865	-6.742**	2.687	-6.046***
	(2.992)	(4.006)	(5.427)	(2.454)	(3.497)	(2.055)
resolution policy*cost to income	0.050*	0.060*	0.040	0.044**	-0.002	0.046**
	(0.028)	(0.033)	(0.041)	(0.019)	(0.034)	(0.021)
loan quality	0.099***	0.111***	0.093**	0.086**	0.091**	0.083**
	(0.031)	(0.033)	(0.034)	(0.034)	(0.034)	(0.032)
cost to income ratio	-0.064**	-0.057*	-0.040**	-0.055**	-0.031**	-0.057**
	(0.029)	(0.031)	(0.017)	(0.022)	(0.014)	(0.024)
asset (log)	0.693	0.398	0.400	0.428	0.051	0.456
	(0.402)	(0.413)	(0.431)	(0.407)	(0.500)	(0.473)
concentration ratio	-0.032	-0.034	-0.028	-0.036	-0.027	-0.032
	(0.060)	(0.058)	(0.057)	(0.057)	(0.055)	(0.058)
gdp growth	-0.010	0.008	0.003	0.006	0.015	-0.004
	(0.134)	(0.134)	(0.127)	(0.127)	(0.127)	(0.128)
inflation (log)	0.967	0.925	1.110	1.077	1.271	1.063
	0.794	(0.824)	(0.787)	(0.788)	(0.755)	(0.783)
dummy for developing country=1	1.691	2.139	8.811***	1.563	0.259	1.625
	(1.946)	(1.801)	(1.576)	(1.732)	(1.777)	(1.813)
dummy for currency crisis=1	-8.446***	-8.422***	-6.811**	-9.476***	-7.312***	-8.058***
	(1.804)	(1.845)	(2.850)	(1.877)	(1.800)	(2.003)
disclosure index	0.093	0.917	-0.068	-0.261	-0.453	0.024
	(0.506)	(0.724)	(0.569)	(0.505)	(0.437)	(0.551)
constant	12.488	8.704	4.413	16.996	16.531	13.919
	(4.88)	(4.398)	(8.733)	(5.128)	(5.575)	(4.628)
R2	0.278	0.300	0.257	0.265	0.257	0.265
Number of countries	20	20	20	20	20	20
Number of observations	632	632	632	632	632	632

The t-statistics based on robust standard errors appeared in the brackets and ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 14
Two-stage least squares estimation using government policy measures as instruments for bank's efficiency: First-stage estimations. Dependent variable: cost to income

intervention dummy (1)
guarantee dummy (2)
liquidity dummy (3)
national. dummy (4)
merger dummy (5)
AMC dummy (6)

	(1)	(2)	(3)	(4)	(5)	(6)
resolution policy	9.887**	24.506***	-1.903	12.949**	-2.779	11.311**
	(3.915)	(5.762)	(4.735)	(6.437)	(3.148)	(4.878)
loan quality	-0.466***	-0.504***	-0.429***	-0.425***	-0.430***	-0.432***
	(0.135)	(0.134)	(0.130)	(0.133)	(0.133)	(0.134)
asset (log)	-4.711***	-4.158***	-3.470***	-4.344***	-3.40**	-4.509**
	(1.512)	(1.335)	(1.289)	(1.369)	(1.359)	(1.437)
concentration ratio	-0.403	-0.395	-0.408	-0.399	-0.408	-0.407
	(0.299)	(0.293)	(0.298)	(0.304)	(0.299)	0.301
gdp growth	0.175	0.128	0.147	0.201	0.147	0.200
	(0.528)	(0.520)	(0.527)	(0.529)	(0.526)	(0.530)
inflation (log)	2.458	2.718	-1.903	2.287	1.867	2.330
	(5.475)	(5.381)	5.588	(5.438)	(5.566)	(5.434)
dummy for developing country=1	-14.913	-17.340	-10.881	-15.149	-11.099	-14.658
	(16.875)	(16.579)	(17.728)	(16.897)	(17.258)	(16.998)
dummy for currency crisis=1	-1.955	-0.994	-4.180***	3.106	-4.800	0.955
	(15.177)	(14.535)	(16.363)	(15.584)	(15.749)	(15.556)
discolsure index	10.391	7.346*	11.283**	11.383**	11.463**	11.051
	(4.462)	(4.303)	(4.577)	(4.491)	(4.561)	(4.625)
constant	88.328**	102.643***	75.291**	74.118**	74.700	79.356**
	(35.312)	(34.257)	(36.728)	(35.403)	(37.537)	(36.277)
Number of observations	632	632	632	632	632	632
Number of countries	20	20	20	20	20	20
Adjusted R2	0.162	0.185	0.152	0.162	0.152	0.162

