# The Long Term Effects of Bank Recapitalization: Evidence from an Emerging Market

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As a response to the global financial crisis of 2008, governments worldwide implemented bailout programs to restore stability and stimulate lending in their financial sectors, notwithstanding that little evidence exists about the long term effects of this type of government intervention. This paper presents an empirical assessment of the long term effects of bank recapitalization on bank risk and lending, two outcomes at the center of policy debate regarding the bailout. To understand the long term effects, a panel data set of the banking sector in Indonesia is used, as the Indonesian government implemented a recapitalization program in the banking sector following the Asian financial crisis of 1997. The results indicate that recapitalization leads to more risk-taking and increased lending by banks, and these effects are persistent in the long run. Although the increased risk-taking suggests evidence of moral hazard, the results indicate that the differences in risk-taking between recapitalized and non-recapitalized firms may be driven also by the decreased risk-taking of banks that did not experience intervention in addition to the increased risk-taking by banks that did. Further, recapitalization is found to stimulate lending in the long run, although more so for larger banks and pre-existing borrowers. Altogether, the results suggest that the effectiveness of recapitalization in reviving lending may have unintended consequences in terms of increased risk in the future.

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## I. Introduction

Over the past five years, much of the world narrowly sidestepped complete financial failure as lending slowed significantly and capital markets experienced a downturn second only to the Great Depression. Perhaps the most contentious element of government response to this and previous financial crises is the bailout of the banking sector. In the U.S alone, the Troubled Assets Recovery Program (TARP) cost taxpayers approximately 300 billion dollars and lead to significant policy debate (Elliott, 2009). Banking sector bailout programs continue to remain an issue in Europe, with the European Financial Stability Fund (EFSF) proposing to recapitalize financial institutions well into 2016. While these bailout programs represent an economically significant commitment of resources[1] and generate considerable political discord, little empirical evidence exists about the long-term effects of this type of policy intervention on bank-level financial outcomes. This paper seeks to fill this gap by examining the long term impact of a major banking sector bailout program on lending and risk taking, two variables central to the political debate surrounding banking sector bailouts.

The general purpose of government bailout programs is to stabilize the banking sector and stimulate lending by providing banks with emergency capital and purchasing so-called toxic assets. Periods of financial crisis are typically characterized by a dramatic decrease in lending due to decreases in deposits, increased loan losses, and the hesitancy of banks to lend. In the U.S., for instance, new lending to large borrowers fell by 47% at the peak of the recent crisis (Ivashina & Scharfstein, 2010). Bailout programs such as the TARP aim to facilitate a recovery in lending by strengthening bank balance sheets through recapitalization, providing managers with the financial support to resume lending (Calomiris, Klingebiel, & Laeven, 2004). The execution of the program, however, has generated widespread skepticism because there are few restrictions imposed on the use of the additional capital and on bank behavior. Bank managers are therefore able to allocate emergency capital to non-lending purposes, and potentially engage in the excessive risk-taking characterized by moral hazard, leaving the impact of the bailout on these two

[1]The resources committed to these programs ranged from 18.8% of GDP for larger countries, and upwards of 30% for smaller countries (Levy & Schich, 2010).

central policy variables an unanswered question. The key tradeoff the government faces, therefore, is that while the provision of a government safety net protects against the potential failure of the banking sector, it also risks impacting incentives in an adverse way in the future.

Economic theory provides some guidance as to the impact of a bank bailout program. The credit view literature of monetary policy suggests that the implementation of monetary policy measures such as recapitalization may directly impact lending depending on how bank managers choose to allocate deposits between the loan market and marketable securities (Bernanke, Gertler, & Gilchrist, 1996; Kashyap, Stein, & Wilcox, 1993; Peek & Rosengren, 2000). If banks expand their new deposits mostly by offering to supply more loans rather than investing in securities, recapitalization should stimulate new spending by the bank dependent sector.

In addition to impacting lending, a banking sector bailout program may also alter bank managers' incentives. The idea that the government may impact the incentives of bank managers by acting as lender of last resort, is well-studied in the literature (Bernardo, Talley, & Welch, 2011; Fischer, 1999). In particular, many papers emphasize that government bailouts may lead to moral hazard, as bank managers may assume excessive risk as a function of being saved from failure (Freixas & Parigi, 2008; Hirsch, 1977). Managers of bailed out banks may engage in excessive risk-taking because having confirmed expectations that the government will rescue the bank in case of future financial distress decreases the downside risk of any investment decision. When a bank is confident that the lender of last resort will enable it to borrow against otherwise illiquid assets in the future, the expected loss to shareholders in the event of a default decreases, decreasing the incentive of a manager to avoid default. As a result, the bank manager will choose a riskier portfolio, increasing the probability of the bank's insolvency (Herring & Vankudre, 1987).

The moral hazard problem may also impact the willingness of managers and other stakeholders to engage in activities that may be necessary to prevent insolvency but are otherwise privately costly, such as monitoring. When the government acts as the lender

of last resort, bank managers may allocate less effort towards the ex-ante screening and later monitoring of projects that would otherwise increase the probability of an investment's success (Eijffinger, 2011). Further, bank managers may decrease their pursuit of delinquent borrowers and recognizing this, borrowers would rationally have less incentive to service their debt. Further, providing a bank with the government safety net may create moral hazard via the decreased effort of depositors and peer banks to monitor bank managers. This would enable managers to more freely pursue value-decreasing projects that enhance their private benefit.

Incentives for increased risk-taking resulting from moral hazard may be mitigated by the subsequent increase in franchise value resulting from government support (Demsetz, Saidenberg, & Strahan, 1996). The franchise value of a bank is the net present value of future rents that can only be captured if the bank remains in business. This value is permanently lost when a bank closes due to the non-transferability of the private information in lending relationships as well as the loss of the bank charter, which governments typically numerically limit. By ensuring the bank will not fail, the government may therefore increase the franchise value of the bank. Since franchise value can only be captured if a bank stays in operation, an increase in franchise value reduces the value-maximizing choice of both leverage and asset risk, thereby lowering shareholders' risk appetite (Demsetz, Saidenberg, & Strahan, 1997; Galloway, Lee, & Roden, 1997; Keeley, 1990). If by providing a government safety net the franchise value of the bank increases, bank managers may choose to invest in more prudent assets (Cordella & Yeyati, 2003; Hellmann, Murdock, & Stiglitz, 2000). Since both moral hazard and increases in franchise value may occur, it is therefore an empirical question whether on-balance recapitalization results in more or less risk-taking on the part of managers.

In order to analyze how a bank bailout impacts the financial outcomes of banks, we use data from the institution of a TARP-like program in Indonesia following the Asian financial crisis of 1997. Similar to TARP, the Indonesian Bank Restructuring Agency (IBRA) recapitalized banks in order to stimulate lending and stabilize the distressed Indonesian banking sector. We estimate the impact of the IBRA on lending and risk-

taking using a differences-in-differences methodology supported by confidential data outlining the selection criteria the IBRA used to determine which banks would be recapitalized, information rarely available in program analysis. Further, we are able to observe whether the effects are persistent, due to the fact that our data covers the years 1993-2008. The results indicate that recapitalization increased lending flow by 3.6 million Indonesian rupiah (IDR), several standard deviations above the pre-crisis control group mean and that this effect is greater for larger banks. Further, the results indicate that recapitalization leads to a 40% net increase in risk-taking. Interestingly, the differences in risk-taking are partly driven by both the increased risk-taking of recapitalized banks and the decreased risk-taking of non-recapitalized banks. The changes in risk-taking are robust to the stock of lending, suggesting that the increased risk was not only a result of the increased lending, but also of higher asset risk. Finally, the results show that the impact of the IBRA was persistent, providing evidence that the credit channel of monetary policy may have long term effects on both the financial and real sectors.

The potential impact on the outcome variables of alternative mechanisms other than recapitalization is also considered herein. First, the potential that political connections are solely driving the changes in outcomes is examined. It is well established in the literature that political connections have value for firms, particularly in emerging markets where political connections may substitute for institutional development (Claessens, Feijen, & Laeven, 2008; Goldman, Rocholl, & So, 2009; Johnson & Mitton, 2003; Li, Meng, Wang, & Zhou, 2008). In particular, Fisman (2001) shows that the political connections of publicly traded Indonesian firms to former President Suharto were sensitive to perceived changes in his political power. We reject the hypothesis that changes in political connections resulting from the fall of Suharto were the primary cause of differences in the outcome variables here because these changes did not occur in the year (or year after) Suharto left power. Supplementary evidence to reject the potential for political connections to confound the results is provided in Section V.

