

The real effect of lending by state owned banks:
Evidence from Japan during the crisis of 90's.

by

Yupeng Lin^a
Anand Srinivasan^b
Takeshi Yamada^c

Preliminary draft: July 4, 2011

Abstract

This paper investigates the effect of lending by state owned banks on employment, real investment and investment in financial assets for publicly traded industrial firms in Japan, focusing on differences between the Japanese crisis in early 1990s and non-crisis periods. We find that increases in lending by state owned banks lead to higher employment, both in crisis and non-crisis periods. For high distress risk firms, the effect of state owned lending on employment is much higher during the crisis relative to normal times. Investment is also positive impacted by increases in state owned bank lending. Performance of firms that receive increases in lending from state owned banks during the crisis is comparable to, or better than control firms. Lending by private banks can have positive effects on investment but not employment. Further, lending by private banks has little impact during the crisis. Our results highlight the positive impact of lending by state owned banks, especially during a crisis.

^aDept. of Finance, NUS Business School, Mochtar Riady Building, 15 Kent Ridge Drive, Singapore 117592. E-mail: linyupeng@nus.edu.sg.

^bDept. of Finance and Risk Management Institute, National University of Singapore, Mochtar Riady Building, 15 Kent Ridge Drive, Singapore 117592. E-mail: bizas@nus.edu.sg

^cThe University of Adelaide Business School, South Australia, Australia 5005. E-mail: takeshi.yamada@adelaide.edu.au

The real effect of lending by state owned banks:
Evidence from Japan during the crisis of 90's.

Abstract

This paper investigates the effect of lending by state owned banks on employment, real investment and investment in financial assets for publicly traded industrial firms in Japan, focusing on differences between the Japanese crisis in early 1990s and non-crisis periods. We find that increases in lending by state owned banks lead to higher employment, both in crisis and non-crisis periods. For high distress risk firms, the effect of state owned lending on employment is much higher during the crisis relative to normal times. Investment is also positive impacted by increases in state owned bank lending. Performance of firms that receive increases in lending from state owned banks during the crisis is comparable to, or better than control firms. Lending by private banks can have positive effects on investment but not employment. Further, lending by private banks has little impact during the crisis. Our results highlight the positive impact of lending by state owned banks, especially during a crisis.

1. Introduction

The recent financial crisis resulted in effective state control of several banks in the US and also for the UK. There is extensive large literature on the detrimental effects of government ownership of banks. At the macroeconomic level, the negative effect of government ownership of banks is shown by Barth et al (1999) on financial development, La Porta et al (2002) on subsequent economic growth. Further, Dinç(2005) directly links lending by government owned bank lending to elections.

There are also several single country studies that directly establish a link between state owned bank behavior to political motivations that are unrelated to economic reasons for such lending (Sapienza, 2004; Khwaja and Mian, 2007; Carvalho, 2010). Thus, it would appear that the state ownership of banks is something that should be reversed quickly. Thus, while the US and several other country governments quickly intervened in terms of providing banks capital, these capital injections and other forms of support were motivated primarily from the perceived costs of the failure of a large financial institution to the country's and the global economy. As a consequence, the US government seeks to divest its stake in commercial banks when the economy recovers from the financial crisis of 2007-2009.

However, most of the evidence on the detrimental effects of government ownership of banks, and consequent politically motivated lending, has been documented in normal economic times - relatively few papers have specifically investigated the impact of government ownership of banks and lending by such banks during a crisis. In particular, the findings on the detrimental effects of government ownership during normal economic times may be different during a crisis. In particular, during a crisis, private lenders may refuse to lend due to high information asymmetry (Mankiw, 1986) resulting in market failure. Under these circumstances, there is a role for government banks in the provision of credit. On the other hand, a crisis may enable a government to provide even more politically motivated loans, as external agents such as the press may not have sufficient information to monitor or question government owned lending during a crisis. In this case, the detrimental effects

of government ownership of banks may be exacerbated, due to the several political motivations identified in the lending of state owned banks identified in earlier studies.

To investigate the real effects of government owned bank lending, this paper uses a comprehensive data set of lending by government owned banks to publicly traded industrial firms in Japan. Japan provides a good laboratory for investigating the effects of the current financial crisis that originated in the US, due to the similarities in the type of crisis as well as comparable levels of institutional development (Hoshi and Kashyap, 2010). Thus, the findings are likely to be applicable to other developed economies, in particular for the US. In particular, we investigate the impact of government owned bank lending on the following variables at the firm-level - employment, real investment and performance. Further, by comparing the effects of lending during crisis and non-crisis periods, we are able to provide sharp tests of differences in government lending across these two types of periods.

To the extent that publicly traded firms have access to several sources of financing, the results of this study are likely to provide a lower bound on the potential benefits of lending by state owned banks during crisis periods. Further, to the extent the companies in Japan have an implicit lifetime employment guarantee for their employees, the findings here are likely to understate the benefits of lending by state owned banks in other economies such as the US where employers do not typically have such employment guarantees.

The principal data set we use is the Nikkei Needs database. This database has been used extensively in studies of Japanese public companies. This database also provides the identity of the lenders to a given firm, which therefore allows the degree of lending from state owned banks to be identified. Using the above data set, supplemented using the PACAP database, we construct a firm-year panel data set that spans from 1984-2006, for all publicly traded companies on the Tokyo Stock Exchange in Japan. This data set is used to identify the impact of lending by state owned banks on these companies.

We use *increases in lending by state owned banks* to a given firm as the principal empirical variable for measuring the effects of state owned bank lending on employment and investment. The rationale for using this variable is that an increase in lending provides an unambiguous signal of support by state owned banks (and by extension, the Government of Japan) to a given firm. In fact, Sato (1990) and Horuichi and Sui (1993) document the close connections between the state owned banks and the Ministry of Trade and Industry in Japan.