The t-statistics based on robust standard errors appeared in the brackets and ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 15
Two-stage least squares estimation using government policy measures as instruments for bank's efficiency: Second-stage estimations. Dependent variable: z-score measure

intervention dummy (1)
guarantee dummy (2)
liquidity dummy (3)
national. dummy (4)
merger dummy (5)
AMC dummy (6)

	(1)	(2)	(3)	(4)	(5)	(6)
loan quality	-0.078	-0.038	0.540	-0.018	-0.307	-0.011
	(0.098)	(0.062)	(1.058)	(0.077)	(0.523)	(0.076)
cost to income	-0.428**	-0.335***	1.001	-0.289*	-0.958	-0.274*
	(0.189)	(0.097)	(2.529)	(0.154)	(1.164)	(0.150)
asset (log)	-1.191	-0.858**	3.959	-0.690	-3.103	-0.636
	(0.734)	(0.497)	(9.166)	(0.690)	(4.716)	(0.581)
concentration ratio	-0.189	-0.151	0.395	-0.132	-0.406	-0.126
	(0.170)	(0.140)	(1.102)	(0.144)	(0.625)	(0.136)
gdp growth	0.071	0.057	-0.145	0.050	0.151	0.048
	(0.287)	(0.251)	(0.652)	(0.236)	(0.507)	(0.232)
inflation (log)	1.964	1.784	-0.821	1.693	2.998	1.664
	(2.407)	(1.946)	(8.979)	(1.731)	(6.139)	(1.703)
dummy for developing country=1	-3.827	-2.750	12.865	-2.204	-10.026	-2.028
	(8.122)	(6.750)	(39.189)	(6.424)	(25.224)	(6.147)
dummy for currency crisis=1	-9.202	-8.760	-2.355	-8.536	-11.744	-8.464
	(7.726)	(6.636)	(39.189)	(6.198)	(17.635)	(6.054)
disclosure index	4.236	3.206	-11.729	2.684	10.165	2.515
	(2.871)	(2.031)	(28.979)	(2.312)	(14.300)	(2.283)
constant	44.382**	37.189**	-67.061	33.546*	85.770	32.370**
	(22.172)	(16.295)	(200.865)	(19.016)	(106.638)	(16.768)
Number of observations	632	632	632	632	632	632
Number of countries	20	20	20	20	20	20
F-statistic (overall signifiance)	3.46***	4.52***	0.75	4.93***	1.20	5.02***

The t-statistics based on robust standard errors appeared in the brackets and ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

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Appendix:
Table 1:

Variable	Description	Source
Z-score	ROA+(Equity to total asset)/standard deviation of ROA, sd(ROA) estimated as 4-year moving average	Bankscope
Standard deviation	Standard deviation of ROA, estimated as 4-year moving average (%)	Bankscope
Loan loss reserves	Total value of reserves on risk loans over total loans (%)	Bankscope
Liquidity ratio	Liquid assets/short-term liabilities in (%)	Bankscope
Equity ratio	Book capital/total asset (%)	Bankscope
Total asset (log)	Total assets (in mln USD), in logarithmic form	Bankscope
Net interest margin	Net interest revenue over volume of interest-bearing asset (%)	Bankscope
Loan quality	Net loans to total asset (%)	Bankscope
Cost to income	Total cost as share of total income (%)	Bankscope
Currency crisis	Dummy indicating the currency crisis	Laeven L. and Valencia F. (2008)
Developing country	Dummy indicating if a country is a developing country	World Bank
Dummy variables for support	Dummy variables are equal to 1 if a bank's received any government support	National Central Banks
Concentration ratio	Assets of three largest banks as a share of assets of all commercial banks.	World Bank Financial Structure Indicators
Rule of law	Ordinal variable measuring the strength of the law in a country	World Bank, Database on Governance Indicators
Information disclosure index	Ordinal variable measuring the degree of information disclosure requirements for banks	World Bank, Survey on Regulation and Supervision
Deposit insurance scheme	Dummy equals to 1 if a country has an explicit deposit insurance scheme	Demirgüc-Kunt et al. (2002)
GDP growth	Annual percentage growth rate of GDP at market prices based on constant local currency (annual), (%)	World Bank Development Indicators
Inflation ratio	Annual percentage change in consumer price index (annual), in logarithm	World Bank Development Indicators