The results may also be confounded by changes in borrower demand. If massive amounts of borrowers are switching from the IBRA sponsored banks to the non-IBRA

banks after the crisis, then the increase in lending may be demand rather than supply driven. To assess the validity of this claim, we analyze the creditor identity of approximately one third of the manufacturing firms in Indonesia during the financial crisis to understand whether borrowers changed creditors during this time. Evidence indicates that observed increases in lending by bailed out banks is not driven by the switching of borrowers from non-recapitalized to recapitalized creditors.

Collectively, the results inform the current political debate by providing evidence of the impact of a bailout on lending and risk-taking. On the one hand, to the extent that the increase in lending provided by recapitalization helps to buffer the real-side economy from an economic downturn, this paper provides evidence that recapitalization is a successful policy mechanism. On the other hand, the results also show that fears of recapitalization leading to increased risk-taking in the long run are indeed justified, suggesting that recapitalization may have unforeseen consequences in terms of changes in risk-taking. Finally, with evidence that managers at non-recapitalized banks take significantly less risk in the long run, the results suggest that a bailout program may have unintended consequences on the entire sector, not just for those firms provided aid.

While the current financial crisis has motivated a resurgence of work on the real effects of financial crisis (M. Campello, Graham, & Harvey, 2010; M. G. Campello, Erasmo; Graham, John R.; Harvey, Campbell R., 2010; Ivashina & Scharfstein, 2010) and theoretical models of the impact of a bailout (Bebchuk & Goldstein, 2011; Glasserman & Wang, 2009; Philippon & Schnabl, 2009), empirically examining the long term impact of a bailout program on bank-level financial outcomes has so far remained relatively unexplored. Further, past work examining the impact of the government's role as lender of last resort on financial stability (Diamond & Dybvig, 1983; Kareken & Wallace, 1978) has remained largely theoretically focused.

Empirical analysis of the long term impact of a bailout program on bank-level financial outcomes is difficult to carry out for several reasons. One main difficulty in estimating the impact of a recapitalization program lies in the shortage of adequate data. Papers examining the impact of monetary policy following the financial crisis of 2008, for

instance, suffer from a lack of post-crisis data (Mariathasan & Merrouche, 2010; Veronesi & Zingales, 2010) which would otherwise help control for pre-existing trends and allow for understanding the long term effects of the policy. This paper, on the other hand, benefits from eleven post-crisis and eight post-intervention years, enabling comparison of before and after outcomes and allowing for understanding whether the effects are persistent, a concern evident in both the credit and monetarist literatures (Bernanke 1983, Christiano & Eichenbaum, 1992).

Another major barrier to the analysis of the impact of a bailout program on bank-level financial outcomes is the selection issue; banks may be selected for recapitalization based on a set of characteristics that may be driving changes in the outcome rather than the bailout *per se*. We address this issue here by utilizing confidential government data providing the characteristics used to determine which banks were recapitalized, which helps address the selection issue to a far greater degree than previously possible.

This paper applies more generally to research on the relationship between regulation and risk-taking, which addresses how the introduction of different banking policies such as deposit insurance and capital requirements affects risk-taking incentives (John, Litov, & Yeung, 2008; Laeven & Levine, 2009; Saunders, Strock, & Travlos, 1990). While similar in the sense that this paper evaluates the impact of government intervention in the banking sector on incentives, prior papers are markedly different in that they focus on cross-country regressions and examine the introduction of policies during relatively stable economic periods. In this paper, on the other hand, panel data is used to analyze the impact of monetary policy during a financial crisis. This allows for the controlling of observed and unobserved firm specific time-invariant characteristics that may otherwise confound identification. Further, this paper focuses on a policy implemented during a period of financial crisis that may have different impact than policies implemented during periods of financial growth.

This paper proceeds as follows. Section I discusses the institutional environment of the Indonesian banking sector and the details surrounding the crisis. Section II describes the data and methods implemented to address the research questions. Section III

discusses the results. Section IV discusses robustness of the results, while Section V looks at additional analyses. Section VI concludes.

### *A. Institutional Description*

*The Indonesian Banking Sector*.—The financial system in Indonesia has traditionally been dominated by banks (Enoch et al 2001). The period of the most significant growth in the banking sector, however, was the 1980s, when a series of reforms aimed at decreasing the dominance of state owned banks and promoting growth were implemented. These reforms, focused on deregulation, lead to a dramatic increase in the number of banks and a diffusion of market power. From 1988 to 1995, the number of banks more than doubled from 111 to 240, while the five largest banks controlled only 17% of total bank assets and a similar percentage of total market share (Sato, 2005). Many of these new banks were private domestic banks, opened explicitly to provide credit for affiliated companies (Baldwin, 2001) .

By the 1990s, however, problems in the banking sector began to emerge. Non-performing loans increased, and it became apparent that connected lending restrictions were violated. Several other banks were also struggling during the early 1990s. In late 1992, Indonesian authorities solicited a $300 million dollar loan from the World Bank to help bail out suffering state banks and several private banks that faced high non-performing loan ratios and very low capital adequacy ratios. In total, this bailout was estimated to have cost about two percent of GDP. Despite these problems, from 1994 to 1997, the Indonesian economy and financial sector witnessed very rapid growth. Bank credit grew three times faster than the steadily increasing GDP.

Although the banking industry witnessed rapid growth over this time period, problems began to emerge. In early 1992, the central bank, the Bank of Indonesia (BI), became aware that several banks faced high non-performing loan ratios and low capital adequacy ratios. In response to these problems, Indonesian authorities solicited a $300 million dollar loan from the World Bank to help bail out these banks. In total, this bailout

was estimated to have cost about two percent of GDP. This was the first incident of government bailout in the banking sector, but would not be the last.

*The Asian Financial Crisis in Indonesia*.—The steady growth of the Indonesian economy was interrupted in 1997 by the influence of the rapid devaluation of the Thai baht. In July 1997, currency speculators moved out of large positions in the Thai currency, which initiated doubt by investors in the economic viability of other Southeast Asian countries as well. Thus, what started as a currency crisis in Thailand, spread all over the region, including Indonesia. The currency crisis quickly became a banking crisis and political crisis ensued as well, leading to the termination of President Suharto's more than thirty year rule over Indonesia as well as three decades of trade surpluses, low inflation, large foreign exchange reserves and constant growth. A timeline of the crisis is provided in Table 1a and 1b.

What started as a currency crisis quickly spread to the banking sector in Indonesia because several existing lending practices created systemic problems under conditions of currency volatility. First, it was commonplace for Indonesian companies in the non-financial corporate sector to hold foreign denominated debt. The devaluation, therefore, left many companies unable to service their debt. Further, banks and their borrowers had established the convention of contracting with short-term obligations and instead continually extending loan terms rather than contracting in long-term obligations. By maintaining short-term obligations, firms could take advantage of typically lower interest rates. Banks, on the other hand, were obliged to maintain this standard practice to attract and retain customers. When the crisis began, banks were no longer willing to extend these loans, further increasing the number of non-performing loans in the system.

As these problems emerged, they contributed to a widespread loss of confidence in the banking sector. As a result, depositors began withdrawing funds, causing banks runs. With decreased deposits available to fund lending, bank managers then became even more hesitant to lend. This cycle resulted in the virtual elimination of available credit, making firms less likely to service their debt and threatening the function of the non-financial sector (Sato, 2005).

By October 1997, the banking crisis became so severe that the Indonesian government solicited the help of the IMF. This began a series of agreements between the IMF and the Indonesian government that would last several years. In exchange for financial and operational support to address the crisis, the Indonesian government agreed to many IMF-lead reforms. One of the first actions to directly address the banking crisis was the closure of 16 small insolvent banks with no public notice on November 1, 1997. The surprise nature of the closures consequently triggered a bank run. So rather than improving confidence in the banking sector, this government intervention had the opposite effect (Chou, 2000). By mid-December 1997, 154 banks had experienced a run on deposits as a result. By 2004, over 60 banks would be closed as a result of the financial crisis (see Table 2).

