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# On the Real Effects of Bank Bailouts: Micro-Evidence from Japan

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# On the Real Effects of Bank Bailouts: Micro-Evidence from Japan

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**Abstract.** Exploiting the Japanese banking crisis as a laboratory, we provide firm-level evidence on the real effects of bank bailouts. Government recapitalizations result in positive abnormal returns for the clients of recapitalized banks. After recapitalizations, banks extend larger loans to their clients and some firms increase investment, but do not create more jobs than comparable firms. Most importantly, recapitalizations allow banks to extend larger loans to low and high quality firms alike, and low quality firms experience higher abnormal returns than other firms. Interestingly, recapitalizations by private investors have similar effects. Moreover, bank mergers engineered to enhance bank stability appear to hurt the borrowers of the sounder banks involved in the mergers.
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During banking crises, most governments intervene to rescue banks fearing the disruption of credit market and of economic activity that bank failures may bring about. However, bank bailouts face stiff resistance by free-market economists and taxpayers alike. Moreover, some argue that the bailout of a few banks is unlikely to restore confidence in credit markets and to limit the effects of recessions because uncertainty induces economic agents to hold back consumption and investment.

Not only whether, but also how to bailout banks is the subject of long-standing debates. Governments can buy undervalued bank assets, directly recapitalize banks and acquire their stocks, encourage mergers of troubled banks with sounder ones, or promote issues of bank equity to private investors.[1] While various motives can be brought in support of different provisions, it is an empirical question whether, and how, bank bailouts benefit the real economy. Tackling this issue empirically is challenging because, plausibly, the resources that governments are willing to invest in bank bailouts and the means of intervention are related to the seriousness and the nature of the banking problems. It is thus arduous to come up with an evaluation of the counterfactual if only macroeconomic data are available. Existing literature mostly analyzes countries where different policies were applied through case studies, without aiming to establish causal effects (Calomiris, Klingebiel, and Laeven, 2005).

In this paper, we exploit the Japanese banking crisis to evaluate the real effects of bank bailouts. Not only we quantify the effect of government interventions on firm stock market valuations, access to credit, and employment and investment policies, but we also investigate the characteristics of the firms that benefit most. These distributional issues are crucial to evaluate the effects of bank bailouts on capital allocation.

Japan represents an ideal laboratory for several reasons. First, there are some interesting analogies between the Japanese banking crisis and the current financial crisis in the U.S. (Hoshi and Kashyap, 2008). Not only both crises originated from the burst of a real estate bubble, but also, in the response to the banking crisis, the Japanese government pursued many different interventions that have parallels with the ones currently enacted by the U.S. administration. In particular, some banks were recapitalized by the government, while others were induced to merge or to issue equity to private investors (Nasako, 2001). Second, there are publicly accessible data on all loans that Japanese listed companies receive from different lenders, together with extensive financial information on banks and firms. Therefore, we can ask to what extent the clients of the banks affected by the interventions indirectly benefit. In

[1] Bebchuck (2008), Blanchard (2008), and Diamond and Rajan (2009) illustrate vividly the debate surrounding the implementation of plans for addressing the credit crisis in the U.S.

particular, we compare the stock price response of non-financial firms that are clients of banks affected by the interventions with that of similar firms whose banks are not affected. This allows us to quantify the benefits of specific interventions. In addition, we explore to what extent the banks that benefit from a specific intervention to resolve bank distress extend more loans to different types of borrowers and whether these borrowers increase investment and shed fewer jobs.

Our results show that government recapitalizations increase the value of bank clients, especially if these have high leverage and are therefore very dependent on bank financing. After recapitalizations, banks extend larger loans to their existing borrowers. There is only limited evidence, however, that larger loans from recapitalized banks affect the real economy positively as the firms that indirectly benefit from bank recapitalizations do not create more jobs than other comparable firms. Only the clients of recapitalized banks that we classify as very dependent on bank loans invest more.

The empirical evidence also suggests that recapitalizations allow banks to extend larger loans to low and high quality firms alike. Low quality firms (such as real estate firms whose over-investment had contributed to the financial crisis) experience higher abnormal returns than other firms upon the announcement of their bank's recapitalization. In addition, after some of the recapitalizations, real estate firms which were clients of recapitalized banks decrease their assets and employment less than other firms with presumably stronger investment opportunities. This suggests that avoiding bank failures and the benefits that this involves for viable firms may come at the expense of further capital misallocation. Interestingly, capital injections by private investors do not appear to prevent capital misallocation as bank recapitalizations by the government and by private investors appear to have similar effects on banks' lending policies.

Differently from recapitalization announcements, which tend to dilute existing shareholders, domestic bank mergers, engineered to avoid bank failures, increase bank valuations. However, on average, the clients of the merging banks do not benefit: While the clients of the weaker bank involved in the merger experience positive abnormal returns, the announcement of the merger results in negative abnormal returns for the clients of the stronger bank. Bank mergers do not affect banks' overall propensity to lend. Consistently with the initial stock price reaction, the clients of the stronger (weaker) bank subsequently obtain smaller (larger) loans from the merged bank.

During the banking crisis, the government also implemented actions that affected all banks and therefore all firms in our sample. Although these results must be interpreted

cautiously because we do not have a subsample of unaffected banks (and firms) that helps us to control for concurrent events, we provide evidence that banks as well as their clients react positively to the creation of asset management companies with the task of buying bad loans from banks, but not to measures calling for a more rigorous evaluation of bank assets and greater transparency in bank balance sheets.

This paper is related to a strand of literature that following the lead of Slovin, Sushka and Polonchek (1993) explores the real effects of banking crises (see Ongena, Smith and Michalsen, 2003; Bae, Kang and Lim, 2002). These papers investigate the stock price reaction of the borrowing firms to bank distress announcements and generally find negative effects on firm valuation. Only Slovin, Sushka and Polonchek (1993) also explore the reaction to the announcement of a bank bailout, but their sample includes the borrowers of just one large U.S. bank and can shed no light on different methods to resolve systemic banking crises. We are able to analyze the effects of a variety of interventions during a systemic banking crisis. Furthermore, we go beyond the effects on firm stock prices by exploring the actual extension of bank loans and the policies of the clients of the banks affected by government interventions.

Our work is also related to a number of papers exploring the Japanese banking crisis. These papers investigate to what extent the shocks to firm collateral and bank assets affect firm investment (Gibson, 1995; Kang and Stulz, 2000; Gan 2007a and 2007b) or bank lending policies (Peek and Rosengren, 2005; Caballero, Hoshi and Kashyap, 2008) and generally find economically large and negative effects. None of these papers explores bank bailouts.

The remainder of this paper is organized as follows. Section I describes the interventions for bank bailouts during the Japanese banking crisis. Section II and III illustrate the empirical approach and the data, respectively. Section IV, V, and VI present the results. Finally, Section VII concludes.

## I. The Japanese Banking Crisis and the Interventions for Bank Rehabilitation

The Japanese banking crisis of the 1990s stemmed from a sharp increase in asset prices, especially land and real estate, in the second half of the eighties, and their subsequent decline. Banks were heavily exposed not only because they held stocks and land directly, but also because real estate loans constituted a large fraction of their balance sheets. Thus, when between 1990 and 1993 real estate prices halved, bank capital was severely hit. Losses were not explicitly realized on bank balance sheets and the announced capital ratio over-estimated the true capital ratio at least until 2002. Nevertheless, banks became less willing to lend and

this led to a credit crunch (Gan, 2007a). As a consequence, starting from the first half of the nineties, firms had less access to bank credit, the most important source of funds in Japan, and cut investment (see, for instance, Kang and Stulz, 2000).

Peek and Rosengren (2005) and Caballero, Hoshi, and Kashyap (2009) document that not only banks reduced the supply of loans, but also misallocated credit by funding the weakest firms. The structure of bank-firm relationships in Japan may have exacerbated this problem, because Japanese firms typically have a particularly close relationship with their main bank, which involves bank shareholdings, board seats for bank representatives as well as a lending relationship (Eser and Peek, 2006). In addition, the main bank takes a leading role in restructuring firms experiencing financial distress (Hoshi, Kashyap and Scharfstein, 1990).

While social and economic incentives may have strengthened Japanese banks' incentives to allocate credit to severely impaired borrowers, empirical evidence suggests that Japanese banks, being forbidden to hold equity stakes in excess of 5 percent by law, have always used their control rights in order to maximize the value of their debt claims (Morck, Nakamura and Shivdasani, 2000). In addition, during systemic banking crises, banks are often unwilling to recognize losses and rather evergreen non-performing loans. For instance, Banerjee, Cole, and Duflo (2009) and Velasco (1991) document bank reluctance to settle non-performing loans in India and Chile, respectively. Nor is loan evergreening limited to developing economies. Banks renewed loans to non-performing borrowers to avoid defaults in the Nordic countries during the banking crisis of the early nineties (Drees and Pazarbasioglu, 1995) and also in the U.S. during the Saving and Loan crisis (Akerlof and Romer, 1993). For this reason, we believe that we can draw insights from the Japanese experience of bank bailouts that go beyond the Japanese economy.

Nakaso (2001) and Hoshi and Kashyap (2008) provide a detailed account of the unfolding of the Japanese banking crisis and of the government's response. Here, we focus on the events that we exploit in the empirical tests to evaluate the real effects of different government interventions.

The banking problems heightened at the end of 1997 with the failures of two securities companies and a regional bank. These failures prompted the discussion about how to prevent further bank failures. On February 16, 1998, the Diet approved the use of JPY 30 trillion of public funds, of which JPY 13 trillion were dedicated to bank recapitalizations. JPY 1.8 trillion were used for the recapitalization of 20 major banks through subordinated debt and preferred shares in the following March. Most of the banks received a capital injection of 100 billion Yen, although some of the smaller banks involved in the program received between 20

and 60 billion Yen. This was, on average, less than 1 percent of bank assets (and some 20 percent of bank capital). Due to the small size of the capital injection, this first attempt to stabilize the banking system was considered unsuccessful at the time.

This first recapitalization was followed in March 1999 by a second recapitalization (through preferred shares) that benefitted 15 of the banks that had already been recapitalized the year before. The amount injected was more than four times as large as the previous injection in March 1998. Each bank received between 1,000 and 200 billion Yen, which was approximately 2 percent of bank assets (and 70 percent of bank capital). Probably for its larger size, this second recapitalization was deemed more successful in reestablishing bank capital ratios. Finally, the third recapitalization occurred in June 2003 when the government recapitalized Resona bank through preferred and common shares and took it over by injecting nearly 2 trillion Yen of new capital, over 13 percent of Resona bank's assets.