Our main findings are summarized here. We find a positive and significant effect of state owned banks' lending on firm level employment and firm level investment. Our tests show that state owned bank lending has a positive and significant effect on employment and investment in both non-crisis and crisis periods. We also find that distressed firms increase employment and investment to a greater extent if they receive government support during a crisis. This finding, while intuitive, is quite important from a policy perspective. Firms that are close to default are most likely to reduce employment during a crisis. Receiving government support in the form of loans from state owned banks is associated with an increase in employment relative to equivalent firms without such loans especially during the crisis. For investment, we find more mixed results. While increases in lending by state owned banks increase investment, there is not much incremental effect in the crisis, either in the aggregate, or for high distress firms.

Next, we investigate the market and accounting performance of state owned bank supported firms. Our empirical results show that state owned bank supported firms perform no worse than comparable firms using ROE, and generate higher long run return for investors during crisis periods. Thus, the increases in employment and investment do not appear to be costly to shareholders in terms of inefficient investment or employment.

A natural question is whether the effect we identify is simply a bank loan effect (a certification effect as in James, 1987) or something unique to lending by state owned banks. To examine this, we test for a private bank effect, where we test for the effect of increases in private bank lending on

future employment and investment. We do not find any effect of private bank lending on employment. While we find a positive effect of increases in private lending on investment, this effect is smaller than the effect due to increases in state owned bank lending. Lastly, high growth firms and cash constrained firms have a larger state owned bank effects during the crisis, suggesting that private bank lending is not similar in nature to state owned bank lending.

A key concern in the above tests stems from the endogeneity of the state owned bank lending. In particular, governments may choose to give loans to firms that have a higher potential for employment growth. We apply both an instrument variables approach as well as propensity score matching method to address this issue and find that our main results are robust to potential this potential bias. Finally, we demonstrate that the state owned bank effects are not periods-specific. Including the later periods, we find that the state owned bank lending effects exist in different periods and it is not sensitive to the definition of crisis periods.

In summary, we comprehensively investigate the real effects of state owned bank lending on borrowers' employment and investment. In terms of its effects on employment, across the plethora of tests, we find that firms that receive loans from state owned banks have higher employment in both non-crisis period and crisis period. In terms of its effects on investment, state owned bank lending not only encouraged capital investment but help firms to better capture the growth opportunities. Our results also support the results in Giannetti and Simonov (2009) who uses the bank restructuring by the Japanese governments resulted in a positive CAR to the relationship borrowers of these banks. Likewise, the findings in Bump et al (2010) which suggest that state guarantees to small businesses would generate significant employment benefits are also complementary to our study. If anything, our study shows that such effects are prevalent even for large publicly traded firms in Japan.

Lastly, while our study provides an important benefit of lending by state owned banks, it should be acknowledged that we do not have access to individual loan contract terms. As a result, we are unable to evaluate if this support given by state owned banks can be given in more effective ways.

However, we can conclude that this mechanism seems to work in terms of employment growth, especially for firms in distress during the Japanese crisis of the 1990s.

The remainder of this paper is organized as follows. Section 2 provides institutional details on the 1990's crisis in Japan as well as an overview of state owned banks in Japan. We develop the hypothesis and provide a literature review in section 3. Section 4 describes our data set and construction of variables. Section 5 performs the empirical analysis of employment and investment. Section 6 concludes with directions for future research.

2. Institutional Details

2.1 1990's Crisis

During 1984 to 1989 period, the Japanese capital markets as well as the real economy expanded rapidly. The Nikkei 225 Stock Average was around 10,000 levels in 1984 and reached a peak of 38,916 on December 29, 1989. Similarly, the land price index rose rapidly during the late 1980s. Meanwhile, the private investment also expended dramatically. As shown in Figure I, the capital investment was growing rapidly during this period. The business press has extensively referred to this period as a bubble period.

Concerned with the overheating in the asset markets, the Bank of Japan increased the official discount rate and imposed limits on commercial bank lending to real estate related projects. These policies resulted in a much tighter credit market conditions. Both stock and real estate prices fell dramatically at the end of 1990. The Nikkei 225 Stock Average fell sharply starting from the first part of the year and by October 1, 1990, it had sunk to 20,222. Real estate prices followed a similar pattern. This deflation in asset prices caused the Japanese economy to contract significantly. Concerned with default risk, private banks in Japan reduce or suspend their lending¹, imposing negative impacts on bank loan supply. Private banks suspended 6956 transactions in 1989. In 1992,

¹Suspension is defined as non-renewal of existing loan contracts.

this number reached as high as 15854, which is more than twice of that in 1989. In the meanwhile, state owned bank stepped in and provided long term funds to stimulate the economic growth. We define the period starting from 1990 to 1994 as the crisis period.

As the economy showed a brief recovery in 1995, we define 1995 onwards as the post crisis period. The GDP growth in the second quarter of 1995 went up to 2.9% and economic growth continued until 1997. This also is consistent with Figure I, where the capital investment starts to recover since 1995. Since there were bank defaults and banking system restructuring from 1997, we exclude data after the end of 1996 in our main empirical tests. However, our results are robust to the inclusion of all data till 2006, and inclusion of the Asian Financial Crisis as a second crisis.²

Using the Japanese crisis of the early 90's to investigate the effects of state owned lending on employment has two important benefits. First, as shown in Figure 2, the fraction of long term loans by government owned banks increased from 2% of total long term funds in 1989 to more than 30% in 1993.³ This large increase provides an ideal laboratory to investigate the effects of a large increase in state lending during a crisis. Does a large increase in lending by state owned banks result in greater wastage and diversion as implied by earlier studies or does this result in benefits that may not be present during non-crisis times? Second, as the Japanese accounting system requires disclosure of bank loans at the individual obligor level, we have a comprehensive and unbiased sample of state owned banks' lending to public companies.

2.2 State Owned Banks in Japan

Japan has various types of government banks⁴ to provide loans to a different set of borrowers. These government banks receive most of their funds from the Fiscal Investment and Loan Program

²Our main results remain the same even if we define crisis period as from year 1991 to year 1994

³Long term funds include equity funds, long term bonds and long term bank debts.