The financial crisis also triggered political instability. Although the 30 year reign of President Suharto was characterized by steady growth, firms with political connections also enjoyed economic advantages (Sato, 2005). During the crisis, attention began to shift towards the detrimental effect these relationships may have had on the economy. As a result, public sentiment towards the President grew hostile, and by June 1998 Suharto stepped down.

*Government Intervention and the Establishment of the IBRA.*— To facilitate the restoration of banking sector stability, government intervention in the earlier stages of the crisis was aimed at providing immediate assistance to liquidity-strapped banks to prevent the complete failure of the banking system and the spread of the crisis to the non-financial sector. In the early stages, the government began to provide liquidity support, recapitalizing banks. BI used several criteria to assess the viability of these banks including: the size of the bank (number of employees, number of deposits, and several other measures), quality of governance, and several measures of financial stability (capital adequacy, non-performing loans, and solvency).

In January 1998, the Indonesian government created a centralized institution to carry out the bank bailout, the Indonesian Bank Restructuring Agency (IBRA). The government delegated three main duties to the IBRA: implement recapitalization, recover bank assets, and recover state funds disbursed to the banking sector by selling the

transferred assets of recapitalized banks. The IBRA would implement the recapitalization by providing banks government bonds, in exchange for common shares.

The first step in the IBRA intervention process was the establishment of guidelines to determine the set of banks to be recapitalized. Based largely on the qualifications used by BI to provide liquidity support at the beginning of the crisis, the IBRA measured the banks on several dimensions. In order to maintain an independent evaluation process, the IBRA retained an international consulting firm to analyze banks based on the predetermined criteria. The intent was that banks would survive based on the strict application of transparent criteria, not by non-market based rules.[2] As a result of the evaluations based on these criteria, the IBRA would then decide how to proceed: whether to let the bank stand alone, to recapitalize the bank or to shut it down. The aim was to close banks that were not viable even with the IBRA assistance, and determine which banks should be recapitalized between remaining banks.

Three main characteristics were used to determine which banks would be recapitalized: the bank's role in the economy, its financial viability, and the quality of governance, called the "fit and proper" test. The bank's role in the economy was assessed using the following measures: the number of employees, number of branches, number of deposits and its geographic reach. In general, the intent was to support banks that were influential in the economy. Due to the geographic dispersion of the Indonesian archipelago, the IBRA wanted to save banks in regions of the country with fewer banks to ensure access to banking services for Indonesians in remote areas. Financial viability, on the other hand, was measured using several financial variables including the capital adequacy ratio, non-performing loan levels, and the ability of shareholders to provide 20% of the recapitalization amount from private sources. Called the Settler Agreement Plan, the provision of private assets by shareholders was intended to prevent moral hazard and help fund the program.

In addition, banks were also evaluated based on the quality of their governance. The IBRA used two criteria to determine whether a bank was fit and proper. The impetus for

[2] With the exception of government owned banks, all of which would be recapitalized.

including this as a characteristic to determine recapitalization was an increased focus by the new government on good governance. The post-Suharto government realized that inadequate bank governance may have led to inefficiency and failure in the application of good management principles and caused fundamental weaknesses at the micro level in the financial markets (Goeltom, 2008). Lending did not escape political influence, as in other countries, where lending has been shown to have a political element (Khwaja & Mian, 2008). Even in state banks, for instance, lending decisions were thought to have been subjectively influenced by government intervention, with the result that many loans were extended by reason of political connections and not based on objective assessment of the investment). Further, it was widely believed that people connected to Suharto contributed disproportionately to loaning large amounts of capital in related lending transactions[3] (Sato 2004). Thus, the fit and proper test was part of the new focus aimed at improving the quality of banking sector governance from the Suharto era.

The quality of governance was measured in two ways. The first was an assessment of the quality of the governance of board members, management, and shareholders. First, the IBRA checked whether these names were listed on two lists as participants in loan transactions. Compiled by BI, the "Daftar Kredit Macet" list or "Daftar Other Receivables" lists, were both lists of "bad loans", deemed uncollectible and requiring full provisioning. At the time, this determination was made by the BI using international standards developed in the Basel II accounting standards and could apply to personal or business-related loans. For most banks, the inclusion of either a shareholder or manager on either government list resulted in being considered not fit and proper.

Beyond forcing banks to acknowledge their losses, these lists also served a political purpose. Anecdotally, most of the names on the DKM/DOR lists were individuals connected to former President Suharto and their inclusion on these lists suggested a form of political retribution. Thus, if managers, shareholders, or board members were on the

[3] Related lending encompasses lending to a "related party"; any natural person or company/entity exercising control over the bank, whether directly or indirectly, through ownership, management, and/or financial links. These types of transactions were not illegal, but were limited by law.

DKM/DOR lists, they were likely to be connected to Suharto, and these banks were less likely to receive the support of the new government.

The second main criterion of the IBRA's bank governance requirements was whether the bank had a history of violating certain BI regulations. This determination was based mostly on whether the bank adhered to LLL and net open position (NOP) requirements. The LLL at the time of the crisis was 20% to unrelated parties and 10% to related parties.

The recapitalization of the banks was implemented over the years 1999 and 2000, although due to the continued loan resolution process, the IBRA remained open until 2004. Over the course of both the initial BI intervention and subsequent participation of the IBRA, 63 banks were recapitalized and the IBRA acquired approximately 33 billion USD in assets, approximately 70% of GDP. Of the 63 banks recapitalized, 14 also transferred assets to the IBRA for resolution. Ultimately, 76 banks closed over this period, accounting for 16% of total 1996 commercial bank assets (Sato 2005). Summary statistics of the recapitalized versus non-recapitalized banks are located in Table 3.

## II. Data and Methods

### *A. Data*

Several datasets, some previously not available for analysis, others never before digitized, and others publicly available, are used to analyze the effect of the IBRA on risk-taking and lending. The data are used to implement a differences-in-differences approach validated by analysis of the selection criteria showing that selection was based primarily on time-invariant characteristics of the firm. The primary dataset consists of the complete financial statements of each commercial bank in the banking sector collected annually by the Bank of Indonesia (henceforth the "BI dataset"). The BI dataset includes balance sheet, income statement and off-balance sheet information for the population of banks operating in the Indonesian banking sector from the years 1993-2000, which previously had not been digitized or translated from Indonesian into English and data from 2001-2008, which are made publicly available by BI. The BI dataset provides the

information used for the risk-taking and lending variables. Further, from this dataset we determine if banks were recapitalized, by the presence of government bonds on the asset side of the balance sheet during the period of the IBRA existence.[4] In addition, the BI dataset includes descriptive information about each bank, including information on the geographic location of the bank, the number of employees, as well as ownership and governance information. The ownership information includes the type of ownership (government, private domestic, etc.), the names of each shareholder and the percentage held by each shareholder. Similarly, the governance information includes the names of each board and oversight committee member.[5]

This dataset was combined with the results of the bank evaluation conducted by the independent consulting firm hired by the IBRA to evaluate the banks. These initial reports included the results of the first 54 banks put under the IBRA's auspices in 1998. The evaluation reports, compiled by the third party international consultancy, contain information on the three criteria discussed in Section 3.3 used to determine if a bank would be recapitalized.

In order to assess the consistency of the data between the two data sets, t-tests of data shared between the two data sets is conducted. Since the IBRA began evaluation in early 1998, the information in its dataset is compared to the BI dataset for 1997. Several values overlap including: total assets, total deposits, number of employees, capital adequacy ratio, and others and are not statistically different from one another. This provides confidence that combining the two datasets is acceptable and that substituting information from the BI dataset for banks not included in the IBRA dataset is adequate. In terms of the quality of the data, the similarity in the two datasets also implies that even if the quality of the BI dataset was not satisfactory, statistically similar data was used at the time to select banks for recapitalization, which is arguably more important for supporting the validity of the empirical methodology used.

[4] Prior to this time period, there is no evidence of government bonds on the asset side of bank balance sheets.

[5] Every Indonesia limited liability company is required to have a two-tiered board, consisting of a Board of Directors and a Board of Commissioners, the latter of which oversees the former. Publicly listed companies also have an Audit Committee that assists the Board of Commissioners.