The above three recapitalizations were important steps in Japan's response to the banking crisis. For instance, Peek and Rosengren (2001) show that the premium paid by Japanese banks in the interbank market decreased significantly at their announcement suggesting that the probability of bank defaults was revised downward. Thus, it makes sense to consider whether and to what extent firms benefitted in the aftermath.

Recapitalizations were mostly directed to the largest banks. In all three recapitalizations, the banks to recapitalize were chosen on the basis of their size and their importance for the stability of the financial system. Recapitalized banks had a larger exposure to the real estate sector. However, no differences were made on the basis of borrower characteristics or lending specialization of the banks. Descriptive statistics indeed suggest that firms related to the banks that were recapitalized were equal in size to the average firm, but they had somewhat lower profitability. In general, there is no reason to believe that the recapitalization announcement should have revealed market participants positive (or negative) information about the borrowers, besides the fact that the borrowers may have been expected to benefit from the improved health of their lending banks. Positive abnormal returns can therefore be interpreted as evidence that firms indirectly benefitted from the recapitalization of their bank.

Recapitalizations were not the only interventions enacted to promote the stability of the banking system. Japan experienced a bank merger wave in the early 2000s. The central bank typically induced banks to acquire weaker banks in order to avoid bank failures (Harada and Ito, 2008). Less profitable and cost efficient banks were more likely to be acquirers as well as targets. Empirical evidence suggests that mergers were not aimed to exploit scale economies and only slowly improved bank profitability. The goal of improving bank capitalization

through mergers was not necessarily reached as consolidated banks suffered from decreasing capital ratios and increasing non-performing loans for three to four years after the merger (Hosono, Sakai, and Tsuru, 2007). Nevertheless, banks' stock price reaction to merger announcements was generally positive suggesting that the perceived probability of default decreased as larger banks were considered more likely to be bailed out. In addition, many mergers were prompted, at least in part, by changes in the supervisory environment that, starting from the October 2002 with the Takenaka's plan, urged banks to apply strictly existing accounting standards and to recognize loan losses on the balance sheets.

Other private sector solutions were encouraged to increase bank capitalization. Between 1998 and 2005, 64 banks made 98 raised capital from private investors. These recapitalizations were generally performed by the existing shareholders and did not alter banks' control structure.[2] The average (median) amount of each capital injection was 75 (28) billion Yen. This was on average slightly more than 1 (44) percent of bank assets (capital). Capital injections by private investors may lead to better outcomes if private investors can evaluate bank balance sheets and monitor bank lending policies better than the government. For these reasons, besides the fact that they do not rely on the taxpayer, capital injections by private investors are often favored in policy debates. However, during banking crises, private investors are often unable to evaluate the extent of losses in bank balance sheets. It is thus an empirical question whether they are more successful in injecting capital than the government.

The three recapitalizations, together with the bank mergers and equity issues to private investors, are the main focus of our analysis. These interventions for bank rehabilitation allow us to compare the performance and access to credit of the clients of the banks that were affected with that of the clients of other banks. Thus, using a difference-in-difference approach we can control for the confounding effects of concurring events and the macroeconomic environment.

The Japanese government took other steps to improve the stability of the banking system. These include: a law that allowed the government to recapitalize all systemically important banks in June 2003 (Fourth recapitalization); a second law that allowed the government to recapitalize all banks without the requirement to be systemically important in June 2004 (Fifth recapitalization); the creation of two asset management companies to purchase bad loans from (any) banks in April 1999 and May 2003; and, as mentioned above, a

[2] Japanese banks have diffuse ownership (with the top holders holding around 5 percent of the shares and the top 10 holders less that 30 percent) and their stocks are mostly held by other financial institutions and industrial companies (Anderson and Campbell, 2004). Financial institutions predominate among the top five shareholders.

plan formulated by the prime minister Heizo Takenaka calling for a rigorous evaluation of bank assets and an increase in transparency with the aim of favoring bank recapitalizations with private funds in 2002. We explore firms' reaction to these interventions as well. However, we recognize that in these cases we do not have a control sample of firms that were not affected and cannot fully control for concurrent events.[3]

## II. Empirical Approach

To explore the real effects of bank bailouts, we combine the event study methodology suggested in a similar context by Slovin, Sushka, and Polonchek (1993), with the analysis of bank lending and corporate policies. Our (main) tests rely on difference-in-difference estimates comparing the performance (and access to credit) of the clients of banks affected by the interventions with that of the clients of unaffected banks. In this way, we control for any changes in the macroeconomic environment and concurrent events affecting all firms and focus on the effects on bank clients. This implies that we abstract from any (eventual) systemic effects on the economy[4].

In the event study, we explore firm abnormal returns around the interventions for bank rehabilitation described above and listed in Table 1. We compute normal returns using the market model. In particular, for any firm *i*, we estimate $R_{it} - R_{ft} = \alpha_i + \beta_i \left( R_{mt} - R_{ft} \right) + \varepsilon_{it}$, where $R_{it}$ and $R_{mt}$ are the day *t* returns on firm *i* and the market portfolio, respectively, $R_{ft}$ is the return on the risk free asset, which we proxy using 60 days Japanese Treasury Bills, and $\varepsilon_{it}$ is a zero-mean disturbance term. We estimate the market model with the Scholes-Williams (1977) method and use up to 260 days and at least 100 days of daily prices. The normal return of firm *i* at date *t* is computed as the return predicted using the estimates of the market model in the interval [t-260,t-1]. Abnormal returns of firm *i* at *t* are then computed as firm *i*'s actual return at *t* minus the normal return at *t*.

We regress the abnormal returns on the dummies that capture the various events to evaluate their impact on firm valuation. The event dummies, one for each of the event we consider, take value 1 for days inside the event window and zero otherwise. A statistically significant coefficient on an event dummy indicates that firm abnormal returns are significantly different from zero for that event. Cumulative abnormal returns are then

[3] Although it is customary in event studies to evaluate the effects of events without a control sample, during a financial crises many different events may affect markets. For this reason, where possible, we use a difference-in-difference approach.

[4] The latter would be difficult to quantify as during financial crises economies are affected by many events.

obtained multiplying the coefficient estimate by the number of days in the event window. Within this empirical framework, we can easily investigate whether the announcement effects differ across subsamples of firms, by identifying the specific subsample with a dummy variable and interacting the dummy variable with the event dummy. A statistically significant coefficient for this interaction term would indicate that abnormal returns are indeed different for the subsample of firms identified by the dummy variable.

We define event windows as follows. Since the government interventions and, to a large extent, also the bank mergers and the bank equity issues to private investors were preceded by lengthy discussions, we surmise that the market may have started to incorporate the news into prices already 10 days before the actual events. We also recognize that it may have taken some time for market participants to recognize which firms being related to a given bank may have indirectly benefitted from the interventions for bank rehabilitation. Therefore, we allow the event window to include 10 days after the event. While most of the analysis focuses on an event window of [-10,+10], we also explore the robustness of our results to the use of an event windows of [-5,+5] and [-3,+3].

Our sample period goes from 1998 to 2004. Thus, our control sample here includes the firm's abnormal return outside the event window and the abnormal returns of firms that are not affected by the event.

In all regressions for abnormal returns, we include, firm, year, and month dummies to control for systematic firm or time effects affecting abnormal returns. We also cluster errors at the firm level. A possible concern is that this falls short of controlling for the cross-sectional correlation of events, especially when we evaluate events that affect all firms in our sample at a given date. To mitigate this concern, we aggregate all firms affected by the event in an equally weighted portfolio and present average abnormal returns for the portfolio of firms affected by that event. In this case, the statistics to test whether abnormal returns are significantly different from zero are the average abnormal returns divided by their standard deviations. The standard deviation in turn is the standard deviation of abnormal returns, computed using the time series of abnormal returns in the estimation window, multiplied by the square root of the number of days in the event window.

For similar events that affect groups of companies at different dates, like mergers, we create portfolios for each merger. The average abnormal returns we present are averages for each portfolio; each portfolio is weighted by the number of firms it includes.

Besides exploring the stock market response to interventions, we also investigate their effect on bank loans and corporate policies. We examine the effects of the various events on

the yearly increase in the loan that a firm obtains from each of its banks. Here, our unit of analysis is the bank-firm-year and our control sample is given by contemporaneous increases in the loan (to a given firm) from the banks that are not affected by the interventions and from the banks affected by the interventions before and after the events. Also in this case, our sample goes from 1998 to 2004. We include firm, year, and bank fixed effects to control for systematic differences across firms, banks, and changes in the economic environment. Our maintained assumption is that in the absence of bank bailouts, the change in loans offered from a given bank would be similar across firms, banks and over time. Thus, a positive coefficient of the event dummy indicates that in the year of the event, firms have an abnormal increase in loans from the affected banks suggesting that the event favored the supply of credit.

Finally, we investigate whether bank bailouts are beneficial for firm performance by exploring the effects of the different interventions on employment growth, investment, and sales growth at the firm level. We recognize that real effects may be delayed and, for this reason, we explore growth and investment over a two-year interval. Our unit of analysis here is the firm-year and our control sample is given by contemporaneous growth rates of firms that are not related to the banks that benefit from the interventions and by the growth rates of the firms related to banks that benefit from the interventions before and after these occur. Thus, also in this case, our sample spans from 1998 to 2004. We include firm and year fixed effects to control for systematic differences across firms and in the economic environment. Thus, any significant effect of the event dummies would suggest that firms related to the banks benefitting from the interventions grow more than comparable firms in the following two years.

## III. Data and Descriptive Statistics

Our main data source is the Nikkei NEEDS Financial dataset. We obtain price, accounting, and loan information for all listed companies in Japan. Crucially for our study, NEEDS Bank Loan data allow us to observe loans outstanding to individual firms from each lender at the end of the firm’s fiscal year. This makes it possible to compare the response to bank interventions of the borrowers of affected and unaffected banks.

We also obtain bank financial statements, bank merger announcement dates, major shareholders, firms' and banks' shareholdings, and information on capital increases and capital reductions. In addition, we reconstruct the sequence of government interventions and obtain

the list of recapitalized banks from Nasako (2001), Kashyap and Hoshi (2008), the website of the deposit insurance corporation of Japan,[5] and news searches in LexisNexis and Factiva.

Our sample includes a maximum of 3,160 non-financial companies and 239 banks and other lending institutions. The panel is unbalanced as the sample includes currently listed companies as well as companies that used to be listed but ceased to exist (together with their banks). In Table 1, we list the specific events we investigate and the number of firms that are related and unrelated to the banks affected by the event. A few comments are in order. For the first three recapitalizations, we have a subsample of firms that are unrelated to the recapitalized bank. In addition, mergers and capital injection by private investors occur at different dates. Table 1 lists the number of firms whose banks do not merge or issue equity to private investors during the sample period. Naturally, the number of firms that are not affected by each bank merger or equity issue is much larger.