⁴They are Japan Development Bank, People's Finance Corporation, Agricultural Forestries and Fisheries Finance Corporation, Hokkaido and Tohoku Development Corporation, Local Public Enterprise Finance Corporation, Environmental Sanitation Business Finance Corporation, Export Import Bank of Japan, Housing Loan Corporation, Small

(FILP) which is mainly funded by the postal saving and insurance system. Similar to the general accounting budgets, the FILP budgets are proposed by the Ministry of Finance.

These state owned banks supply long term credit to those firms whose projects were regards as important for the economic development (Horiuchi and Sui, 1993). Meanwhile, Ministry of International Trade and Industry (MITI) also actively recommends potential borrowers to these state owned banks. For example, Japan Development Bank and Export-Import Bank have been established to provide long-term loans to large firms in industries that government considers important for its policy objectives. Government banks that provide loans to smaller firms, such as Japan Finance Corporation for Small Business and People's Finance Corporation, among others, were established for the aim of mainly providing credit for firms that might have difficulty receiving loans from private financial institutions. There are also a few government banks that have been established to provide government credit for the development of certain regions such as the Hokkaido and Tohoku Development Corporation and the Okinawa Development Finance Corporation (See Imai, 2009.) Although the state owned banks exist to provide credit in line with the government's policy objectives, they are also very active in searching business and can decide credit allocation independently from the government. They can also act like private commercial banks and supply loans in the form of syndicated loans. They also regularly monitor the performance of borrowers during the loan commitment by requiring the operation reports or consulting the private main bank of the borrower to obtain information.

Because of the closed relation with MITI and Ministry of Finance, state owned bank lending not only provide direct loans to private firms but also may be interpreted as an indication of government guarantee and induce private banks to extend credits to those firms (Sato,1990). Compared to private bank lending, state owned banks' proportion of corporate financing is relatively small. For listed

Business Finance Corporation, Small Business Credit Insurance Corporation, and Okinawa Development Finance Corporation. Local Public Enterprise Finance Corp and Housing Loan Corporation are most likely not included in our sample as they are less likely to lend to private corporations. For details, see Imai (2009).

industrial firms, the state owned bank loan is about 10% of the total corporate borrowing from banks (Figure 2 (B)). Because the market share for state owned banks is relatively small in Japan, the effect of state owned bank lending are largely depend on their abilities to leverage private bank lending and therefore scale up their impacts. This feature actually provides us with ideal laboratory to investigate the guarantee effect of state owned bank lending.

3. Literature review and Hypothesis

Theory suggests there can be benefits of having state owned banks for self-interested politicians. For example, Shleifer and Vishny (1994) present a model that suggests subsidized government lending in exchange for firms agreeing to increase employment. State owned banks can provide such direct subsidies to firms by charging a much lower interest rate. Empirically, Sapienza (2004) documents that state owned banks provide credit to political connected firms at a much lower price. This implies that state owned banks make inefficient lending decisions for the private benefits of politicians, while possibly also benefit a section of the electorate. This would suggest that state owned bank lending is used primarily as an instrument for increasing employment. Further, Imai (2009) documents that similar effects are prevalent in Japan in terms of state owned bank lending.⁵ To the extent that politicians are more concerned about employment during a crisis, the impact of state owned bank lending may be larger during a crisis relative to normal times. Likewise, politicians may be more concerned about firms that are distressed as these firms are most likely to cut employment. This leads to our first hypothesis and two ancillary hypotheses.

H1: Increasing in state owned bank lending is positively related to firm employment.

H1A: The impact of state owned bank lending on employment is larger during a crisis relative to

⁵Imai (2009) does not study employment, investment and other variables of analysis. The focus of this paper is to establish the political motivations do drive lending decisions.

normal economic times.

H1B: The impact of state owned bank lending on employment is larger for firms that are distressed relative to firms in better financial condition.

In the Shelifer and Vishny (1994) model, the increase in employment is not necessarily enhancing economic efficiency. However, in a crisis, this need not be the case. For example, Duygan-Bump, Levkov, and Montoriol-Garriga (2010) reported that workers in particularly financially constrained firms became unemployed in the U.S. during the financial crisis of 2007-2009. Their results suggested that unemployment can be mitigated if state owned bank lending can effectively fill the credit gap and extend appropriate credit to these firms. Thus, any finding of increase in employment during a crisis is not necessarily detrimental to economic efficiency.

Therefore, we next develop hypotheses on the impact of state owned bank lending on other variables that are proxies for economic efficiency. For example, the ‘development theory’ articulated by Gerschenkron (1962) also suggests that private banks are less willing to provide financing services due to the scarcity of capital. The credit crunch will result in lower investment and higher unemployment rate. In such a scenario, Gerschenkron (1962) posits that state owned banks should step in and provide capital funds and engage in long term credit policy to stimulate the economic growth.

The effects posited by Gerschenkron (1962) are likely to be amplified during periods of crisis. For example, in a simple model of lending with information asymmetry, Mankiw (1986) demonstrates that lending markets may be subject to failure during a crisis. Thus, he argues that there is a role for subsidized lending by the state during such periods. Therefore, state owned bank lending plays an important role in acting as a buffer and filling the credit gap. Further, to the extent that firms are more credit constrained during a crisis, or firms that are more distressed, the effect should be larger. This leads to our second set of hypotheses.

H2: Increasing in state owned bank lending is positively related to firm investment.

H2A: The increase in investment due to state owned bank lending is larger during a crisis relative to normal times.

H2B: The increase in investment associated with state owned bank lending is larger for distressed firms.

Thirdly, to the extent that empirical results documented in other studies of lending by state owned banks, the loans made by state owned banks may be driven by political considerations, this implies that the future performance of such firms should be worse than other firms. On the other hand, if state owned banks are motivated by economic considerations that are driven by lack of credit from private banks, such firms should experience better or at least comparable performance relative to other firms. This leads to our final hypothesis which is two sided.

H3A: If the lending during a crisis is political motivated, then performance of state owned banks firm borrowers should be worse than comparable borrowers without state owned bank lending.

H3B: If the lending during a crisis is driven by economic considerations, then performance of state owned bank borrowers should be better than or equal to comparable borrowers without state owned bank lending.