For the banks not included in this sample, which were already audited, the information based on these criteria is culled from several sources. Measures of size and financial viability can be found in the information provided in the BI dataset. In order to reconstruct the governance measure, another dataset is appended. This proprietary dataset, obtained from a prominent Indonesian political consultancy firm, contains information on 500 political actors in Indonesia (henceforth referred to as the "political actors dataset")[6]. The political actors dataset includes information on ministers, cabinet members, key director generals, party leaders, parliamentary faction heads, parliamentary commission chairs and other influential players. For each actor, the political actors dataset contains information regarding his or her family, education, government positions held, other party positions held, and private sector affiliations. More tacit information is also available including details about friendships, involvement in scandals, membership in country clubs, etc. To reconstruct the fit and proper variable, the names of the most influential actors prior to the crisis are matched to the names of board members and shareholders of the banks in the BI dataset. In addition, the tacit information from the political actors dataset is also analyzed for connections to the Suharto regime. Approximately 10% of the banks listed have at least one board member or shareholder who was also an influential political actor under Suharto using this method.

The data above are used to estimate the impact of bank recapitalization on risk-taking and lending. To measure the impact of the government bailout on the probability of insolvency, we use several measures of bank insolvency risk. The primary measure is the z-score, a measure of bank stability suggested by Roy (1952) and used extensively in the literature (Demirgüç-Kunt & Huizinga, 2010; Hannan & Hanweck, 1988; Houston, Lin, Lin, & Ma, 2010; Laeven & Levine, 2009). [7] The z-score equals the return on assets plus the capital asset ratio divided by the standard deviation of asset returns. The z-score measures the distance from insolvency of a bank, therefore the greater the z-score, the lower the bank risk of default. As models of bank default suggest that a bank's risk of default depends on its underlying asset risk and leverage (Merton, 1977; Nier &

[6] These politicians were determined by the political consultancy firm to be the most influential based on their extensive research in Indonesian politics.
[7] See the Appendix for further description.

Baumann, 2006), the z-score is a composite measure which proxies for both of these elements. For interpretation and because the z-score is highly skewed, the natural logarithm of each z-score measure is used, which is normally distributed. The Basel II measure of bank solvency, the Capital Adequacy Ratio (CAR) is also used for robustness.[8] The other outcome variable used is lending, measured as the change in disbursed credit in IDR from the previous year. [9]

Figure 1 displays the time series of the z-score for both recapitalized and non-recapitalized banks. We observe that both sets of banks had similar trends in insolvency risk prior to recapitalization while after recapitalization, differences between the two sets of banks emerge. In particular, recapitalized banks have a greater risk of insolvency, while non-recapitalized banks have a lower risk of insolvency. This is consistent with a model of moral hazard in which prior to the crisis, both sets of banks believed that the government had an incentive to prevent them from failing (Fischer, 1999). After the crisis, while the expectations of recapitalized banks are confirmed, non-recapitalized banks change their expectations as they now realize they may not be saved from failure if another financial crisis were to occur. This suggests that while recapitalized bank managers take more risk, non-recapitalized bank managers substitute their prior expectation of government support with the internal insurance of higher capital ratios.

### *B. Summary Statistics*

The starting point is the set of all commercial banks that existed in 1994 and survived over the crisis period until 2008. This provides a sample of 149 banks over the 15-year period 1994-2008, a total of approximately 2,200 firm-year observations. By the IBRA's closing in 2004, 63 banks had been recapitalized: 5 state banks, 35 private domestic banks, 16 private non-foreign exchange, 12 regional development banks, 5 joint venture banks and 6 foreign owned banks. Prior to recapitalization, banks that would later be

[8] See Appendix for further detail.
[9] This is done for purposes of constructing i.i.d random variables. Alternatively, results remain robust using lending levels.

bailed out were on average larger, and less profitable, although government owned banks primarily drove this.[10] (See Table 3)

*How Were Firms Chosen for Recapitalization?—* In order to understand how firms were chosen for recapitalization, several analyses of the selection criteria provided by the IBRA are conducted. Whether the actual allocation of firms into the recapitalized and non-recapitalized groups corresponds to the stated selection criteria can be verified using the selection criteria provided in the IBRA dataset. Table 4 column 1 provides the parameter estimates from a probit analysis of recapitalization on the selection criteria provided by the IBRA. Table 4 column 2 provides the parameter estimates of a probit analysis with the selection criteria provided by the IBRA plus other covariates that may have determined recapitalization, but were not provided by the IBRA.[11] These results provide a great deal of information concerning the allocation process and the attributes significant in determining recapitalization.

Several aspects of the results are particularly helpful in understanding the selection of firms for intervention. First, geographical dispersion, governance, and the ownership parameter estimates are all significant in determining recapitalization (and governance in particular is a strong predictor of recapitalization). In addition, the significance of the parameter estimates is robust to the inclusion of the additional covariates. Finally, post-estimation diagnostics indicate that approximately 96% of the firms were correctly classified based on the selection criteria.

Taken together, these results provide evidence that the actual selection criteria adopted by the IBRA corresponds to the stated selection rule. Robustness to the inclusion of additional covariates further verifies that the IBRA used the selection criteria provided to allocate firms to their respective groups. Verifying the use of the selection criteria also confirms that the selection process was based on time-invariant characteristics. The

[10] All of the results remain robust to the exclusion of government owned banks.
[11] Several are additional proxies for size (age, cash), others include a measure of the concentration of ownership (average shares held by each shareholders), and finally, a measure of the proportion of loans to related parties, which is commonly used as an additional proxy for governance. The failure of a firm that is widely held may have a broader social impact, implying that the government may be more inclined to save it from distress.

decisions regarding recapitalization were made at one point in time; there were no additional rounds of data collection based on additional time periods.

*Differences in Recapitalized and Non-Recapitalized Firms*.— The main results are anticipated in Figure 1 and 2, which display the average value of the outcome variable for the recapitalized and non-recapitalized banks each year. Before the recapitalization program was implemented, the two sets of firms exhibit similar patterns in changes in the outcome variables. After the bailout program was implemented, however, the trends between the two groups appear to diverge.

### *C. Identification and Estimation*

The intent here is to measure the effect of the intervention on the outcome variables of interest. Ideally a researcher would have at his or her disposable a group of firms that received the intervention and the same group that did not receive the intervention at precisely the same point in time. In this ideal scenario, differences do not exist between the two groups (either created by the heterogeneity of firms or time-varying shocks common to all firms). Resulting changes in the outcome variables after the intervention can therefore be attributed solely to the intervention itself. Random assignment of firms into the recapitalized and non-recapitalized groups would provide an equally bias-free environment for measuring the causal impact of the intervention.

In the absence of either scenario, a difference-in-differences approach controls for observable and unobservable firm-specific heterogeneity and time-varying shocks common to all firms that might be correlated both with selection for intervention and with the outcome variables. The fundamental assumption of the difference-in-differences approach is that changes in the control group are a good estimate of the counterfactual; i.e. changes in the group receiving intervention if in fact that group did not receive intervention. Although we cannot measure this directly, we can measure whether changes in the two groups prior to the intervention are statistically different from one another. The idea is that if secular changes in the pre-intervention periods are the same, then it is likely

they would have been the same had the recapitalized firms not been recapitalized. The secular trends are tested by regressing the outcome variable on interaction terms of the indicator for (eventual) treatment and each year, including both firm-year fixed effects. The hope is that the parameter estimate of the interaction term of treatment and each year is not statistically different from zero prior to the intervention.

Figures 3 and 4 depict the results of the regression testing for pre-intervention differences in changes between the two groups. Each square demarcates the parameter estimate for the interaction effect of that particular year (interacted with treatment). The bars indicate the confidence interval for each parameter estimate. For the years before 2001 (the first year post-recapitalization), these intervals include zero for both the risk and lending outcome (for all but one year), which indicates that the impact of the intervention was not a continuation of secular trends.

Thus, even though the selection criteria were significant in predicting recapitalization and in particular the governance variable, it appears that even though the two sets of firms have differences in perceived governance, they do not have differences in outcomes, at least prior to the intervention. This suggests that the separation of firms into treatment and control groups are based on something unrelated to prior performance. So while trying to separate firms based on a criterion that mattered to performance,

s 3 and 4 provide evidence that perceived differences in governance were not correlated with differences in pre-intervention outcomes. This suggests that allocation to the non-recapitalized group based on governance may not have been based on bad management per se, but on political forces, as anecdotes suggest.