In Table 2, we describe the main variables and the salient features of the sample. While in the empirical analysis we control for (time-invariant) firm characteristics by including firm fixed effects, here we want to stress that our sample includes large listed companies, which have a median number of 1,300 employees. Slightly less that 10 percent of firms are in real estate and construction, the industries that are most affected by the crisis.

Panel B of Table 2 presents the event dummies at yearly frequency. Firms are considered to be affected by each intervention (i.e., the dummy is set equal to one) in the year in which this occurs and are considered as unaffected in the remaining years. The descriptive statistics of the event dummies show that, when the time-series and cross-sectional variation are exploited, only a minority of firms are affected by the interventions.

It is also important to note that we construct three sets of event dummies for bank mergers. In Table 2, we make no distinction between the merging banks (or between target and bidder), because typically all banks involved in mergers and acquisitions are weak (Harada and Ito, 2008 and Hosono, Sakai and Tsuru, 2007). In the empirical analysis, however, we also distinguish between the weaker and the stronger bank involved in the merger. We define a bank to be stronger if it is larger (this is often the case in our sample as many of the acquired banks are quite small and do not lend to listed companies) or if it has a lower proportion of loans to the real estate sector. We proceed in this way instead of using information on non-performing loans because most of losses were arising from the real estate sector and were rarely reported on bank balance sheets.

[5] See http://www.dic.go.jp/english/.

While bank financing is important for all firms in Japan, firms rely to different extent on bank loans: firms that fund less than 10 percent of their assets with debt coexist with firms that have a leverage of over 50 percent. We consider firms with high leverage (a ratio of financial loans to total assets above the median in 1997) as highly dependent on financial loans and explore whether they are affected to a larger extent by bank bailouts. In addition, the median firm has nine bank relationships suggesting that not all banks are equally important. However, 15 percent of the sample firms receive over half of their loans from a single bank. We consider firms that receive more than half of the loans from a single bank as highly dependent on that bank and explore whether these firms are more affected by interventions benefitting their most important bank.

## IV. Results

### *A. Announcement effects on bank valuation*

In Panel A of Table 3 (column 1), we explore the effects of the interventions on banks. The announcement of three out of four recapitalizations produces negative abnormal returns for banks.[6] This is unsurprising because the recapitalizations dilute existing shareholders. Moreover, banks may be reluctant to accept a capital injection from the government if this is considered a signal of weakness. This was certainly the case at the time of the first government recapitalization in Japan (Nakaso, 2001) and, together with the dilution of existing shareholders, can explain the large negative effect of the first recapitalization. Only the fourth recapitalization does not result in negative abnormal returns. This may have depended on the fact that in this occasion the government announced the willingness to inject capital in any systemically important bank. Therefore, the bad news of a higher probability of dilution may have been compensated by lower uncertainty in the interbank markets.

Interestingly, bank mergers as well as the creation of asset management companies are considered positively by the market. The positive impact of bank mergers may indicate the market's anticipation of improvements in efficiency, but also the fact that large banks are considered less likely to be allowed to fail. We also explore whether there are any additional benefits for the weaker bank involved in the merger, but we do not find any evidence supporting this conjecture.

[6] Although we consider five recapitalizations throughout the analysis, we have no price data for Resona bank in the period of its recapitalization. For this reason, when we consider the announcement effect of bank recapitalizations on bank stock prices, we exclude the recapitalization of Resona bank (third recapitalization).

The positive effect of asset management companies purchasing bad loans from banks is unsurprising and consistent with the widespread belief that, in these cases, purchases often occur at above-market prices implying a transfer to shareholders. However, in unreported specifications, we find no additional benefit of the creation of asset management companies for banks with large exposure to the real estate sector, which should be more likely to profit from a sale of bad loans. This may suggest that the main benefit of asset management companies is to decrease information asymmetry in the banking system. Finally, the Takenaka's program does not appear to affect bank valuations thus suggesting that increased transparency and rigorous evaluation of bank assets are not expected to affect banks' expected cash flows and probability of failure.

Overall, this empirical evidence shows that our selection and dating of the interventions for bank rehabilitation capture salient moments for the banking system. We can thus explore the effects on non-financial companies' valuations, access to bank loans, and corporate policies to evaluate to what extent different attempts to bail out banks benefit the real economy.

*B. Announcement effects on firm valuation*

Estimates in Table 3 (Panel A, column 2) show that the announcements of bank recapitalizations and of the creation of asset management companies produces significantly positive abnormal returns for the related firms. The effects are large. For instance, the first recapitalization, widely perceived to be insufficient to restore bank financial health and that, accordingly appears to have the smallest effect, produces cumulative abnormal returns for the firms related to the recapitalized banks over the 21 days event window of $0.0775 \times 21 \approx 1.63$ percent. The second recapitalization and the creation of the asset management companies appear to have the largest impact with cumulative abnormal returns over 9 percent.

When the asset management companies are announced, it is still unknown which banks will benefit from the purchase of bad loans and, for this reason, we cannot distinguish the effect of the announcement between related and unrelated firms as we do for government recapitalizations. However, banks with large exposures to the real estate should be more likely to have bad loans to sell. Thus, their clients should be expected to indirectly benefit to a larger extent, because the ability to sell bad loans may increase bank ability to borrow in the interbank market and to extend loans. In column 3, we surmise that the clients of banks with a percentage of loans to the real estate sector larger than the median benefit more from the creation of asset management companies. We find that this is the case. The clients of banks

with high exposure to real estate experience abnormal returns that are 30 percent higher than the clients of other banks.

Interestingly, bank mergers that result in significantly positive bank abnormal returns have no effect on firm valuation. Differently from recapitalizations and the anticipated purchases of bad loans from asset management companies, mergers bring no new cash on bank balance sheets. Therefore, it is not surprising that they are not viewed as positive news for their clients. This finding may also depend on the fact that expectations of improved financial health leading to higher willingness to lend may come about with a higher probability of termination of the bank relationship after the merger. The latter is a common concern in episodes of bank consolidations in non-crisis periods (see, for instance, Karceski, Ongena and Smith, 2005 and Sapienza, 2002).

To better evaluate the effects of bank mergers, we investigate whether the clients of the weaker merging banks benefit to a different extent. We find that the clients of the weaker merging banks experience significantly positive abnormal returns; their cumulative abnormal return is 1.41 percent. Interestingly, the clients of the stronger banks react negatively to the announcement of the merger. This suggests that avoiding bank failures by favoring the consolidation of the banking system may have some costs for the real sector as the healthier banks appear to be expected to lend less to their clients.

The Takenaka's market reform requiring banks to improve transparency on the quality of bank loans appears to have a negative effect on firm valuation, implying that it is expected to further decrease bank lending. It is interesting that this is not viewed negatively by bank shareholders as the effect of the Takenaka's reform on bank abnormal returns is not distinguishable from zero.

To evaluate whether our interpretation of the empirical evidence is warranted, we explore whether firms that we would expect to be more dependent on banks are more affected by the interventions. We start by defining a firm as highly dependent on bank loans if this has relatively high leverage (leverage above the median of our sample in 1997). Estimates in column 5 of Table 3 show that for all recapitalizations, with the exception of the third one, the firms that we classify as highly dependent on bank loans have higher abnormal returns. This supports our interpretation of the results that firm abnormal returns are driven by expectations of increased access to credit and higher probability of relationship survival. Once again, bank mergers do not appear to affect the valuation of related firms, possibly because of the lack of fresh capital on the merged banks' balance sheets and the countervailing forces pointed out above.

We also surmise that the interventions may affect more strongly firms that are highly dependent on a single bank when this is affected by the event (i.e., the recapitalization or the merger). We define firms that receive more than half of their loans from one bank only as highly dependent on a single bank. At least in the case of the second and fourth recapitalizations, these firms experience significantly higher abnormal returns than other firms. Japanese banks' tendency to cooperate may explain why the recapitalization of an important bank does not have a much stronger effect than the recapitalization of any of the banks in the remaining cases.

In unreported specifications, we also consider interactions of the high bank dependence dummies with the event dummies for the asset management companies, the Takenaka's market based reform, and distinguish between the clients of stronger and weaker banks in mergers (the latter exercise involves a triple interaction term). Since these additional interaction terms are not significant, for brevity, we do not report these specifications.

As mentioned before, a concern with the cross-sectional firm-level regressions we have presented so far is that our t-statistics are inflated by the cross-sectional correlation of returns. Note that since for the events on which we focus most of our attention, we have a control sample of firms that are unaffected by the event, the cross-sectional correlation of returns could also bias our results against finding any differences between related and unrelated firms. Nevertheless, we explore this issue by aggregating the firms related to banks affected by a specific event in portfolios.

In panel B of Table 3, we present average abnormal returns for equally weighted portfolios and tests for whether they are significantly different from zero. In all cases, the average abnormal returns have the same sign implied by the coefficients of the cross-sectional regressions. For the first recapitalization and the Takenaka's market reform, however, the abnormal returns are not statistically significant. For the remaining specifications, not only are average abnormal returns statistically different from zero, but also imply cumulative abnormal returns during the event window that, if anything, are larger than the ones implied by the cross-sectional analysis. For instance, in the case of the second recapitalization, the cumulative abnormal return during the [-10,+10] event window is slightly over 15 percent. Interestingly, when we consider portfolios also bank mergers appear to benefit related firms. The magnitude of the effect is however much smaller than for recapitalizations. However, also in this case, the comparison of portfolio abnormal returns of the clients of the weaker and of the stronger banks involved in the mergers suggest that the clients of the weaker banks reap all the benefits (tests unreported).

We also explore the robustness of our results to the use of shorter event windows (results are tabulated only for the equally weighted portfolios for brevity). The sign and magnitude of average abnormal returns is generally the same as the one we report for the [-10,+10] event window, but, unsurprisingly, given that information about our events of interest was made public over a longer period, statistical significance is lower.

In summary, the empirical evidence consistently suggest that different types of bank bailouts benefit related firms.

*C. Access to loans*

When we consider the loans that firms receive from different banks, our data have yearly frequency. Since we wish to include year fixed effects to control for changes in the macroeconomic environment, we have to focus on the first three recapitalizations and bank mergers for which we observe both related and unrelated firms. For the remaining events affecting all firms in the sample, we would not be able to distinguish the impact of government interventions from time effects.