4. Data and Summary Statistics

4.1 Data and key variables

Our main sample consists of all listed companies on the Tokyo Stock Exchange, excluding financial institutions and utility companies, from 1984 to 1996.⁶ We deliberately choose to end the main sample in 1996 to avoid the Asian Financial Crisis, as well as to avoid potential confounding effects of recapitalization of the Japanese banks by the government in the late 90's. Such recapitalizations by the government may have had the effect of providing a guarantee effect for private banks, which would reduce the difference between government and private loans. In robustness checks, we include all data till 2007, using the Asian Financial Crisis as a second crisis on which to test our hypotheses, and all our results are robust to the inclusion of the second crisis.

⁶We start the data sample in 1984 even though the database has observations from 1977. The reason is that some industry specific control variables are only available from this date onwards.

Accounting and bank loan information and historical stock prices of these companies is obtained from the Nikkei Corporate Financial Database (Nikkei), Nikkei Bank Loan Database and Pacific-Basin Capital Markets Research Center (PACAP) respectively, and industry-specific Producer Price Indices (PPI) are obtained from the Bank of Japan's web site⁷. The Nikkei Bank Loan database includes loans outstanding of individual banks for each company at the fiscal-year-end. We obtain 24,429 observations with adequate loan information and 13,911 observations with both loan and stock price information from 1984 to 1996 on a yearly firm basis.⁸

In Japan, there are 9 major state owned banks including Development Bank of Japan and Export Import Bank of Japan which supply credit to companies. These banks are 100% owned by the Japanese government during our sample periods. Using the above data item, a dummy variable "State owned bank" is constructed, that takes a value of 1 if the total amount of loan that granted by stated owned banks increases in a given year relative to the prior year and 0 otherwise. Thus, our dummy captures the effect of increases in state owned bank lending on corporate behavior. This is the principal measure that will be used in the empirical analysis. We construct two alternative dummy variable to measure the impact of state owned bank lending - "State owned bank b" that takes a value of 1 if the ratio of government loan to capital increases in the given year and 0 otherwise. "State owned bank c" takes a value of 1 if the ratio of government loan to total borrowing increases in the given year and 0 otherwise. Except where stated explicitly otherwise, state owned bank will refer to the first dummy, i.e., one where the total amount of state owned bank lending increases from the previous year.

We define the crisis period as starting from 1990 ending in 1994. We use two principal measures for distress – leverage in the top quartile, and Altman's Z score in the bottom quartile. We define employment as number of employees at the end of the year. It includes full-time employees, employees on term contracts, temporary employees (loaned employees from other companies), and

⁷<http://www.boj.or.jp/en/statistics/index.htm/>

⁸We delete firms that do not have any information on total borrowing from banks.

employees on leave of absence. It does not include directors. As it is not uncommon in Japanese firms for employees to have lifetime employment, they are expected to work in exchange for some degree of job security. Therefore, Japanese firms are less likely to layoff permanent employees and the variation of full time employees may not be able to capture the changes in employment. In order to overcome this issue, our definition includes both permanent and temporary employees. This definition provides us with more volatility on employment since firms may layoff temporary employees when facing negative shock on business.

Investment in our study is defined as the change in tangible fixed asset (FB032) plus depreciation. Other key variables are defined as following: (1) Sales, defined as logarithm of sales (FC001) adjusted for industrial producer price index to proxy for demand; (2) Cash Surplus (FB003), defined as the amount of cash available to finance new projects, scaled by assets. In some specification we also use logarithm of the amount of cash; (3) Capital, defined as logarithm of tangible fixed asset (FB032); (4) Market Share, defined as the ratio of firm sales over a measure of industry total sales, where industry is measured at the 3 digit SIC code level; (5) Wage, defined as logarithm of ratio of labor expenses to number of employees and adjusted by industrial producer price index; (6) Book Leverage, defined as total debt divided by total asset (FB067); (7) Tobin's q , defined as the ratio of the market value of assets to their replacement values, as a proxy for investment opportunities (Chung and Pruitt 1994); (8) Cash Flow, defined as net income before extraordinary items and depreciation (FC029), scaled by total capital in previous year.

4.2 Summary statistics

Table 1 presents summary statistics from 1984 to 1996 and univariate comparisons of key variables for borrowers with more state owned bank lending and borrowers without more state owned bank lending. Specifically, Panel A reports statistics for the number of firms years with data for the whole sample period and the sub samples of the pre-crisis period (1984-1989), crisis period

(1990-1994) and post-crisis period (1995-1996). Throughout the whole sample period, more than half of the firm years record positive loan outstanding from state owned banks. However, only 8.68% of the firm years had an increase in borrowing from state owned banks in the pre-crisis period (computed as the ratio of 865 divided by 9962). This number went up to 12.88% in crisis period and went down to 5.55% in post-crisis period. This is consistent with the observation that government share of lending significantly increased during crisis period (Figure 2).

Statistics for key variables for the overall sample are presented in Panel B. Panel C stratifies the sample by firm years where the borrowing firm had outstanding loans from state owned bank and firm years where there were no outstanding loans from state owned banks. For the whole sample period, firm years that borrowed from state owned banks had fewer employees and tended to be larger than other firms years. Meanwhile, compared to the firm years that record zero credit from state owned banks these observations have lower Tobin's q (1.2020 versus 1.2414) and lower cash flow to capital ratio (0.1810 versus 0.2950) and therefore are considered depressed. This pattern holds for the crisis period. These findings are consistent with Sapienza (2004) who documents that state owned banks generally favor providing loans to depressed firms.

Panel D reports firm characteristics for firms that obtain an increase in state owned banks loans. The results show that, conditional on an increase from state owned banks, firms hired more employees and invested more on capital for whole sample period, as well as during the crisis. In sum, the univariate analysis shows that state owned banks favor distressed firms, firm of larger scale, and firms with an increase in state owned bank lending tend to hire more people. Table 2 shows the industry distribution of firms by state owned banks and we observe a contrasting level of state owned bank lending across industries, with priority to railroad transportation and chemicals industry for the whole sample period.