The following equation specifies the difference-in-differences model used for estimating the effect of recapitalization on the outcome variables:

$$Outcome_{it}=\beta(Recapitalization*Post)_{it}+\delta_i+\alpha_t+\varepsilon_{it} \quad (1)$$

where Recapitalization is an indicator equal to one for those firms that were recapitalized, Post is a variable equal to one for post-recapitalization years, $\delta_i$ is a firm

fixed effect and $\alpha_t$ is a time fixed effect. Controlling for firm fixed effects in this specification has the further benefit of effectively controlling for the selection criteria, as the selection criteria used to determine which firms to recapitalize is time invariant.

## III. Results

### *A. The Impact of Bailout on Risk-taking and Lending Volume*

Table 5 shows results of the impact of recapitalization on risk-taking and lending. Column 1 of Table 5 presents the results of equation (1) for the primary risk measure. This result indicates that recapitalization is associated with a decrease in z-score (increase in risk-taking) by approximately 40%. The net change in average risk-taking is approximately a 1.5 standard deviation increase from the pre-recapitalization control group average risk-taking measure.

To better understand the magnitude of this change, a placebo differences-in-differences analysis was calculated using only the pre-recapitalization data. The restricted sample of data prior to 1997 was divided into two time periods, and the same analysis from equation (1) was repeated. That is, the years 1993, 1994 were considered "pre-recapitalization" years and 1995, 1996 were considered "post-recapitalization" years. The results of the analysis are located in Table 7. This exercise provides two important pieces of information. First, the parameter estimate of the recapitalized variable is not significant, providing further evidence that the differing patterns between the recapitalized and non-recapitalized banks in the full sample are not simply the result of a pre-existing trend. Although the parameter of interest is not significant, there is a net decrease in the risk measure between the two groups over the placebo time period. This net change, however, is only a .02 standard deviation decrease from the pre-recapitalization control group average, compared to the 1.5 standard deviation increase from the pre-recapitalization control group in the full sample.

These results provide evidence for behavior that is consistent with the moral hazard view, which suggests that bank managers increase risk-taking due to ex-ante and ex-post reliance on government support. In line with the theory discussed earlier, this suggests

that the impact of recapitalization on risk-taking is greater through the moral hazard channel than the franchise value.

Although the parameter estimates support the moral hazard view, Figure 1 suggests a more nuanced explanation for the results. The parameter estimate of the regression results represents the difference-in-differences between the recapitalized and non-recapitalized firms. Figure 1, shows that post-recapitalization, the control group seems to have a more dramatic change in risk than the recapitalized set of firms. More specifically, there seems to be a large increase in the z-score for non-recapitalized firms, which means a decrease in risk. Here, the within-group difference for the non-recapitalized firms is significant, while the within-group difference for the recapitalized group is significant only with one measure. This implies that the differences-in-differences parameter estimate, which is significant, may be driven by changes over time within the non-recapitalized firm, which provides evidence that recapitalization may have more of an impact on those firms not receiving support rather than on the supported firms.

The influence of the change in behavior of non-recapitalized banks provides interesting policy implications. Government intervention here may lead to a change in behavior, but not in the sense anticipated. Similar to a moral hazard argument that assumes manager's change their behavior because they believe they will be bailed out, managers perhaps change their behavior when they know they will not be bailed out in the future. The behavior seen here is consistent with a view that firms left to stand alone substitute the absence of a government safety net with their own internal safety net by taking fewer risks.

Table 5 column 3 presents results of the model looking at the relationship between recapitalization and lending. The parameter estimates for recapitalization are significant and positive, indicating that the recapitalization has successfully stimulated credit availability. Recapitalization increases lending flow by 3.6 (millions IDR), which is several standard deviations above the pre-crisis control group average lending flow. The results of the placebo analysis using lending volume instead of risk-taking show that lending flow actually decreased over the placebo crisis (see Table 7). This implies that,

similar to the risk-taking value, the lending flow patterns between recapitalized and non-recapitalized banks for the entire time period cannot be the result of a long-term trend.[12]

Table 6 provides evidence that bank managers not only take on more insolvency risk by lending more, but also on average lend to riskier projects. This analysis conducts the same regression as Table 5, looking at the relationship between recapitalization and insolvency risk, but also controls for lending stock. Conditional on the amount of lending, recapitalized banks take on more insolvency risk than non-recapitalized firms, indicating that managers are both lending more and to riskier projects.

## IV. Robustness

The empirical approach used, along with the availability of the selection criteria employed to choose which banks to recapitalize helps to resolve typical issues regarding the effect of policy implementation on the firm level. Here, several other remaining concerns are addressed.

### *A. Bank Size*

One concern may be that the results are confounded by bank size. If larger banks respond differently to the recapitalization than smaller firms, and being recapitalized is a function of size, then the effect of recapitalization may be measuring the effect of size on the outcome variables instead. Table 8 show the regression results from equation (1), controlling for the differential effect of bank size on the risk-taking and lending volume, respectively. Each of the parameter estimates regarding risk-taking is robust to including the size control. Bank size, therefore, does not change the risk-taking result. Not surprisingly, the parameter estimate of the relationship of recapitalization to lending volume remains significant when including the size control, but the magnitude decreases. This implies that recapitalization will increase lending volume, but more so for larger banks, which may have a greater capacity to lend because of their size (more loan officers, greater monitoring capabilities, etc.).

[12] The fact that the lending volume actually decreases prevents the comparison of magnitudes discussed for the risk-taking variable.

### *B. Political Connections*

The Asian financial crisis was also a period of political change in Indonesia (see Table 1a), precipitated by the fall of President Suharto in January 1998. Prior to the crisis, a firm's political connection to Suharto had the potential to provide abnormal economic returns (Fisman, 2001). His removal from power, therefore, may have dramatically altered the business environment for these firms. If the change in the political connection caused changes in managers' behavior, then the effect being measured here may in fact be the result of political connections rather than recapitalization. If the fall of Suharto changed manager behavior and this is driving differences in the outcome variables between the two groups, these changes should be reflected in the 1998 data, when Suharto was removed from power. It is evident from the time series, however, that the changes in outcome variables between the two groups happened later, during the recapitalization period (1999-2000).

Further, many of the Suharto-connected banks were associated with Suharto-connected firms. If the change in the political regime were causing the change in behavior, Suharto-connected banks would experience a decrease in lending, as many Suharto-connected firms were being investigated or dismantled over this same period. In the data, however, non-recapitalized bank lending does not decrease after the bailout.

### *C. Attrition Bias*

As discussed earlier in this paper, a set of banks does not survive over the period used for analysis. Evidence suggests, however, that their pre-intervention trends are different than the treatment and control group. While this may indicate the potential for attrition bias, the validity of the empirical identification rests on the assumption that the treatment and control group have similar intervention trends. If those firms that exit exhibit different pre-intervention trends, they would not have been appropriate control firms to begin with. Since the average treatment on the treated is being measured, we are satisfied with the control group not including the failed firms. Further, the control group used has been validated by the test of common pre-intervention trends (see Figures 3 and

4). Additional evidence of the similarity in the trends of the treatment and control group is that these trends remain similar over two major changes in the economic environment: the financial crisis itself in 1997 and the fall of Suharto in 1998.

### *D. Alternative Measures of Risk*

While the z-score measure is the primary measure of risk, the results are robust to using alternative bank risk measures. The primary z-score measure is calculated using the standard deviation within the firm over time. In addition, the results remain robust to using the capital adequacy ratio (CAR) as the measure of risk. Similar to the z-score, CAR measures the capacity of the bank in terms of meeting the time liabilities and other risks such as credit risk, operational risk, etc. In the simplest formulation, a bank's capital is the cushion for potential losses, which protects the bank's depositors or other lenders. Banking regulators in most countries define and monitor CAR to protect depositors. The details of the CAR calculation are located in the Appendix. As shown in Table 5, Column 2, the main regression results remain robust to this alternative measure as well.

### *E. Outliers*

All of the results are robust to truncating the data at the 1st and 99th percentile of observations on risk and lending volume. In addition, the results remain robust when the sample is limited to only non-government owned banks.