Estimates in Table 4 (column 1) show that the second and third recapitalizations are successful in increasing the availability of credit to firms. The effect is however economically small as in the best case (the third recapitalization), the size of the loan relative to the firm's total financial debt increases by less than 1 percent. We do not find a similarly positive effect for the first recapitalization and bank mergers which is consistent with the lack of statistical significance in some of the previous results on firm abnormal returns. The finding is not only consistent with our conjecture that the merger, not bringing new cash to the merged bank, cannot benefit (all) borrowers, but also with the widespread belief that the first recapitalization was insufficient to restore bank capital. The compositional effects for the clients of weaker and stronger merging banks are fully consistent with the results of the event study: While the clients of weaker banks obtain larger loans, credit to the clients of stronger banks is reduced.

Interestingly, after all recapitalizations, banks appear to extend more long-term loans to firms. During a financial crisis, this is likely to have a positive effect on firm value as it decreases the probability of incurring liquidation costs and reduces profit volatility. Firms take advantage of longer loan maturity also after the first recapitalization when the increase in long-term loans is accompanied by a decrease in short-term loans. The effect of bank mergers is opposite as merged banks appear to substitute long-term loans with short-term loans. This

contributes to explain why the higher probability of survival of the lending bank after the merger, on average, does not affect firm valuation positively.

*D. Firm employment and investment*

Overall, bank recapitalizations seem to increase the availability of credit to firms. This can provide stimulus to the economy only to the extent that firms receiving larger loans invest and increase employment. In Table 5, we find limited evidence that the firms that, being clients of recapitalized banks, are more likely to benefit from larger loans use the loans to increase employment or investment. Only after the second recapitalization, related firms appear to increase investment, measured by the increase in tangible assets over the next two years, by almost 4 percent. We also find that firms with higher leverage, which are more likely to depend on bank loans for funding, increase investment both after the first and second recapitalization and bank mergers. After bank mergers, bank-dependent firms increase investment by less than 2 percent. The effect is double in the case of the first two recapitalizations.

In the case of bank mergers, we find no evidence that the effect differs between the clients of weak and strong banks (results omitted). This may indicate that the reduction in uncertainty due to the higher probability of survival of the merged bank is more important for investment than access to bank loans, at least for the clients of the stronger bank.

Overall, the real effects of the interventions for bank rehabilitation appear concentrated on the firms that we classify as highly dependent on bank loans. This suggests that firms less dependent on bank loans may be able to access other sources of external funds even in a bank-dominated financial system like in Japan. In this case, we should observe that the increase in bank loans following the interventions is used to substitute other sources of external funds rather than to increase investment and employment. We find no evidence that firms decrease the use of other sources of external finance, such as trade credit. We find, however, that after the first two recapitalizations (but not after the third) firms increase the amount of cash they hold. This (unreported) result is consistent with the findings of Ivashina and Scharfstein (2008) and Campello, Graham and Harvey (2009) that, during the global credit crisis of 2008, firms have been drawing down credit lines in order to build cash reserves and insulate themselves from credit supply shocks. This suggests that overall economic uncertainty constraints investment and that restoring bank capital may be a necessary, but not a sufficient condition to stimulate employment and investment.

Finally, although some firms increase investment, we find no evidence that they become more productive. The growth of sales of firms related to recapitalized banks, if anything, appears to be lower than for comparable firms.

## V. Effects on Capital Allocation

So far we have shown that bank bailouts have a positive effect on the valuation of client firms and that, after the recapitalizations, the bailed out banks lend more to their clients. Nevertheless, the real effects of bank recapitalizations appear to be limited: Although highly bank-dependent firms that are clients of recapitalized banks invest more than comparable firms, employment growth is unaffected. Overall, this evidence casts doubts on whether the loans of the recapitalized banks indeed reach firms with growth opportunities whose ability to invest is impaired by the credit crunch.

Such a concern is reinforced by the findings of Peek and Rosengren (2005) and Caballero, Hoshi, and Kashyap (2008) who show that, during the banking crisis, Japanese banks, on average, allocated credit to the weakest firms to avoid the realization of losses on their own balance sheets and to comply with capital requirements. None of these papers studies the effects of bank bailouts on bank lending policies. Capital injections may, however, play an important role because capitalization affects banks' incentives to lend to different borrowers.

Banks close to their capital requirements have an incentive to renew loans to insolvent borrowers to avoid a write down in book capital. These incentives disappear if recapitalizations restore capital requirements.[7] Even when banks do not engage in loan evergreening and are not insolvent, low capitalization may give banks perverse incentives in selecting borrowers. Diamond and Rajan (2000) argue that banks with low capitalization are able to charge higher interest rates to poorly performing firms that would not be able to reimburse their loans in the short run and are therefore inclined to lend to these borrowers.

Bank recapitalizations may restore bank incentives to extend loans to the most creditworthy borrowers if a sufficiently large amount of capital in injected. If the amount of funds injected is small, though, recapitalizations making more funds available to troubled banks may increase capital misallocation.

Since the Japanese crisis was caused by over-investment in the real estate sector, to explore this issue, we surmise that firms in the real estate and construction sectors (henceforth, real estate firms) did not have growth opportunities during the banking crisis. If

[7] See Giannetti (2007) for a model.

these firms are to benefit more than manufacturing firms from bank recapitalizations, this would suggest that avoiding bank failures and the gains that this involves for viable firms may come at the expense of further capital misallocation. Similarly, we consider firms with profitability below the median of their industry as less efficient and we ask whether these less efficient firms benefit more than other firms from the interventions for bank rehabilitation.

In Table 6, our results suggest that troubled real estate firms as well as firms with low profitability benefit more than the average firm from the first bank recapitalization.[8] The effect is not only statistically significant, but also economically large. After the announcement of the recapitalization, the cumulative abnormal return of the average non-real-estate firm is 1.1 percent, but real estate firms' cumulative abnormal return is 6 percent. The second and third recapitalization had a larger effect on the average firm and smaller or even no additional benefit for real estate firms.

This supports the notion that the amount of capital injected is crucial for banks' incentives to pursue sound lending policies. As explained in Section I, in the first recapitalization, the government injected too little capital for banks to meet bank capital requirements. In the second and third recapitalizations, a larger amount of capital was injected and the impact on firm abnormal returns suggests that low quality firms benefitted to a lower extent than in the first (smaller) recapitalization.

The interpretation of our results is confirmed by bank lending policies. After the first recapitalization, the recapitalized banks increase their loans to all firms. Only in the second recapitalization, although banks extend more credit to all their clients, they increase their loans to real estate firms to a lower extent than to other firms.[9] In the aggregate, however, the exposure of the recapitalized banks to the real estate sector increases from 16 (17) to 17.5 (21) percent in the first (second) recapitalization, while stays constant for the other banks (only in the third recapitalization, when Resona bank is not only recapitalized but also taken over, its exposure to the real estate sector slightly decreases from 27 to 26 percent).

Because of banks' incentives, capital injections that leave banks undercapitalized may retard the restructuring of low quality firms. Not only, as noted before, we find limited effects of bank recapitalizations on corporate policies, but the only firms to increase employment (or to decrease the number of employees to a lower extent) seem to be real estate firms after the

[8] We do not include interactions with the asset management companies and the Takenaka's market based program dummies because these events are not the main focus of our analysis and these interaction terms are not statistically significant.

[9] The coefficient of the second recapitalization event dummy is statistically larger than the coefficient of the interaction between the second recapitalization event dummy and the real estate firm dummy at 10 percent level.

second recapitalization. Moreover, after the first recapitalization, real estate firms decrease their fixed assets to a lower extent than other firms, for which the increase in bank loans appear to have no effect on investment.

Consistently with our previous results, real estate firms, as well as other firms, do not seem to exploit the greater access to bank loans to increase sales to a larger extent than firms that do not benefit from the recapitalization of one of their lending banks.

The empirical evidence is similar in Panel B where we identify low quality firms with firms with profitability below the median of their industry. In this case, however, there is evidence that firms use the larger loans made possible by the second recapitalization to restructure, as it appears that the sales of less profitable firms increase faster in the following two years.

It is worth noticing that also bank mergers do not result in an improvement in bank lending policies.[10] Loans to real estate firms increase as much as loans to other firms after mergers (Panel A). Consequently, real estate firms appear to increase investment to the same extent as other firms. Moreover, all the increases in bank loans after mergers seem to be directed to low profitability firms, which appear to cut employment more than other firms. Also in this case, however, the empirical evidence is consistent with the view that low profitability firms use loans to restructure as they increase their sales more than other firms over the next two years.

Finally, in unreported specifications, we conjecture that manufacturing firms with a large proportion of sales exported to foreign countries may have stronger growth opportunities and experience more severe financing constraints during the credit crunch. In fact, while domestic demand in Japan was low, export were thriving during the sample period (Madsen, 2004). To fund investment opportunities, the loans of recapitalized banks should reach these firms. Consistently with our previous results, we do not find that these arguably high quality firms experience higher abnormal returns or receive larger loans than other firms after recapitalizations and bank mergers. We also consider that some firms may have no demand for bank loans because they have access to the bond market. If we exclude firms with access to the bond markets before the interventions, our results are qualitatively invariant. We still find that export-oriented firms do not receive larger loans than other firms nor experience higher abnormal returns. After mergers, however, export-oriented firms that are clients of the stronger banks, contrary to the other clients of these banks, do not appear to experience

[10] In unreported regressions, we show that these results do not depend on whether firms are clients of weaker or stronger merging banks.

negative abnormal returns suggesting that, at least in this respect, mergers may have improved capital allocation.

The fact that our results are qualitatively and quantitatively invariant for the subsample of exporting firms –whose demand and investment opportunities depend on the international environment– suggests that our estimates of the effects of recapitalizations are unlikely to depend on the low domestic demand, low interest rates and other peculiar features of the Japanese macroeconomic situation during the sample period. Overall, these results suggest that interventions for bank rehabilitation increase the supply of credit to low and high quality firms alike and are seldom translated in performance improvements either because most firms have access to alternative sources of funding for the limited investment opportunities or because they prefer to accumulate cash in uncertain economic times.

## VI. Robustness and extensions

### *A. Keiretsu and bank shareholdings*

It is often claimed that in Japan, banks and firms within the same business group (keiretsu) sustain each other without necessarily taking into account the profitability of their actions (Aoki, 1990). Hence, credit misallocation and the limited real effects of the interventions we detect may depend on the organizational structure typical of Japanese business groups and would not be informative about the real effects of bank bailouts in other institutional contexts.

However, empirical evidence shows that the fortunes of Japanese top executives are positively related to stock performance and earnings like in the U.S. (Kaplan, 1994); moreover, shareholders are more likely to appoint outside directors to the board after poor stock returns (Kaplan and Minton, 1994 and Kaplan and Ramseyer, 1996).[11] This evidence suggests that Japanese executives face incentives to maximize profits as those who fail risk losing their jobs. Even more importantly, low current earnings and liquidity are more significant than poor stock market performance in explaining the appointment of bank directors to the board (Morck and Nakamura, 1999), suggesting that Japanese banks are interested in protecting their loans and not shareholders or other stakeholders. Consequently, Japanese banks' reactions to government interventions should be informative about the possible effects of bank bailouts elsewhere.