5. Multivariate Empirical Results

5.1.1 Test of H1 –Employment regressions

In this section, we apply multivariate analysis to further explore the effect of state owned bank lending on employment, which pertains to Hypothesis 1. To examine this effect, we use the following empirical model to examine the effect of increases in state owned bank lending on employment.

$$\log(\text{Employment}_{i,t}) = X_{i,t}\beta + F_{i,t}\gamma + e_{i,t} \quad (1)$$

where $i=1, 2, \dots, n$ refers to cross-sectional firms, and $t=1, 2, \dots, T$ refers to a fiscal year. The dependent variable is the log of total number of employees including temporary employees and full time employees. In the baseline model, vector X consists of non financial factors including capital, sales, wage, and fixed effects. Vector F consists of financial factors including the crisis dummy, the state owned bank dummy, interaction term between crisis dummy and state owned bank dummy, book leverage and cash surplus. These financial factors are aimed at capturing the borrowing costs or the probability of credit being rationed completely. The control variables are consistent with the existing literature (See Nickell and Nicolitsas, 1999). Specifically, we use Sales, Cash Surplus, Capital, Market Share, Wage and Book Leverage

Table 3 reports estimates from regressing employment on state owned bank lending measures, and contemporaneous control variables. To examine the effect of state owned bank lending on employment in crisis period, we focus on interaction term between the state owned bank dummy and the crisis dummy as the primary explanatory variables. Reported t-statistics and p-values are based on robust standard errors clustered at the firm level. We also include industry fixed effects to control for other industry level heterogeneity.

In specification (1) in Table 3, the coefficient on the state owned bank dummy is positive and significant, suggesting that firms that receive increase in loans from state owned banks hire more people than non-supported firms. According to the coefficient, the employment growth for state owned bank supported firms is 6.7 percent higher than non-support firms. This result is not only

statistically but also economically significant. The estimated coefficients on interaction term between the state owned bank dummy and the crisis dummy is insignificant in all specifications indicating that there is no incremental effect for state owned bank lending during crisis period.

Our results also indicate that larger capital and sales are correlated with higher employment. Moreover, following Nickell and Nicolitsas (1999), we assume that wage is predetermined and find that the coefficient on wage is negative and significantly different from zero at the 1% level. A higher wage level implies higher staff cost which reduces firm's incentive to hire.

In specification (2), we control for book leverage, market share, cash surplus and the scale of state owned bank borrowing. We find that the results for state owned bank lending and crisis remains the same. Moreover, we find that firms with larger market share will hire more workers as firms with larger market power are likely to face less elastic demand. Sharp (1994) argues that both size and leverage are important determinants of employment. In our results, we also find that a higher leverage is associated with a lower employment, as firms that might suffer financial distress are likely to reduce employment.⁹

In specification (3) and (4), we use two alternative methods to define state owned bank lending earlier defined in section 4.1. In both specifications, coefficients of these alternative proxies are significant and those of interaction terms are insignificant. Therefore our results are not sensitive to the definition of government support.

These empirical results show that the state owned bank lending impose large impact on firms' hiring activities. The state owned bank supported firms increase hire 3-7% more workers, depending on different specifications. However, there is no incremental effect of state owned bank lending during a crisis. Thus, based on the above, we can obtain the following result.

Result 1– Hypothesis 1 is supported, Hypothesis 1A is rejected – there is no larger effect of an increase in state owned bank lending in a crisis relative to normal times.

⁹The coefficients of financial variables cannot be interpreted as elasticity of employment in our regression.

An important puzzle raised by this result is the reason why state owned bank lending can have such large impact given a small market share of state owned bank loan. One possible explanation is that an increase in state owned bank lending implicitly suggests credit guarantee to the firm. Thus, the response of a firm to such an increase may be much more than proportional to the size of the loan.

5.1.2 Test of H1B - Impact of borrower distress

To investigate this further, we examine the impact of an increase in state owned bank lending on distressed as well as high leverage firms. Such firms are more likely to benefit from an implicit guarantee effect. To do this, we sort the sample into four subsamples based on book leverage and compare the samples in quartile 1, which includes the lowest-leverage 25 percent and quartile 4, which includes the highest leverage 25 percent. The results in Table 4 are quite interesting. During normal times, low leverage and high Z score (low distress) firms show an increase in employment when receiving an increase in state owned bank funding. However, for high leverage and low Z score (high distress) firms, the effect during a crisis is much larger in terms of employment. These results are consistent with the argument that state owned bank lending implicitly suggest government guarantee and distress firms benefit more from such guarantee. It is also consistent in general with public policy seeking to prevent layoffs during the crisis. The above suggests the following result.

Result 2 – Hypothesis 1B is supported. More distressed firms show larger effects of increases in state owned bank lending. The result is amplified during a crisis.

5.2 Test of H2 - Capital Investments

In the previous section, we show that state owned bank lending has positive and significant effect on employment. Another equally important goal of government policy is to stimulate investment, especially during a crisis. In this section, we try to look at whether such support is able

to increase the private investment during the crisis. To examine the relationship between investment and state owned bank lending, we follow the q-theory of investment which implies that investment is a function of Tobin's q ratio (Hayashi 1982). We also take into account the importance of financial variables such as internal cash flow (Fazzari, Hubbard, and Petersen 1988).

$$\frac{I_{i,t}}{K_{i,t-1}} = \beta \frac{CF_{i,t}}{K_{i,t-1}} + \delta q_{i,t} + F_{i,t}\gamma + e_{i,t} \quad (2)$$

Investment I is defined as changes in tangible fixed asset plus depreciation. Capital K is defined as tangible fixed asset. Tobin's q is defined as the ratio of the market value of assets to their replacement values (Chung and Pruitt 1994). Cash flow $CF_{i,t}$ is defined as net income before extraordinary items and depreciation. Vector F includes state bank support dummy, fixed effects and other control variables.