## V. Additional Analyses

### *A. Borrower Demand*

Thus far, changes in lending have been ascribed to the dramatic increase in capital for recapitalized firms, without considering demand side changes that may have been occurring simultaneously. Demand side changes would be driving the systematic differences between the non-recapitalized and recapitalized firms, only if: a) borrowers are systematically switching from non-recapitalized to recapitalized banks, b)

recapitalized banks have systematically larger borrowers, after the recapitalization program or c) new borrowers systematically borrow from recapitalized rather than non-recapitalized banks.[13]

In order to analyze the demand side change, the transition probabilities of switching from a non-IBRA sponsored to IBRA-sponsored creditor are analyzed. A panel dataset of approximately one-third of the firms in the manufacturing sector in Indonesia in 1994, 2001, 2005, and 2009, is used to conduct this analysis. Information in this dataset includes: creditor names, total investment amounts separated by equity and loans, firm address, number of employees, legal status and ownership structure, and industry. This manufacturing dataset shows whether manufacturing firms are switching creditors over time. By connecting this additional manufacturing dataset to the original banking sector dataset, whether manufacturing firms are switching creditors from a non-IBRA sponsored to IBRA-sponsored creditor can be observed.

Results in Tables 9 and 10 indicate that borrowers are typically not switching from non-recapitalized to recapitalized banks. Over 90% of manufacturing firms in the sample used that begin the crisis with creditors that will not be recapitalized stay with their non-recapitalized creditor after the bailout program is implemented. This exercise cannot rule out, however, that there may have been demand increases for the IBRA banks caused by firms with non-surviving creditors systematically entering the IBRA banks. More data would allow for analyzing the questions more closely in the future.

## VI. Conclusion

Recently, a great deal of attention has been generated by the government bailouts of financial sectors worldwide, mainly because the costs of such an intervention are significant while the impact on financial outcomes is unknown. Although the intent of government intervention is to decrease systemic risk and restore lending, a major engine of economic growth, fears of moral hazard make bailout programs politically contentious. Further, recent critics of the U.S. program have pointed to evidence that recapitalized

[13] These explanations for the salience of demand side features assume that the market for loans is not perfect. If it were, borrowers would be indifferent to bank type, as the price of the same loan between banks should take into borrower preferences.

banks did not increase lending in the wake of the 2008 crisis, but rather funneled the increased capital to investment and executive bonuses. This paper represents a first step in understand whether these claims are justified by examining the impact of a banking sector bailout on bank-level financial outcomes.

The results suggest that a bailout is effective at stimulating lending while also increasing the insolvency risk, providing evidence for behavior consistent with moral hazard. The resulting differences in financial outcomes between the two groups of banks, however, are nuanced. Namely, the increased risk-taking is driven not only by the increase in risk-taking of recapitalized banks, but also by the decrease in risk of non-recapitalized banks. This suggests a model of moral hazard behavior whereby both sets of banks expected the provision of a government safety net prior to the intervention while afterwards, with confirmed expectations of a bailout in case of financial distress, the recapitalized banks increase their insolvency risk relative to the non-recapitalized group. The non-recapitalized group, on the other hand, after not being provided the expected government safety net, seems to substitute it with an internal safety net of lower risk-taking behavior. This suggests that a policy geared towards altering expectations or creating uncertainty regarding being bailed out may be effective. By credibly committing to not bailing out formerly recapitalized banks again, or retaining discretion in choosing banks for recapitalization rather than pre-committing to a set of rules, this paper suggests models of "constructive ambiguity" may be more successful at attenuating moral hazard while still stabilizing the banking sector. Constructive ambiguity policies attempt to reduce the probability market participants assign to receiving government support in case of insolvency while reserving the central bank's option to lend when financial distress threatens the stability of the banking sector (Freixas, 1999; Goodfriend & Lacker, 1999).

From a business policy perspective, the results have implications for bank stakeholders in the sense that they provide information regarding the differences between the two sets of banks as a function of the bailout. For depositors, evidence of the differential risk-taking of bank managers provides relevant information when choosing with whom to locate deposits. Borrowers, on the other hand, may wish to align the riskiness of loans with bank risk. For instance, borrowers may wish to seek out loans for

the long-term operations of the firm from less risky non-recapitalized banks, while it may be advantageous to seek riskier loan funds from a recapitalized bank. For the government, the results indicate that recapitalization is a successful tool for stimulate lending, but more so for larger banks. Finally, all of these results are persistent in the long term. This indicates that the bailout program creates differences in the two groups that are persistent, justifying policy concerns that the government intervention may have significant, enduring effects on the banking sector in the future.

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## Appendix

*Risk Measures*

*Z-score*

A modified distance to default measure is used to measure risk. When $\pi$ is the value of profits and K is capital, and insolvency is presumed to occur when current losses exhaust capital $-\pi>K$, estimates of the likelihood of insolvency, p may be obtained by noting that

$(\pi/A)<-(K/A)$ (1)

is equivalent to this likelihood p, where $(\pi/A)$represents the return to assets (ROA) and (K/A) the capital-assets ratio (CA). Then standardizing both sides of (1), insolvency occurs when

$((ROA-\mu_{ROA})/(\sigma_{ROA}))<((-CA-\mu_{ROA})/(\sigma_{ROA}))$, (2)

It follows that the probability of insolvency is equal to

$\Phi((-CA-\mu_{ROA})/(\sigma_{ROA}))$ (3)

and assuming symmetry of the distribution can be written as

$\Phi((\mu_{ROA}+CA)/(\sigma_{ROA}))$ (4)

where $((\mu_{ROA}+CA)/(\sigma_{ROA}))$ represents the number of standard deviations between the expected value of the return to assets and (negative values of) the capital-assets ratio, and $\sigma_{ROA}$ is the standard deviation of the return on assets. Then, if profits are normally distributed, the inverse of the probability of insolvency (4) equals:

$((\mu_{ROA}+CA)/(\sigma_{ROA}))$ (5)

The value in (5) is defined as the z-score, a widely used measure of insolvency risk (Laeven and Levine 2008, Hannan and Hanweck 1998, Scott 1980).[14]

A higher z-score indicates that the bank portfolio is less risky and more stable.

A higher z-score indicates that the bank is more stable. Since the z-score is highly skewed, and for purposes of interpretation, we use the natural logarithm of the z-score, which is normally distributed.

[14] The normality assumption can be relaxed. Then, a bound for the probability of insolvency p can be obtained using Chebyshev's inequality such that $p\leq(1/2)\sigma_{ROA}^2/((E(ROA)+CA)/(\sigma_{ROA}))^2$

*CAR Calculation*

$$CAR = \frac{\text{Tier1 Capital + Tier2 Capital}}{\text{Risk-Weighted Assets}}$$

**Tier 1 Capital**
Current earnings
Current year's profit after tax
Decrease in the value of portfolio equity
Designated reserves
Last year's profit after tax
Other capital contributions
Paid in capital
Positive adjustments
Retained losses

**Tier 2 Capital**
General provisions
Hybrid instruments
Subordinated debt
Undisclosed reserves

**Assets**
Zero weight
Cash
Government bonds
Three Percent Weight
Outstanding foreign exchange contracts
Fifty Percent Weight
Mortgage loans
Performance bonds warranties
Revolving underwriting commitments
One Hundred Percent Weight
Other loans
Standby letters of credit
Fixed assets
Other assets
Loan repayment guarantees and acceptances
Purchase and resale agreement (reverse repo)

## Figures

Figure 1. Time Series of Risk Measure Between Recapitalized and Non-Recapitalized Banks

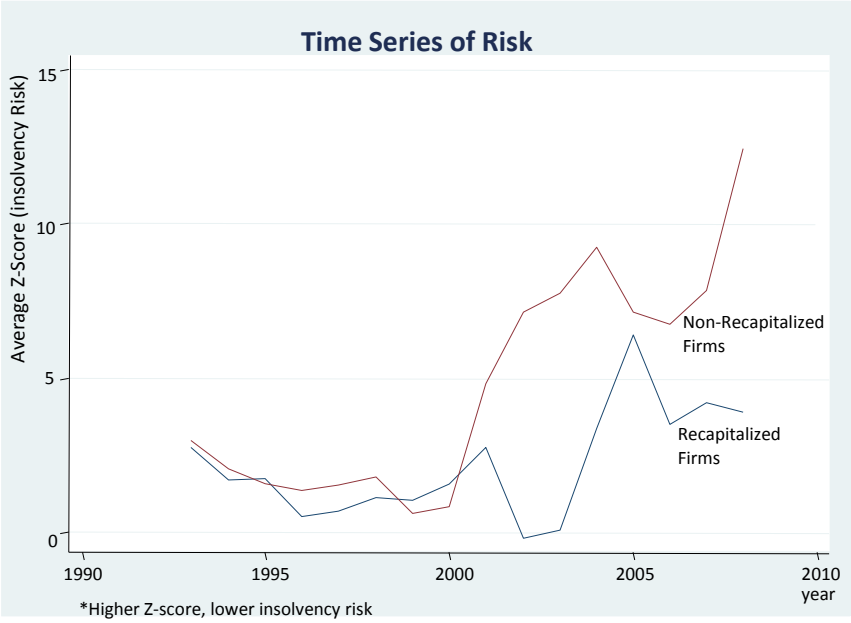


Figure 2. Time Series of Average Lending Volume between Recapitalized and Non-Recapitalized Banks