[11] Anderson and Campbell (2004) show that the negative relation between performance and turnover was particularly high for banks during the financial crisis.

Nevertheless, we directly explore whether our results are driven by the peculiarity of bank-firm relationships in Japan. We can identify whether the main banks of Japanese keiretsu are subject to interventions and which of our sample firms belong to these keiretsu in 1998 using data from Peek and Rosengren (2005).[12] In our sample, 289 firms belong to a keiretsu. We then interact the recapitalization and merger dummies with another dummy that takes value 1 if the main bank of the keiretsu to which a given firm belongs is subject to that specific intervention. If our results were driven by the keiretsu organizational structure, we should observe that the valuations and the loans increase to a larger extent for firms that belong to the same keiretsu of the bank. In Table 7, we show that, quite to the contrary, our results on firm valuation are not affected by keiretsu firms.[13] Only after the second recapitalization same-keiretsu firms receive larger loans than other firms.

Interestingly, firms that belong to the same keiretsu of one of the merging banks experience significantly positive abnormal returns upon the announcement of the merger. This may depend on the fact that relationships with same-keiretsu firms are less likely to be terminated after the merger. Same-keiretsu firms thus benefit more from the higher probability of survival of the lending bank after the merger.

Another peculiarity of Japan is that banks hold shares in industrial companies. Although this phenomenon is diffused (89 percent of firms have banks as shareholders in our sample), banks' equity stakes are generally much smaller (on average, 2 percent of firm capital and constrained to be less than 5 percent by law) than their exposure as creditors. For this reason, equityholdings are believed not to affect bank incentives (Morck and Nakamura, 1999). Nevertheless, we test whether a firm benefits more from the interventions if the recapitalized bank is both a lender and a shareholder. If this were the case, equity ties – and not perverse incentives related to low capitalization – could explain why banks increase loans to low quality firms after the recapitalizations. We find no evidence that bank shareholdings explain firm abnormal returns upon the announcement of recapitalizations or their access to bank loans.

Overall, our results do not appear to be driven by the peculiar nature of bank-firm relationships in Japanese keiretsu or by bank shareholdings.

[12] We focus on keiretsu centered around banks (financial keiretsu) and exclude keiretsu centered around industrial companies (industrial keiretsu) as only in the former it may be argued that the nature of bank-firm relationships is different in Japan (Morck and Nakamura, 1999).

[13] Resona Bank is not considered to be part of any keiretsu. For this reason, we do not interact the third recapitalization event dummy with the keiretsu dummy.

*B. Bank equity issues to private investors*

A common concern with government recapitalizations is that they come with poor governance as government officials are unwilling or unable to monitor recapitalized banks. Capital injections by private investors instead could come with more monitoring and lead to sounder bank lending policies.

In Table 8, we explore this possibility. We define an event dummy for bank equity issues to private investors as we did before and we include it along with the event dummies related to government interventions. Also capital injections from private investors produce positive abnormal returns for related firms. However, the magnitude of the effects is significantly smaller than for all government recapitalizations but the first. This is unsurprising if one considers that, after these equity issues, banks reduce the loans to their clients. Thus, the gain for related firms can only derive from the higher probability of the bank's survival.

These effects would nevertheless be good news if banks recapitalized by small investors were more inclined to decrease the supply of credit to low quality firms. We find however that this is not the case. Upon the announcement of the recapitalization, the real estate firms related to the bank experience abnormal returns that are 50 percent higher. The effect on abnormal returns for firms with low profitability is even 100 percent higher. Nor banks recapitalized by private investors extend smaller loans to real estate firms: While the size of the loans decrease for all the other firms after capital injections by private investors, loans to real estate firms remain unvaried (the sum of the coefficients of the bank equity issues event dummy and of the interaction between the previous dummy and the real estate dummy is equal to zero at the 1 percent level).

These results indicate that capital injections have similar effects on bank clients whether they are performed by the government or by private investors. In particular, we find no evidence that the latter can more effectively monitor bank lending policies.

*C. Other events*

Besides the events we discuss above, we also explore other events related to the banking crisis and its resolution. The consideration of these additional events not only allows us to evaluate their role in the resolution of the crisis, but also to test whether our estimates may spuriously capture events concurrent to the ones on which we focus.

For instance, between 1999 and 2003, 9 listed banks in our sample reduced their capital. We explore the effects of the announcement of these banks' capital reductions by including a

capital-reduction event dummy defined similarly to the other event dummies in Panel A of Table 3 and Table 4. We cannot detect any effects of these announcements on firm abnormal returns or bank lending policies suggesting that the explicit realization of bank losses does not affect bank behavior and that it is not expected to, possibly because bank losses were already common knowledge for market participants. For brevity, we do not report the results.

Another concern is that our event dummies may capture firm reactions to different events, not recapitalizations and bank mergers. This is unlikely because we mostly focus on the differential effect for clients of affected and unaffected banks. A bias would arise only if concurrent event affected the same subset of firms that are clients of banks benefitting from the interventions. Nevertheless, to address this concern, we create some "placebo events", affecting the firms actually interested by the interventions at different dates, randomly chosen during the sample period. Results in Table 9 show that none of the placebo event dummies referring to the first three recapitalizations and bank mergers, which are the main focus of our analysis, is statistically significant in our cross-sectional regressions for firm abnormal returns. The placebo event mimicking the fifth recapitalization is negative and significant, but, as we note above, we put less emphasis on results affecting all firms at a given point in time, because in these cases we have no control group. Placebo event dummies appear to be unrelated also to the change in bank loans and the various proxies of firm performance that we consider.[14] Overall, this test increases our confidence that we are not capturing concurrent events or changes in the macroeconomic environment.

*D. Other borrowers*

For reasons of data availability, our analysis has focused on the reaction of listed companies to interventions in favor of their related banks. While we find limited evidence of real effects, it is possible that bailouts benefit other borrowers that we do not observe.[15] Since we have information on the number of borrowers as well as on the number of small business borrowers and the amount of loans to small business borrowers for all listed and for the largest unlisted banks each year, we can ask whether after capital injections or bank mergers, the number of borrowers, the number of small business borrowers or the amount of loans to small business borrowers increase.

[14] Importantly, the significance of the event dummies as well as of the placebo dummies is invariant is we compute standard errors by bootstrapping.
[15] We also test whether banks use the capital injection to hoard cash, but fund no evidence of that.

Since we want to be able to include year fixed effects to control for the macroeconomic environment as well as bank fixed effects, we focus only on the events that affect a subset of banks. Estimates in Table 10 show that recapitalizations do not appear to increase the number of bank borrowers, whether large or small, or the amount of loans to small business borrowers. The effects are similar for government recapitalizations and capital injections by private investors. After the recapitalization of Resona bank, the number of borrowers even decreases, apparently driven by a decrease in the number of small business borrowers. Overall, it appears unlikely that capital injections have large effects on sectors of the economy that we do not capture.

After mergers, banks appear to have more borrowers (but not more loans to small business borrowers). This may be a mechanical effect due to the fact that when a bank acquires a much smaller bank we may not observe the number of borrowers of the client. However, in unreported regressions, we also explore the probability that, after the merger, a bank terminates relationships with the listed companies for which we observe bank loans. We find that this probability decreases by 8(25) percentage points for non-real estate (real estate) firms.[16] The lower probability of relation termination may help to explain the larger number of bank borrowers as well.

## VII. Conclusions

To the best of our knowledge, this paper provides the first micro-evidence on the effects of bank bailouts on firm valuation, access to credit, and subsequent investment and performance. We show that the announcement of banks' recapitalizations by the government affects positively the valuation of those banks' clients and the amount of loans firms obtain from the recapitalized banks. However, most of firms do not expand employment or have higher growth of sales than comparable firms in the two years following the recapitalization of related banks. Only bank dependent firms invest more.

More importantly, our empirical evidence uncovers that recapitalizations allow banks to supply larger loans to deserving and undeserving firms alike and that the positive effects on the valuation of undeserving firms are much larger, especially if the amount invested to recapitalize banks is insufficient to reestablish high levels of bank capitalization. This suggests that capital injections may increase the misallocation of credit if they are not appropriately designed. We also shows that private sector solutions, such as bank mergers or

[16] We find that the probability that the relation with a listed company is terminated is lower also after recapitalizations.

capital injections by private investors, are not immune from inefficiencies in the allocation of credit during banking crises. Therefore, not only should policymakers restore bank incentives to pursue sound lending policies by requiring the injection of (or directly injecting) an amount of capital sufficient to restore bank capital requirements, but it may also be desirable to direct bank lending away from less productive industries.

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## Table 1
## Interventions for Bank Rehabilitation

This table provides a list of the main interventions for bank rehabilitation we focus on. The events in bold are the ones that affect differently subsamples of firms at the same time.

| Events | Date | Description | Related firms | Unrelated firms |
|---|---|---|---|---|
| **First recapitalization** | **February 16, 1998** | **20 major banks were recapitalized** | 2039 | 148 |
| **Second recapitalization** | **March 1, 1999** | **15 major banks were recapitalized** | 2029 | 202 |
| **Third recapitalization** | **May 19, 2003** | **Resona Bank was recapitalized** | 696 | 1497 |
| Fourth recapitalization | June 2, 2003 | Government allowed to provide capital to any bank that is considered systemically important | 2193 | |
| Fifth recapitalization | June 2, 2004 | Government allowed to provide capital to any bank | 2148 | |
| **Merger** | **Different dates** | **71 bank mergers affecting 58 banks between 1998 and 2005** | 2490 | 670 |
| **Bank equity issue** | **Different dates** | **98 capital injections affecting by private investors 64 banks between 1998 and 2005** | 2437 | 723 |
| Asset management companies | April 1, 1999 May 1, 2003 | Two different asset management companies were created with the goal to purchase bad loans from banks | 2577 | - |
| Takenaka's market based program for financial revival | October 30, 2002 | Banks were requested to rigorously evaluate assets and to improve transparency | 2237 | - |

## Table 2
## Descriptive Statistics

This table reports descriptive statistics for the main variables. Bank (Firm) abnormal return is the difference between the actual return of the bank (firm) at time *t* minus the expected return predicted using the CAPM. The CAPM regression coefficients are computed with daily data using a (t-260,t-1) estimation window for each firm-day. We discard observations with less than 100 days to compute expected returns. Loan growth is the change in debt of firm *i* from bank *j* between years *t* and *t+1* divided by the total debt of firm *i* at *t*. Employment growth is defined as $\ln(\text{Employment}_{t+2}/\text{Employment}_t)$. Asset and Sales growth are defined similarly. In the empirical analysis, all performance measures are winsorized at approximately the 1st and the 99th percentile of their distribution. Real estate (High leverage) is a dummy equal to one if the firm is in the Construction or Real Estate industry (has leverage in the top 1/3 of the sample in 1997). The recapitalization dummies take value 1 if the lending bank of the firm was affected by a government recapitalization at a given date, and 0 otherwise. The merger dummy takes value one if the lending bank of the firm merged with another financial institution at a given date and zero otherwise. The bank equity issue dummy takes value 1 it the lending banks has issued equity to private investors at a given date and 0 otherwise. With the exception of abnormal returns all other variables are presented at yearly frequency. Abnormal returns have daily frequency.