Table 5 reports the empirical results for state owned bank's impacts on investment. In specification (1) and (2), the estimated coefficients on the state owned bank dummy is positive and significant at the 1% level, suggesting that state owned bank can effectively stimulate investment. However, there is no incremental effect during the crisis as was the case with employment. The coefficients on Tobin's q are positive and significant at the 1% level. This is consistent with the q theory that firms with more growth opportunities will invest more. The positive and significant coefficient on cash flow reflects that firms are sensitive to cash flow fluctuations. These two regressions suggest that state owned bank lending can help to boost investment in both non-crisis period and crisis period.

We further sort the sample into four subsamples based on book leverage and compare the samples in quartile 1, which includes the lowest-leverage 25 percent and quartile 4, which includes the highest leverage 25 percent. The results in column (3) and (4) show that the higher leverage firms experience significant investment growth given the support from state owned bank and such effects

dominate those in lower leverage firms. We further sort the sample based on Altman's Z-score. The results show that the highly distressed firms experience significant employment increases if lending by state owned banks increases. These results are consistent with our hypothesis that state owned bank lending effects are more significant for distressed firms. Most interaction terms with one exception are insignificant. Thus, the results of this table suggest the following for tests of hypothesis 2.

Result 3 – Hypothesis 2 is supported. Hypothesis 2A (high effect during a crisis) is not supported. Hypothesis 2B (higher effect for distressed firms) is supported.

5.3 Test of H3 – Performance of firms with increase in state owned bank loans

In this section, we try to answer the question whether the positive effect of an increase in state owned bank lending is largely motivated by political considerations or whether economic factors also play a role in these lending decisions. The political economy aspect, as documented for example, in Sapienza (2004), emphasizes that state owned banks may serve riskier firms than private banks. In this scenario, state owned bank supported firms may have lower profitability if this risk is not fully priced. Instead of trying to address the issue of efficiency, we restrict our scope to a more modest goal. In particular, we try to demonstrate that that State owned bank lending **is not** associated with a bad market or accounting performance for borrowing firms.

In Panel A of Table 6, we investigate the accounting performance of state owned bank supported firms. The results show that state owned bank supports are not associated with lower ROE. The coefficient of state owned bank are insignificant all specifications. The results can reject the hypothesis that state owned bank supported firm perform worse than their peers. We further compare the abnormal stock return of state owned bank supported firms and their peers. The buy and hold abnormal stock return is calculated by deducting buy and hold market return from buy and hold stock return. Panel B reports the mean and median for the difference between state owned bank supported

firms and their peers. The results shows that state owned bank supported firms generate high abnormal return for investor in crisis periods. These results suggest that at least in the case of Japan, lending during the crisis does not appear to be a subsidy from tax payers to companies. The above suggest the following:

Result 4 – State owned bank lending during the crisis is not associated with poorer performing borrowing firms.

5.5 Are private banks capable of replicating state bank effects

However, some of this effect may be driven by the monitoring role of banks (Diamond, 1984; Boot and Thakor, 1991), rather than a government guarantee effect. To test if private banks are capable of producing similar effects on employment and investment, we run a regression specification similar to equations (1) and (2), with an additional dummy variable (private banks) that takes a value of 1 if private bank loans increase to the borrower between year t and year t-1, and 0 otherwise. Further, we add interactions between private bank and state owned banks during the crisis, to see if there are any cross effects between state owned and private bank lending. Panel A, Table 7 shows the result for employment. All control variables from Table 4 are used, but not displayed to conserve space. The results show that private banks do not have the same effect as state owned banks on employment – in fact, increases in private lending have no effect on employment, neither during normal times, nor during the crisis. However, the triple interaction term of state owned bank, private bank and crisis has a positive impact on employment. This suggests that there are some synergy effects when private banks increase their lending in conjunction with state owned banks during the crisis.

Panel B examines the impact of increases in private bank lending on investment. In contrast to employment, private bank lending increases investment, although the magnitudes of the effect are

lower. While there is a cross effect of state owned and private lending, this only exists in normal times; during the crisis, there is no positive spillover effect from government to private lending.

To further examine if private banks can replicate state owned banks, we further examine investment. In particular, we examine the impact interactions of state owned bank and Q, and Private bank and Q. If we interpret Q as the available growth opportunities, then a positive interaction term would imply an increases sensitivity to Q with increases in state owned or private bank lending. In normal non-crisis times, state owned banks have an incremental positive effect on the impact of Q on investment, suggesting that such lending is beneficial to borrowers. On the other hand, interaction of private bank lending with Q is insignificant.

We also examine the impact of cash flow on investment, again, focusing on the incremental impact of cash flow in conjunction with increases in state owned or private bank lending. During non-crisis periods, private bank lending reduces the sensitivity of investment to cash flow, implying lowering of financial constraints. The cross term of cash flow with state owned bank lending is insignificant.

When looking at crisis effects, we find much stronger results. In particular, state owned bank effects are stronger both in terms of interactions with Q and interactions with cash flow. Thus, these suggest that State owned bank lending can effectively release firm's financial constraint and enable firms to make optimal business decisions and consequently increase employment and investment. These also provide evidences to support the *Hypothesis 2A (high effect during a crisis)*. The above suggest the following:

Result 5 –private banks cannot fully replicate state owned bank effects and the state owned bank effects can be scaled up by private bank lending.

5.6 Endogeneity of State Owned Bank Lending

One concern we might have is that the state owned bank lending is endogenously determined as, for example, state owned banks may support a firm which potentially has higher employment growth. If the effect of state owned bank lending is driven by sample selection, the results will be biased and our interpretation will not be accurate. Two approaches are popular in the literature to account for such endogeneity – namely instrumental variables and propensity score matching. Following prior work, we use both approaches to account for potential selection biases.

We employ propensity score matching methodology proposed by Heckman (1990) and Heckman, Ichimura and Todd (1997) to test the effect of state owned bank dummy on employment. In this approach, we need specify the actual relation between employment and the characteristics that might affect employment. In the first stage regression, each firm year where there is increase in the state owned government bank support is matched to another firm year where the firm was equally likely to have obtained state owned bank lending, but in fact did not. The difference in the employment of these two matched samples should reflect the incremental effect of government support if the assumptions of the underlying propensity score methodology are met.