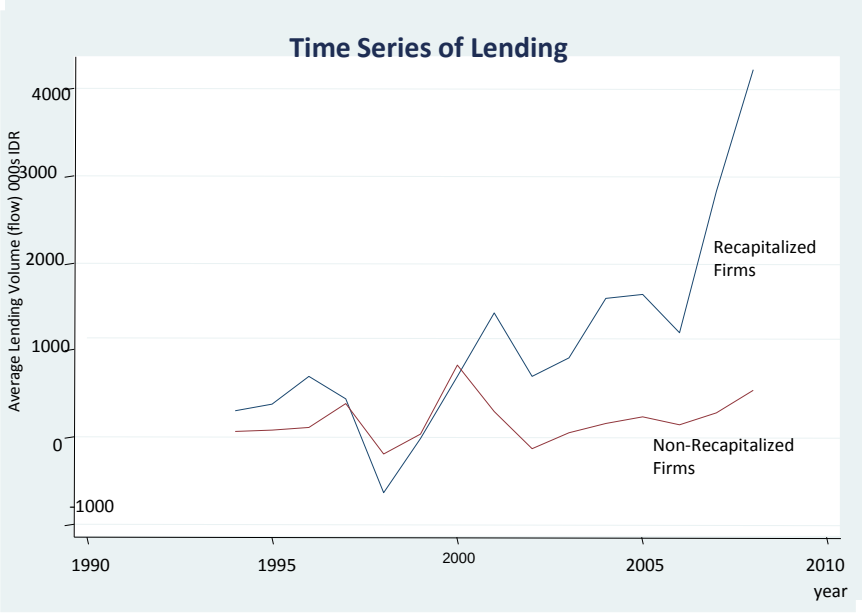

Figure 3. Secular Trends: Zscore

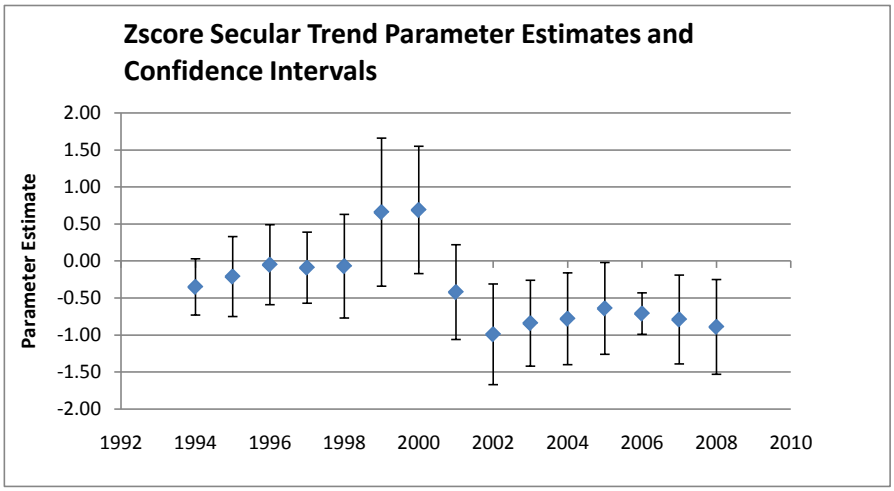


Figure 4. Secular Trends: Lending

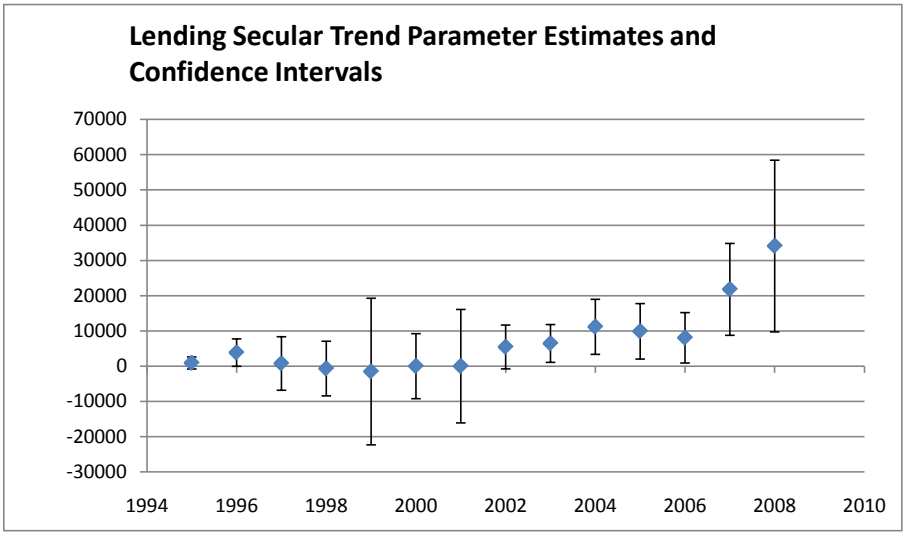

Table 1a. Asian Financial Crisis Timeline

| | |
|---|---|
| Pre-July 1997 | 30 year period of steady economic growth |
| Jul-97 | Devaluation of the Thai baht |
| Aug-97 | Indonesia rupiah (IDR) begins period of volatility |
| Oct-97 | First IMF package announced; 16 banks closed immediately |
| Jan-98 | Indonesian Bank Restructuring Agency (IBRA) established |
| May-98 | President Suharto resigns |
| 1999,2000 | Recapitalization implemented |
| Apr-04 | IBRA closed |

Table 1b. Asian Financial Crisis Graphical Timeline

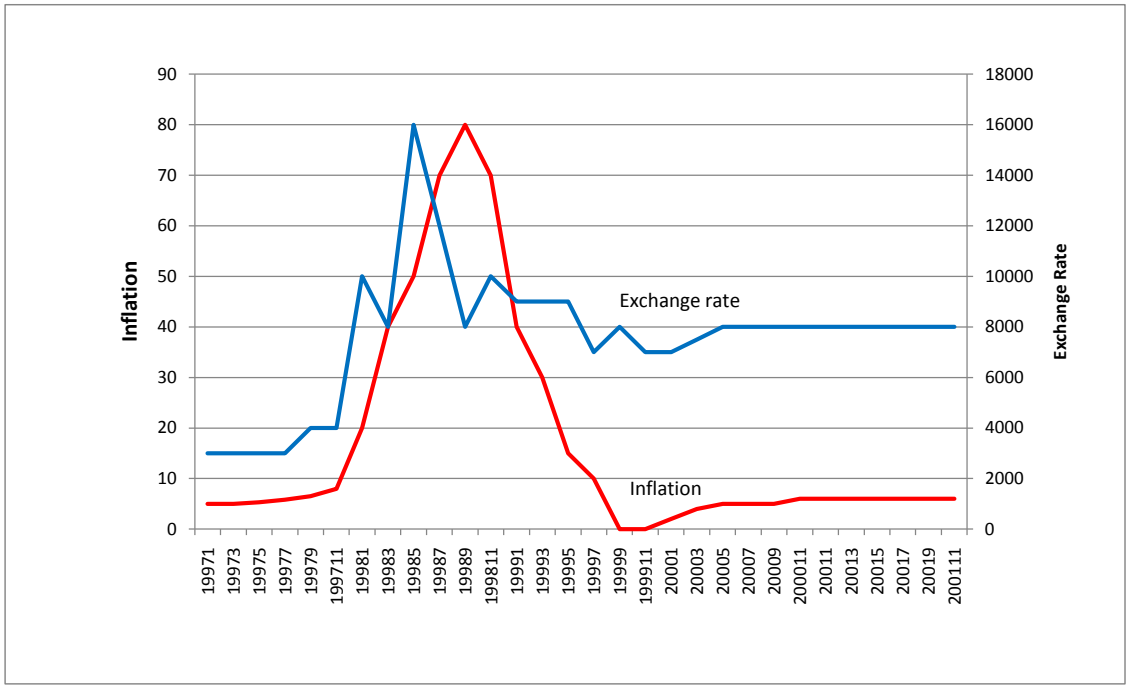

Table 2. Bank Survival and Recapitalization

| | 1997 | 2001 | Recapitalized | % Survived | Recapitalized / Survivors | Recapitalized / Total |
|---|---|---|---|---|---|---|
| Government | 6 | 5 | 5 | 100% | 100% | 100% |
| Foreign | 12 | 12 | 6 | 100% | 50% | 50% |
| Regional | 27 | 25 | 12 | 93% | 48% | 44% |
| Private | 131 | 82 | 35 | 63% | 43% | 27% |
| JV | 32 | 25 | 6 | 78% | 24% | 19% |
| | 208 | 149 | 64 | 72% | 43% | 31% |