*Panel A: Firm Characteristics*

| | Obs | Mean | Std.Dev | Median | 1st percentile | 99th percentile |
|---|---|---|---|---|---|---|
| Firm abnormal return (%) | 3723000 | 0.224 | 3.462 | 0.177 | -9.440 | 11.061 |
| Bank abnormal return (%) | 175247 | 0.201 | 2.540 | 0.172 | -6.756 | 7.684 |
| Loan growth x 100 | 142102 | 0.090 | 0.913 | 0.000 | -2.533 | 3.923 |
| Employment growth (2 years) | 15415 | 0.012 | 0.178 | -0.011 | -0.418 | 0.653 |
| Asset growth (2 years) | 15415 | 0.022 | 0.318 | -0.006 | -0.793 | 1.001 |
| Sales growth (2 years) | 15415 | 0.031 | 0.230 | 0.021 | -0.567 | 0.730 |
| Real estate | 15971 | 0.074 | | | | |
| High leverage | 15971 | 0.341 | | | | |

*Panel B. Event dummies*

| | Obs | Mean |
|---|---|---|
| First recapitalization | 15971 | 0.111 |
| Second recapitalization | 15971 | 0.274 |
| Third recapitalization | 15971 | 0.048 |
| Fourth recapitalization | 15971 | 0.152 |
| Fifth recapitalization | 15971 | 0.149 |
| Merger | 15971 | 0.490 |
| Bank equity issue | 15971 | 0.390 |
| Asset management companies | 15971 | 0.408 |
| Takenaka's market based program | 15971 | 0.153 |
| Bank equity issue | 15971 | 0.390 |

## Table 3
## Market Response to the Interventions for Bank Rehabilitation

*Panel A. Firm abnormal returns*

All variables are defined in Table 2 and the dependent variable is indicated on each column. AR refers to abnormal returns. Parameters are estimated by ordinary least squares. The constant is included in all regressions, but the coefficient is omitted. Standard errors presented in parentheses are corrected for heteroskedasticity and clustering at the firm level. ***, **, and * denote statistical significance at the 1, 5, and 10 percent, respectively.

| | (1) Bank AR | (2) Firm AR | (3) Firm AR | (4) Firm AR | (5) Firm AR High dependence= High leverage | (6) Firm AR High dependence= Bank provides more than 50% of loans |
|---|---|---|---|---|---|---|
| First recapitalization | -1.356*** | 0.0775*** | 0.0812*** | 0.0804*** | 0.0180 | 0.0805*** |
| | (0.25) | (0.017) | (0.0173) | (0.0173) | (0.026) | (0.0173) |
| First recapitalization * High dependence | | | | | 0.0892*** | 0.0166 |
| | | | | | (0.032) | (0.0214) |
| Second recapitalization | -0.626*** | 0.433*** | 0.436*** | 0.434*** | 0.312*** | 0.434*** |
| | (0.19) | (0.016) | (0.0161) | (0.0161) | (0.022) | (0.0161) |
| Second recapitalization * High dependence | | | | | 0.181*** | 0.0938* |
| | | | | | (0.030) | (0.0489) |
| Third recapitalization | | 0.0978*** | 0.0920*** | 0.104*** | 0.136*** | 0.109*** |
| | | (0.031) | (0.0310) | (0.0309) | (0.052) | (0.0312) |
| Third recapitalization * High dependence | | | | | -0.0596 | 0.0115 |
| | | | | | (0.063) | (0.0577) |
| Fourth recapitalization | 0.0579 | 0.326*** | 0.329*** | 0.329*** | 0.188*** | 0.297*** |
| | (0.052) | (0.018) | (0.0181) | (0.0180) | (0.026) | (0.0209) |
| Fourth recapitalization * High dependence | | | | | 0.198*** | 0.101** |
| | | | | | (0.034) | (0.0395) |
| Fifth recapitalization | -0.479*** | 0.308*** | 0.306*** | 0.307*** | 0.216*** | 0.311*** |
| | (0.076) | (0.014) | (0.0138) | (0.0138) | (0.020) | (0.0157) |
| Fifth recapitalization * High dependence | | | | | 0.128*** | -0.0179 |
| | | | | | (0.026) | (0.0307) |
| Merger | 0.355* | 0.00590 | 0.00352 | | 0.0175 | 0.00212 |
| | (0.20) | (0.0080) | (0.00805) | | (0.013) | (0.00810) |
| Merger*Strong bank | | | | -0.0337*** | | |
| | | | | (0.0120) | | |
| Merger*Weak bank | | | | 0.0678*** | | |
| | | | | (0.0155) | | |
| Merger* High dependence | | | | | -0.0169 | 0.0794* |
| | | | | | (0.016) | (0.0407) |
| Asset management companies | 0.0852*** | 0.455*** | 0.361*** | 0.452*** | 0.455*** | 0.452*** |
| | (0.029) | (0.011) | (0.0223) | (0.0113) | (0.011) | (0.0113) |
| Asset management companies*Bank with High real estate exposure | | | 0.111*** | | | |
| | | | (0.0250) | | | |
| Takenaka's market based program | -0.0628 | -0.0829*** | -0.0805*** | -0.0795*** | -0.0829*** | -0.0802*** |
| | (0.048) | (0.014) | (0.0143) | (0.0143) | (0.014) | (0.0143) |
| Firm fixed effects | No | Yes | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Month fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 164732 | 3722951 | 3722951 | 3722951 | 3722951 | 3722951 |
| R-squared | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 |

*Panel B. Abnormal returns for equally weighted portfolios of related firms*

| | Mean | median | t-test | p-value | % positive | Wilcoxon Z | p-value |
|---|---|---|---|---|---|---|---|
| First recapitalization | | | | | | | |
| (-10,+10) | 0.344 | 0.000 | 0.89 | 0.386 | 52.4% | 0.27 | 0.788 |
| (-5, +5) | 0.296 | -0.189 | 0.61 | 0.558 | 45.5% | 0.47 | 0.640 |
| (-3, +3) | -0.016 | -0.368 | -0.02 | 0.981 | 42.9% | 0.70 | 0.486 |
| Second recapitalization | | | | | | | |
| (-10,+10) | 0.724 | 0.423 | 4.68 | 0.000 | 90.5% | 4.79 | 0.000 |
| (-5, +5) | 0.744 | 0.416 | 3.11 | 0.011 | 90.9% | 4.40 | 0.000 |
| (-3, +3) | 0.372 | 0.280 | 2.21 | 0.069 | 85.7% | 3.63 | 0.000 |
| Third recapitalization | | | | | | | |
| (-10,+10) | 0.766 | 0.869 | 6.03 | 0.000 | 85.7% | 4.22 | 0.000 |
| (-5, +5) | 0.832 | 0.807 | 5.52 | 0.000 | 90.9% | 4.40 | 0.000 |
| (-3, +3) | 0.606 | 0.568 | 3.48 | 0.013 | 85.7% | 3.63 | 0.000 |
| Fourth recapitalization | | | | | | | |
| (-10,+10) | 0.668 | 0.622 | 3.49 | 0.002 | 85.7% | 4.22 | 0.000 |
| (-5, +5) | 0.511 | 0.847 | 1.63 | 0.134 | 81.8% | 3.42 | 0.001 |
| (-3, +3) | 0.889 | 0.873 | 7.23 | 0.000 | 100.0% | 5.09 | 0.000 |
| Fifth recapitalization | | | | | | | |
| (-10,+10) | 0.505 | 0.482 | 2.27 | 0.035 | 76.2% | 3.09 | 0.002 |
| (-5, +5) | 0.116 | 0.392 | 0.51 | 0.621 | 81.8% | 2.44 | 0.015 |
| (-3, +3) | 0.185 | 0.174 | 0.74 | 0.489 | 71.4% | 2.16 | 0.031 |
| Bank mergers | | | | | | | |
| (-10,+10) | 0.101 | 0.052 | 1.95 | 0.0654 | 71.4% | 1.96 | 0.050 |
| (-5, +5) | 0.058 | 0.045 | 0.86 | 0.4119 | 63.6% | 1.45 | 0.147 |
| (-3, +3) | 0.132 | 0.052 | 1.48 | 0.1894 | 85.7% | 3.63 | 0.000 |
| Asset management companies | | | | | | | |
| (-10,+10) | 0.579 | 0.561 | 6.75 | 0.000 | 100% | 5.92 | 0.000 |
| (-5, +5) | 0.700 | 0.730 | 6.27 | 0.000 | 100% | 5.39 | 0.000 |
| (-3, +3) | 0.543 | 0.561 | 5.13 | 0.002 | 100% | 5.09 | 0.000 |
| Takenaka's market based program | | | | | | | |
| (-10,+10) | -0.070 | 0.090 | 0.37 | 0.717 | 52.4% | 0.269 | 0.788 |
| (-5, +5) | 0.180 | 0.284 | 0.91 | 0.386 | 54.5% | 0.468 | 0.640 |
| (-3, +3) | 0.279 | 0.373 | 0.94 | 0.382 | 57.1% | 0.698 | 0.486 |

## Table 4
## Loans and Interventions for Bank Rehabilitation

All variables are defined in Table 2 and the dependent variable is indicated on each column. Parameters are estimated by ordinary least squares. The constant is included in all regressions, but the coefficient is omitted. Standard errors presented in parentheses are corrected for heteroskedasticity and clustering at the firm level. ***, **, and * denote statistical significance at the 1, 5, and 10 percent, respectively. All estimates are multiplied by 100.