In our model, for the first stage regression, we use firm size, leverage, sales, ROA, keiretsu dummy, the size of state owned bank loans in the previous year, industry of a firm as predictors of the firm's likelihood of obtaining an increase in the government support and year dummy variables. Using propensity scores and econometric matching estimators, we calculate average differences between government supported and non-supported firms for employment growth and investment to capital ratio. The employment growth is defined as the number of increased employees divided by the total number of employee in previous year. The results are report in Table 8. Panel A in Table 8 shows that during crisis and non-crisis periods, firms with increases in state owned bank lending increase their employment and investment compared to other firms, suggesting that state owned bank lending induces firm to hire or retain more employees.

In order to further rule out the possibility that the results might be attributable to sample selection problem, we apply instrumental variables approach and use the keiretsu dummy as the instrument for state owned bank lending. A keiretsu is a grouping of large Japanese financial and industrial corporations and cross-shareholdings. In a keiretsu each firm maintains its operational independence while retaining very close commercial relationships with other firms in the group. During the sample period of our data set, until the mid-1990s, there were six bank-centered major keiretsu groups.¹⁰ The Japanese recession in the 1990s had profound effects on keiretsu group firms. Many of the banks in keiretsu were plagued by bad loan portfolios and forced to merge or go out of business. Gibson (1995) showed that poor credit ratings of Japanese banks during the crisis period negatively affected corporate investments of firms that borrowed from these banks. This evidence implies that keiretsu member firms became more financially constrained during the period and needed to find alternative sources of financing. According to the aims indicated on their websites, the state owned banks lend money for firms whose business is affected due to change in economic condition or when private banks freeze the lending. Also, as major keiretsu groups have close connections with government bureaucrats and politicians, state owned banks might more likely support keiretsu members firms.

In the regression, we define keiretsu dummy equals to 1 if the firm belongs to any of these six major groups. Panel B in Table 8 report the results of 2SLS. The first stage regression shows that the coefficient on keiretsu dummy is positive and significant at the 1% level. It is consistent with our hypothesis that keiretsu members are more likely to be supported by state owned banks. In the second stage regression, the coefficient of the ‘state owned bank’ dummy is positive and significant at the 1% level. If we focus on crisis period, we still find a similar result, except that the magnitude of effect of state owned bank lending decrease marginally. In unreported regressions, we use the first-differenced GMM approach (Arellano and Bond, 1991) by incorporating additional instrumental

¹⁰Mitsui, Mitsubishi, Sumitomo, Fuyo, Sanwa, and Dai-ichi Kangyo.

variables such as the ownership ratio of the government and that of public corporations. This methodology, which takes into account the endogeneity bias and the unobserved firm specific heterogeneity, produces similar results as those reported in Table 8.

5.7 Are the Findings Period-Specific?

Our analysis yields evidence supporting the hypothesis that state owned bank lending helps relationship firms to release financial constraints and consequently increase employment and investment. We also show that part of the state owned bank lending effect can be explained by the fact that private banks interpret such lending as a credit guarantee and therefore generate some synergy effects as they increase lending in conjunction with state owned banks during the crisis. In this section, we explore the possibility that positive impacts of state owned bank lending result from a period-specific factor that happens to be correlated with the state owned bank privatization process. This explanation is speculative. We explore whether our result is potentially time-period-specific by looking at the employment and investment including the years after the original sample period (1997 to 2006). During 1997 to 2006, numbers of banks have been restructured and some of the state owned banks have been privatized. The results are displayed in Table 9. We include a dummy for the Asian financial crisis. Most of our results continue to hold with this extended sample.

6 Conclusion

In this paper, we provide empirical evidence for the positive effect of state owned bank lending. State owned bank lending has a positive and significant effect on borrower's employment in both non-crisis and crisis periods. We also find that state owned bank support is more meaningful for risky borrowers, which might partly explain the puzzle as to why otherwise insolvent borrowers survived during the crisis. With respect to corporate investment, we find that state owned bank support has positive and significant effects on borrowers' capital investment and enables the firms to

capture growth opportunities in crisis period with the help of state credit. We document that the part of positive effect of state owned bank lending may also be explained by credit guarantee, given a low market share of state owned bank lending. We find that state owned bank's effect can be scaled up by private bank lending. Moreover, we find that state owned bank supported firms have better market performance and generate higher return for investor during crisis periods, suggesting that the positive effects actually reflect operating efficiency improvement. Finally, we find that the state owned bank effects are not periods specific. Our results remain even if we include the later periods and defined new crisis periods.

Future research would focus on specific reasons for the beneficial effects we identify in this study. In particular, is the effect of state owned lending due to a guarantee effect on corporate borrowers? What is the best way to provide such lending – directly as government guarantees of debt or through loans? Further, with loan contract terms, it would be interesting to contrast the cost and benefit of such lending versus other types of transfer from the government to the corporate sector.

References

- Arellano, M. and Bond, S.R., 1991. Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *Review of Economic Studies*, 58, 277-297.
- Bagehot, Walter, 1873, *Lombard Street: A Description of the Money Market*, reprinted (1962), Homewood, IL: Richard D. Irwin.
- Barth, James R., Gerard Caprio Jr., and Ross Levine, 1999, *Financial regulation and performance*. Working Paper. Washington DC: World Bank.
- Boot, Arnoud W., and Anjan V. Thakor, 1991, Off-balance sheet liabilities, deposit insurance and capital regulation. *Journal of Banking and Finance* 15, 825-846.
- Caprio, G., Laeven, L., Levine, R., 2007. Government and bank valuation. *Journal of Financial Intermediation* 16, 584-617.
- Carvalho, D.R., 2010. The real effect of government owned banks: Evidence from an Emerging Market. Working Paper.
- Chung, K.H. and Pruitt, S.W., 1994. A simple approximation of Tobin's q. *Financial Management* 23, 70-74.
- Cull, R., Xu, L.C., 2000. Bureaucrats, state banks, and efficiency of credit allocation: the experience of Chinese state owned enterprise. *Journal of Comparative Economics* 28, 1-31.
- Diamond, D., W., 1984. "Financial Intermediation and Delegated Monitoring," *Review of Economic Studies* 51, 393-414.
- Dinc, S.I., 2005. Politicians and banks: political influence on government owned banks in emerging markets. *Journal of Financial Economics* 77, 453-479.
- Duygan-Bump, B., Levkov, A., Montoriol-Garriga, J., 2010. Financing constraints and unemployment: Evidence from Great Recession. Federal Reserve Bank of Boston Working Paper.
- Fazzari, S. M., R. G. Hubbard, and B. C. Petersen. 1988. Financing constraints and corporate investment. *Brookings Papers on Economic Activity* 1:141-95.
- . 2000. Investment-cash flow sensitivities are useful: A comment. *Quarterly Journal of Economics* 115 : 695-705.
- Gan, J., 2007. The real effect of asset market bubbles: loan and firm level evidence of a lending channel. *Review of Financial Studies* 20, 1941-1973.