*This is due to mergers
JV=Joint Venture

Table 3. Summary Statistics Pre-Recapitalization

| Mean | Recapitalized | Non-Recapitalized | Difference | Standard Errors |
|---|---|---|---|---|
| Employees | 2202 | 666 | 1536 | 545** |
| Branches | 37 | 17 | 20 | 8.9** |
| Total assets | 39269 | 9872 | 29397 | 7735** |
| Total deposits | 6343 | 1478 | 4865 | 1108** |
| Total profits | -226 | 106 | 332 | 317 |

*** p<0.01, ** p<0.05, * p<0.1

Standard errors in parentheses

*Total assets, deposits, profits in hundreds IDR

| Table 4: Probit Estimates of Recapitalization | | |
|---|---|---|
| VARIABLES | =1 if Recapitalized | =1 if Recapitalized |
| Employees | 0.17 | 0.133 |
| Deposits | 0.001 | 0.003 |
| Assets | -0.001 | -0.003 |
| Loans | 0.002 | 0.005 |
| CAR | -1.3 | -1.42 |
| Fit and proper | 0.94*** | 0.96*** |
| Geographic Location 1 | -0.79*** | -0.75*** |
| Geographic Location 2 | -0.49*** | -0.49*** |
| Geographic Location 3 | 0.10*** | 0.56 |
| Geographic Location 4 | -0.54*** | -0.51*** |
| Ownership Type 1 | -0.58*** | -0.57*** |
| Ownership Type 2 | 0.56** | 0.85*** |
| Ownership Type 3 | 0.14 | 0.53** |
| Ownership Type 4 | -.01*** | -0.82*** |
| Age | . | 0.01 |
| Cash | . | -0.01 |
| Average Shares Held | . | 0.01 |
| Proportion of Connected Loans | . | 0.33 |
| Observations | 145 | 145 |
| Firms Correctly Classified | 96% | 97% |

*** p<0.01, ** p<0.05, * p<0.1

Standard errors in parentheses

Geographic Location 1= Jakarta, Geographic Location 2= Multiple Metropolitan Areas, Geographic Location 3= One province, not only metro, Geographic Location 4= Multiple provinces, not only metros, Omitted Geographic Location= Nationwide Ownership Type 1= Joint Venture, Ownership Type 2= Private Domestic, Ownership Type 3= Foreign, Ownership Type 4= Regional Development, Omitted Ownership Type= Government owned

Employees, assets, deposits, loans cash multiplied by 10,000

Table 5: Estimates of the Impact of Recapitalization on Risk and Lending

| VARIABLES | (1) Z-score | (2) CAR | (3) Lending |
|---|---|---|---|
| Recapitalized * Post | -.44*** | -0.45* | 36000*** |
| | (.16) | (0.24) | 3796 |
| Post | -.65*** | 1.58*** | -6400* |
| | (.23) | (0.22) | (3720) |
| Constant | .49*** | -3.50*** | 1009 |
| | (.12) | (0.15) | (1355) |
| Observations | 2227 | 2227 | 1671 |
| R-squared | .34 | 0.26 | .18 |
| Firms | 149 | 149 | 149 |

*** p<0.01, ** p<0.05, * p<0.1

Robust standard errors in parentheses clustered at the firm level

Recapitalized=1 if a firm was recapitalized

Post=1 for post-recapitalization years

Z-score= $\log((ROA_{it}+CA)_{it}/\sigma(ROA)_i$

CAR=log((Tier 1 capital + Tier 2 capital) /Risk-weighted Assets)

Lending is lending flow in hundreds Indonesian rupiah (IDR)

Table 6: Estimates of the Impact of Recapitalization on Risk Controlling for Loan Stock

| VARIABLES | (1) Z-score | (2) CAR |
|---|---|---|
| Recapitalized * Post | -.56*** | -0.62* |
| | (.16) | (0.22) |
| Post | 2.0*** | 1.97*** |
| | (.39) | (-.54) |
| Lending stock | -.01 | -.16 |
| | (.004) | (.05) |
| Constant | .21*** | -3.97*** |
| | (.07) | (-.13) |
| Observations | 2227 | 2227 |
| R-squared | .36 | .32 |
| Firms | 148 | 149 |

*** p<0.01, ** p<0.05, * p<0.1

Recapitalized=1 if a firm was recapitalized

Post=1 for post-recapitalization years

Robust standard errors in parentheses clustered at the firm level

Z-score= $\log((ROA_{it}+CA)_{it}/\sigma(ROA)_i$

CAR=log((Tier 1 capital + Tier 2 capital) /Risk-weighted Assets)

| Table 7: Estimates of the Impact of Recapitalization on Risk (Placebo) | | |
|---|---|---|
| VARIABLES | (1)<br>Z-score | (2)<br>Lending Volume |
| Recapitalized * Post | -0.007 | 179005 |
| | (0.195) | (116031) |
| Post | -0.383*** | -21613 |
| | (0.119) | (23183) |
| Constant | 0.06 | 122584*** |
| | (0.041) | (32701) |
| Observations | 513 | 403 |
| R-squared | 0.171 | 0.047 |
| Firms | 143 | 141 |

*** p<0.01, ** p<0.05, * p<0.1

Robust standard errors in parentheses clustered at the firm level

Recapitalized=1 if a firm was recapitalized

Post=1 for post-placebo recapitalization years

Z-score = $\log(\text{zscore})_{it}=((ROA_{it}+CA)_{it}/\sigma(ROA)_{i}$

Lending is lending flow in hundreds Indonesian rupiah (IDR)

| Table 8: Estimates of the Impact of Recapitalization on Risk with Additional Controls | | | |
|---|---|---|---|
| VARIABLES | (1)<br>Z-score | (2)<br>CAR | (3)<br>Lending Volume |
| Recapitalized * Post | -0.45*** | -0.47* | 2790* |
| | (0.16) | (0.24) | (1600) |
| 1996 Employee count * Post | -.02 | .11 | 4.18*** |
| | (.002) | (.003) | (.19) |
| Post | 0.80*** | 1.57*** | -6090*** |
| | (0.19) | (0.23) | (2326) |
| Constant | 0.50*** | -3.51*** | 2097*** |
| | (0.12) | (0.15) | (727) |
| Observations | 1,685 | 1,747 | 1,801 |
| R-squared | 0.33 | 0.26 | 0.238 |
| Firms | 149 | 149 | 149 |

*** p<0.01, ** p<0.05, * p<0.1

Robust standard errors in parentheses clustered at the firm level

Post=1 for the post-recapitalization years

Z-score= $\log((ROA_{it}+CA)_{it}/\sigma(ROA)_{i,}$ which measures solvency risk using within firm variation over time

CAR=log((Tier 1 capital + Tier 2 capital) /Risk-Weighted Assets)

Table 9: Transition Probabilities of Switching Creditors by Borrowers

| | Non-IBRA/Survive | IBRA |
|---|---|---|
| Non-IBRA/Non-survive | 23% | 73% |
| Non-IBRA/Survive | 91% | 9% |
| IBRA | 5% | 95% |

Table 10: Linear Regression of Switching Creditors by Borrowers

| | |
|---|---|
| Non-IBRA/Non-survive | -0.13*** |
| | (.04) |
| Non-IBRA/Survive | -0.849*** |
| | (0.035) |
| Size Controls | X |
| No. observations | 592 |
| Pseudo R-Squared | 0.47 |

Left hand side=1 if borrower switched creditor

Omitted group: IBRA