| | (1)<br>All loans | (2)<br>All loans | (3)<br>All loans | (4)<br>Long-term loans | (5)<br>Short-term loans |
|---|---|---|---|---|---|
| First recapitalization | 0.0083 | 0.0367*** | 0.0474*** | 0.0201* | -0.0118 |
| | (0.0130) | (0.0139) | (0.0144) | (0.0110) | (0.0110) |
| Second recapitalization | 0.0898*** | 0.1110*** | 0.1112*** | 0.0552*** | 0.0346** |
| | (0.0159) | (0.0174) | (0.0174) | (0.0119) | (0.0137) |
| Third recapitalization | 0.6070*** | 0.6292*** | 0.5650*** | 0.2753*** | 0.3321*** |
| | (0.0731) | (0.0737) | (0.0743) | (0.0530) | (0.0527) |
| Merger | -0.00158 | 0.0218 | | -0.0190* | 0.0174* |
| | (0.0133) | (0.0141) | | (0.0109) | (0.0097) |
| Merger*Strong bank | | | -0.0469*** | | |
| | | | (0.0113) | | |
| Merger*Weak bank | | | 0.0705*** | | |
| | | | (0.0131) | | |
| Asset management companies*Bank with High real estate exposure | | 0.0235* | | | |
| | | (0.0126) | | | |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes |
| Bank fixed effects | Yes | Yes | Yes | Yes | Yes |
| Observations | 188669 | 188669 | 188669 | 188669 | 188669 |
| R-squared | 0.100 | 0.100 | 0.100 | 0.071 | 0.074 |

## Table 5
## Interventions for Bank Rehabilitation and Corporate Policies

All variables are defined in Table 2 and the dependent variable is indicated on each column. Parameters are estimated by ordinary least squares. The constant is included in all regressions, but the coefficient is omitted. Standard errors presented in parentheses are corrected for heteroskedasticity and clustering at the firm level. ***, **, and * denote statistical significance at the 1, 5, and 10 percent, respectively. All estimates are multiplied by 100.

| | (1) Employment growth (2 years) | (2) Employment growth (2 years) | (3) Investment (tangible assets, 2years) | (4) Investment (tangible assets, 2years) | (5) Sales growth (2 years) | (6) Sales growth (2 years) |
|---|---|---|---|---|---|---|
| First recapitalization | 0.874 | -0.393 | 1.199 | -4.553* | -2.822* | -3.524** |
| | (1.367) | (1.491) | (2.245) | (2.338) | (1.489) | (1.698) |
| First recapitalization * High Leverage | | 2.021 | | 9.133*** | | 1.110 |
| | | (1.253) | | (2.096) | | (1.543) |
| Second recapitalization | 1.301 | 0.302 | 3.603** | -1.552 | 0.540 | -0.037 |
| | (0.802) | (0.977) | (1.659) | (1.794) | (1.109) | (1.217) |
| Second recapitalization * High Leverage | | 1.320 | | 6.772*** | | 0.762 |
| | | (0.930) | | (1.549) | | (1.112) |
| Third recapitalization | -0.895 | -1.719 | -2.229 | -0.275 | 0.011 | -1.202 |
| | (0.794) | (1.091) | (2.053) | (1.870) | (1.147) | (1.667) |
| Third recapitalization * High Leverage | | 1.154 | | -2.509 | | 1.653 |
| | | (1.303) | | (2.988) | | (2.025) |
| Merger | 0.123 | -0.294 | 0.007 | -1.981* | -1.229* | -1.528* |
| | (0.500) | (0.654) | (0.978) | (1.060) | (0.696) | (0.879) |
| Merger* High leverage | | 0.695 | | 3.284** | | 0.496 |
| | | (0.799) | | (1.388) | | (1.082) |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Month fixed effects | No | No | No | No | No | No |
| Bank fixed effects | No | No | No | No | No | No |
| Observations | 14362 | 14362 | 14361 | 14361 | 14362 | 14362 |
| R-squared | 0.559 | 0.559 | 0.460 | 0.461 | 0.509 | 0.509 |

## Table 6
## Recapitalizations and Capital Allocation

All variables are defined in Table 2 and the dependent variable is indicated on each column. AR refers to abnormal returns. Parameters are estimated by ordinary least squares. The constant is included in all regressions, but the coefficient is omitted. Standard errors presented in parentheses are corrected for heteroskedasticity and clustering at the firm level. ***, **, and * denote statistical significance at the 1, 5, and 10 percent, respectively. All estimates in columns 2-5 are multiplied by 100.

*Panel A. Real estate firms*

| | (1) Firm AR | (2) Loan growth | (3) Employment growth (2 years) | (4) Investment (tangible assets, 2years) | (5) Sales growth (2 years) |
|---|---|---|---|---|---|
| First recapitalization | 0.0521*** | 0.036** | 0.863 | -0.301 | -2.772* |
| | (0.017) | (0.015) | (1.388) | (2.209) | (1.519) |
| First recapitalization * Real estate firm | 0.233*** | -0.007 | 0.597 | 17.097*** | -0.755 |
| | (0.059) | (0.037) | (2.217) | (6.522) | (2.656) |
| Second recapitalization | 0.423*** | 0.115*** | 1.131 | 3.295** | 0.599 |
| | (0.017) | (0.018) | (0.809) | (1.646) | (1.097) |
| Second recapitalization * Real estate firm | 0.097** | -0.085* | 3.844** | 6.473 | -1.292 |
| | (0.048) | (0.049) | (1.918) | (5.202) | (2.681) |
| Third recapitalization | 0.103*** | 0.639*** | -0.560 | -0.244 | 0.369 |
| | (0.034) | (0.079) | (0.794) | (1.704) | (1.105) |
| Third recapitalization * Real estate firm | -0.047 | -0.044 | -2.432 | -16.096 | -3.127 |
| | (0.092) | (0.211) | (2.681) | (10.788) | (4.831) |
| Fourth recapitalization | 0.322*** | | | | |
| | (0.019) | | | | |
| Fourth recapitalization * Real estate firm | 0.0428 | | | | |
| | (0.056) | | | | |
| Fifth recapitalization | 0.294*** | | | | |
| | (0.014) | | | | |
| Fifth recapitalization * Real estate firm | 0.158*** | | | | |
| | (0.049) | | | | |
| Merger | 0.010 | 0.026* | 0.115 | -0.831 | -1.252* |
| | (0.009) | (0.014) | (0.512) | (0.956) | (0.716) |
| Merger* Real estate firm | -0.033 | -0.038 | -0.296 | 8.323** | 0.216 |
| | (0.021) | (0.039) | (1.539) | (4.009) | (2.441) |
| Asset management companies | 0.455*** | | | | |
| | (0.011) | | | | |
| Takenaka's market based program | -0.083*** | | | | |
| | (0.014) | | | | |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes |
| Month fixed effects | Yes | No | No | No | No |
| Bank fixed effects | No | Yes | No | No | No |
| Observations | 3722951 | 142101 | 14362 | 14361 | 14362 |
| R-squared | 0.004 | 0.108 | 0.559 | 0.462 | 0.509 |

*Panel B. Low profitability firms*

| | (1) Firm AR | (2) Loan growth | (3) Employment growth (2 years) | (4) Investment (tangible assets, 2years) | (5) Sales growth (2 years) |
|---|---|---|---|---|---|
| First recapitalization | 0.040* | 0.015 | 1.530 | -0.667 | -2.780* |
| | (0.021) | (0.022) | (1.471) | (2.391) | (1.628) |
| First recapitalization * Low profitability firm | 0.088*** | 0.039 | -1.360 | 3.189 | -0.027 |
| | (0.032) | (0.028) | (1.159) | (1.990) | (1.401) |
| Second recapitalization | 0.433*** | 0.063** | 2.297*** | 4.254** | -0.907 |
| | (0.023) | (0.028) | (0.887) | (1.721) | (1.178) |
| Second recapitalization * Low profitability firm | 0.004 | 0.069** | -2.043** | -1.488 | 2.630** |
| | (0.031) | (0.035) | (0.882) | (1.841) | (1.156) |
| Third recapitalization | 0.135*** | 0.616*** | -1.186 | -2.160 | -0.834 |
| | (0.043) | (0.106) | (1.039) | (3.351) | (1.460) |
| Third recapitalization * Low profitability firm | -0.074 | 0.030 | 0.400 | -0.187 | 1.622 |
| | (0.060) | (0.141) | (1.348) | (3.772) | (1.951) |
| Fourth recapitalization | 0.211*** | | | | |
| | (0.022) | | | | |
| Fourth recapitalization * Low profitability firm | 0.251*** | | | | |
| | (0.035) | | | | |
| Fifth recapitalization | 0.275*** | | | | |
| | (0.017) | | | | |
| Fifth recapitalization * Low profitability firm | 0.077*** | | | | |
| | (0.027) | | | | |
| Merger | 0.014 | -0.018 | 1.331** | 0.402 | -3.022*** |
| | (0.011) | (0.017) | (0.585) | (1.194) | (0.813) |
| Merger* Low profitability firm | -0.022 | 0.071*** | -2.272*** | -0.698 | 3.414*** |
| | (0.016) | (0.014) | (0.599) | (1.209) | (0.903) |
| Asset management companies | 0.453*** | | | | |
| | (0.011) | | | | |
| Takenaka's market based program | -0.081*** | | | | |
| | (0.014) | | | | |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes |
| Month fixed effects | Yes | No | No | No | No |
| Bank fixed effects | No | Yes | No | No | No |
| Observations | 3723000 | 142101 | 14363 | 14362 | 14363 |
| R-squared | 0.004 | 0.108 | 0.561 | 0.462 | 0.514 |

## Table 7
## Keiretsu and Interventions for Bank Rehabilitation

All variables are defined in Table 2 and the dependent variable is indicated on each column. AR refers to abnormal returns. Parameters are estimated by ordinary least squares. The constant is included in all regressions, but the coefficient is omitted. Standard errors presented in parentheses are corrected for heteroskedasticity and clustering at the firm level. ***, **, and * denote statistical significance at the 1, 5, and 10 percent, respectively. All estimates in columns 2-5 are multiplied by 100.

| | (1) Firm AR | (2) Loan growth | (3) Employment growth (2 years) | (4) Investment (tangible assets, 2years) | (5) Sales growth (2 years) |
|---|---|---|---|---|---|
| First recapitalization | 0.081*** | 0.036*** | 0.722 | 1.912 | -2.240 |
| | (0.017) | (0.014) | (1.391) | (2.304) | (1.532) |
| First recapitalization * Same keiretsu bank | 0.003 | 0.009 | 0.886 | -4.864** | -4.115** |
| | (0.011) | (0.072) | (1.559) | (2.289) | (1.642) |
| Second recapitalization | 0.435*** | 0.103*** | 1.273 | 3.623** | 0.571 |
| | (0.016) | (0.017) | (0.804) | (1.656) | (1.110) |
| Second recapitalization * Same keiretsu bank | -0.040 | 0.464* | 2.602 | -0.839 | -3.991 |
| | (0.034) | (0.240) | (2.798) | (7.490) | (2.571) |
| Third recapitalization | 0.103*** | 0.633*** | -0.896 | -2.211 | 0.005 |
| | (0.031) | (0.074) | (0.794) | (2.055) | (1.152) |
| Fourth recapitalization | 0.328*** | | | | |
| | (0.019) | | | | |
| Fourth recapitalization * Same keiretsu bank | 0.009 | | | | |
| | (0.059) | | | | |
| Fifth recapitalization | 0.303*** | | | | |
| | (0.014) | | | | |
| Fifth recapitalization * Same keiretsu bank | 0.044 | | | | |
| | (0.047) | | | | |
| Merger | -0.001 | 0.022 | 0.118 | 0.015 | -1.190* |
| | (0.008) | (0.014) | (0.503) | (0.976) | (0.697) |
| Merger* Same keiretsu bank | 0.139*** | -0.056 | -0.506 | -0.263 | -0.955 |
| | (0.047) | (0.054) | (1.011) | (1.872) | (1.231) |
| Asset management companies | 0.452*** | | | | |
| | (0.011) | | | | |
| Takenaka's market based program | -0.080*** | | | | |
| | (0.014) | | | | |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes |
| Month fixed effects | Yes | No | No | No | No |
| Bank fixed effects | No | Yes | No | No | No |
| Observations | 3722951 | 142101 | 14362 | 14361 | 14362 |
| R-squared | 0.004 | 0.108 | 0.559 | 0.460 | 0.509 |

## Table 8
## Government vs. Private Recapitalizations

All variables are defined in Table 2 and the dependent variable is indicated on each column. AR refers to abnormal returns. Parameters are estimated by ordinary least squares. The constant is included in all regressions, but the coefficient is omitted. Standard errors presented in parentheses are corrected for heteroskedasticity and clustering at the firm level. ***, **, and * denote statistical significance at the 1, 5, and 10 percent, respectively. All estimates for Loan Growth are multiplied by 100.

| | Firm AR | Loan Growth | Firm AR | Loan Growth | Firm AR | Loan Growth |
|---|---|---|---|---|---|---|
| VARIABLES | | | Low quality = Real estate | | Low quality =Low profitability | |
| First recapitalization | 0.062*** | 0.049*** | 0.027 | 0.035 | 0.044** | 0.049*** |
| | (0.017) | (0.014) | (0.021) | (0.021) | (0.018) | (0.014) |
| First recapitalization * Low quality firm | | | 0.078** | 0.026 | 0.166*** | -0.007 |
| | | | (0.033) | (0.027) | (0.063) | (0.036) |
| Second recapitalization | 0.405*** | 0.204*** | 0.410*** | 0.194*** | 0.400*** | 0.204*** |
| | (0.017) | (0.020) | (0.023) | (0.031) | (0.017) | (0.020) |
| Second recapitalization * Low quality firm | | | -0.012 | 0.012 | 0.050 | -0.072*** |
| | | | (0.032) | (0.038) | (0.049) | (0.027) |
| Third recapitalization | 0.105*** | 0.609*** | 0.137*** | 0.592*** | 0.115*** | 0.614*** |
| | (0.031) | (0.074) | (0.043) | (0.106) | (0.033) | (0.074) |
| Third recapitalization | | | -0.073 | 0.033 | -0.087 | -0.079* |
| | | | (0.060) | (0.141) | (0.085) | (0.045) |
| Fourth recapitalization* Low quality firm | 0.325*** | | 0.208*** | | 0.319*** | |
| | (0.018) | | (0.022) | | (0.019) | |
| Fourth recapitalization * Low quality firm | | | 0.252*** | | 0.066 | |
| | | | (0.035) | | (0.058) | |
| Fifth recapitalization | 0.306*** | | 0.275*** | | 0.292*** | |
| | (0.014) | | (0.017) | | (0.014) | |
| Fifth recapitalization * Low quality firm | | | 0.078*** | | 0.161*** | |
| | | | (0.027) | | (0.049) | |
| Merger | 0.003 | 0.021 | 0.014 | -0.019 | 0.006 | 0.020 |
| | (0.008) | (0.014) | (0.011) | (0.017) | (0.009) | (0.014) |
| Merger* Low quality firm | | | -0.021 | 0.070*** | -0.027 | 0.014 |
| | | | (0.016) | (0.014) | (0.022) | (0.031) |
| Asset management companies | 0.446*** | | 0.446*** | | 0.446*** | |
| | (0.011) | | (0.011) | | (0.011) | |
| Takenaka's market based program | -0.078*** | | -0.078*** | | -0.078*** | |
| | (0.014) | | (0.014) | | (0.014) | |
| Bank equity issue | 0.060*** | -0.114*** | 0.046*** | -0.149*** | 0.049*** | -0.118*** |
| | (0.008) | (0.011) | (0.011) | (0.016) | (0.009) | (0.011) |
| Bank equity issue* Low quality firm | | | 0.028* | 0.062*** | 0.078*** | 0.031 |
| | | | (0.015) | (0.019) | (0.023) | (0.021) |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Month fixed effects | Yes | No | Yes | No | Yes | No |
| Bank fixed effects | No | Yes | No | Yes | No | Yes |
| Observations | 3723000 | 142101 | 3723000 | 142101 | 3723000 | 142101 |
| R-squared | 0.004 | 0.109 | 0.004 | 0.109 | 0.004 | 0.109 |

## Table 9
## Placebo Events

The dependent variable is firm level abnormal returns and the rest of the variables are defined in Table 2. Placebo event 1 to 5 are dummy variables that affect the same firms affected by the five recapitalizations respectively at random dates before or after the event. Placebo event 6 randomizes the dates for the firms affected by mergers. Parameters are estimated by ordinary least squares. The constant is included in all regressions, but the coefficient is omitted. Standard errors presented in parentheses are corrected for heteroskedasticity and clustering at the firm level. ***, **, and * denote statistical significance at the 1, 5, and 10 percent, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| First recapitalization | 0.0807*** | | 0.0579*** | 0.0807*** | 0.0840*** | 0.0844*** | 0.0808*** |
| | (0.0173) | | (0.0173) | (0.0173) | (0.0173) | (0.0173) | (0.0173) |
| Second recapitalization | 0.435*** | 0.431*** | | 0.436*** | 0.436*** | 0.438*** | 0.435*** |
| | (0.0161) | (0.0160) | | (0.0161) | (0.0161) | (0.0161) | (0.0161) |
| Third recapitalization | 0.102*** | 0.102*** | 0.111*** | | 0.253*** | 0.0949*** | 0.102*** |
| | (0.0309) | (0.0309) | (0.0309) | | (0.0299) | (0.0309) | (0.0309) |
| Fourth recapitalization | 0.327*** | 0.328*** | 0.328*** | 0.343*** | | 0.309*** | 0.328*** |
| | (0.0181) | (0.0181) | (0.0181) | (0.0175) | | (0.0180) | (0.0180) |
| Fifth recapitalization | 0.306*** | 0.307*** | 0.310*** | 0.305*** | 0.289*** | | 0.306*** |
| | (0.0138) | (0.0138) | (0.0138) | (0.0138) | (0.0137) | | (0.0138) |
| Merger | 0.00310 | 0.00353 | -0.000744 | 0.00345 | 0.0147* | -0.000806 | |
| | (0.00806) | (0.00806) | (0.00806) | (0.00806) | (0.00806) | (0.00806) | |
| Asset management companies | 0.452*** | 0.453*** | 0.435*** | 0.459*** | 0.427*** | 0.450*** | 0.452*** |
| | (0.0113) | (0.0112) | (0.0112) | (0.0112) | (0.0111) | (0.0113) | (0.0113) |
| Takenaka's market based program | -0.0805*** | -0.0796*** | -0.0758*** | -0.0804*** | -0.0758*** | -0.0768*** | -0.0806*** |
| | (0.0143) | (0.0143) | (0.0143) | (0.0143) | (0.0143) | (0.0143) | (0.0143) |
| Placebo event 1 | 0.00686 | 0.00673 | | | | | |
| | (0.0219) | (0.0219) | | | | | |
| Placebo event 2 | -0.0179 | | -0.0184 | | | | |
| | (0.0217) | | (0.0217) | | | | |
| Placebo event 3 | -0.0263 | | | -0.0264 | | | |
| | (0.0394) | | | (0.0394) | | | |
| Placebo event 4 | -0.0129 | | | | -0.0126 | | |
| | (0.0209) | | | | (0.0209) | | |
| Placebo event 5 | -0.0400* | | | | | -0.0400* | |
| | (0.0214) | | | | | (0.0214) | |
| Placebo event 6 | -0.00894 | | | | | | -0.00893 |
| | (0.00899) | | | | | | (0.00899) |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Month fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 3723000 | 3723000 | 3723000 | 3723000 | 3723000 | 3723000 | 3723000 |
| R-squared | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 |

## Table 10
## Lending to Listed and Unlisted Companies

The dependent variable is the one- (or two-) year growth rate in the bank's number of borrowers and small business borrowers in columns (1) to (4) and column (6). In column (5), the dependent variable is the one year growth rate in the amount of loans to small business borrowers. Parameters are estimated by ordinary least squares. The constant is included in all regressions, but the coefficient is omitted. Standard errors presented in parentheses are corrected for heteroskedasticity and clustering at the bank level. ***, **, and * denote statistical significance at the 1, 5, and 10 percent, respectively.

| | (1) One year, all borrowers | (2) One year, all borrowers | (3) One year, small borrowers | (4) One year, small borrowers | (5) One year, loans to small borrowers | (6) Two years, small borrowers |
|---|---|---|---|---|---|---|
| First recapitalization | 0.0362 | 0.0340 | 0.0363 | 0.0341 | -0.0469* | 0.0415 |
| | (0.0381) | (0.0353) | (0.0387) | (0.0359) | (0.0248) | (0.110) |
| Second recapitalization | -0.0301 | -0.0528 | -0.0296 | -0.0524 | 0.0333 | 0.132 |
| | (0.0464) | (0.0521) | (0.0466) | (0.0523) | (0.0438) | (0.225) |
| Third recapitalization | -0.176*** | -0.170*** | -0.177*** | -0.171*** | -0.311*** | -0.331*** |
| | (0.0195) | (0.0202) | (0.0193) | (0.0200) | (0.0152) | (0.0412) |
| Bank equity issue | | 0.0256 | | 0.0257 | 0.0150 | 0.0191 |
| | | (0.0206) | | (0.0206) | (0.0156) | (0.0310) |
| Merger | 0.0783* | 0.0799* | 0.0785* | 0.0801* | 0.0983*** | 0.141* |
| | (0.0416) | (0.0419) | (0.0417) | (0.0420) | (0.0281) | (0.0815) |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Bank fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 860 | 860 | 860 | 860 | 872 | 838 |
| R-squared | 0.251 | 0.255 | 0.254 | 0.257 | 0.274 | 0.328 |