- Gerschenkron,A.,1962. *Economic Backwardness in Historical Perspective. A book of Essays.* Cambridge: Harvard University Press.
- Giannetti ,M.,and Simonov,A.,2009. *On the Real Effects of Bank Bailouts: Micro-Evidence from Japan.* Working Paper.
- Gibson, M. S., 1995. *Can bank health affect investment? Evidence from Japan.* *Journal of Business* 68, 281-308.
- Gompers, P.A., Ishii, J.L., Metrick, A., 2003. *Corporate governance and equity prices.* *Quarterly Journal of Economics* 118, 107 - 155.
- Hayashi, F.,1982. *Tobin's marginal q and average q: A neoclassical interpretation.* *Econometrica* 50, 213–24.
- Heckman, J., 1990, *Varieties of Selection Bias,* *American Economic Review*, 80, 313-318.
- Heckman, J., Ichimura, H. and Todd, P., 1997, *Matching As An Econometric Evaluation Estimator: Evidence from Evaluating a Job Training Program,* *Review of Economic Studies*, 64, 605-654.
- Horiuchi,A., Sui,Q.Y.,1993. *Influence of the Japan development bank loans on corporate investment behavior.* Working Paper.
- Hoshi, T., and A. K. Kashyap., 1990. *Evidence of q and investment for Japanese firms.* *Journal of the Japanese and International Economies* 4, 371–400.
- . 1999. *The Japanese banking crisis: Where did it come from and how will it end?* In *NBER macroeconomics annual*, ed. Ben Bernanke and Julio Rotemberg. Cambridge, MA:MIT Press.
- . 2010. "Will the U.S. bank recapitalization succeed? Eight lessons from Japan," *Journal of Financial Economics* 97, 398-417
- Imai, M.,2009. *Political Determinants of Government Loans in Japan.* *Journal of Law and Economics* 52, 41-70.
- James, C., 1987. *Some evidence on the uniqueness of bank loans.* *Journal of Financial Economics* 19, 217-235.
- Kang, J.K.,Stulz,,R.M.,2000. *Do banking shocks affect borrowing firm performance? An analysis of the Japanese experience.* *Journal of Business* 73, 1-23.
- Khwaja,A.I., Mian,A.2008. *Tracing the impact of banking liquidity shock: evidence from an emerging market.* *American Economics Review* 98, 1413-1442.

- Kunt,A.D., Huizinga,H.,1999. Determinants of commercial bank interest margins and profitability: some international evidence. *The World Bank Economic Review* 13, 379-408.
- La Porta ,R.,Lopez-de-Slianes, F., Shleifer,A.,2002. Government ownership of banks. *Journal of Finance* 57, 256-301.
- Mankiw,N.G.,1986.The Allocation of Credit and Financial Collapse, *Quarterly Journal of Economics* 101, 455-470.
- Micco, A., Panizza,U.,Yanez,.M.,2007. Bank ownership and performance. Does politics matter? *Journal of Banking and Finance* 31, 219-241.
- Nickell, S. and Layard, R. (1999). 'Labor market institutions and economic performance', in Ashenfelter O. and Card D. (eds), *Handbook of Labor Economics*, Vol. 3C, Amsterdam, Elsevier.
- Nickell, S.,Nicolitsas, D.,1999. How does financial pressure affect firms? *European Economic Review* 43, 1435-1456.
- Sapienza,P.,2004.The effects of government ownership on bank lending. *Journal of Financial Economics* 72, 357-384.
- Sato,K.,1990.Indicative planning in Japan. *Journal of Comparative Economics* 14, 625-647.
- Sharpe,S.A.,1994.Financial market imperfections, firm leverage, and the cyclical of employment. *American Economics Review* 84, 1060-1074.
- Shleifer,A.,Vishny,R.W.,1994. Politicians and firms. *Quarterly Journal of Economics* 109, 995-1025.
- Spaloara,M.E.,2009. Do financial factors affect the capital-labor ratio? Evidence from UK firm-level data. *Journal of Banking and Finance* 33, 1932-1947.
- Tett, G.,2003. *Saving the Sun: A Wall Street Gamble to Rescue Japan from Its Trillion-Dollar Melt-down*. New York: Harper-Collins Business.

Appendix. Definitions of variables used in the study

Variables Based on Accounting Information

Book Leverage: Total Debt divided by Total Asset. Item name for Total Asset is FB067. Total Debt Equals to $FB074+FB075+FB076+FB077+FB0159 + FB098+FB101+FB102 + FB107$

Capital : Logarithm of Tangible Fixed Asset. Item name for Tangible Fixed Asset is FB032.

Cash Flow: Net Income before extraordinary items and depreciation, scaled by total capital in last year. Item name for Net Income before extraordinary items is FC029.

Cash Surplus: Amount of Cash available to finance new projects, scaled by Assets.

Employment: Logarithm of Number of Total Employees including part time employees. Item name for Number of Total Employees is FE056

Investment: Changes in Tangible Fixed asset plus depreciation, scaled by total capital in last year. Item name for Depreciation is FC046.

Market Share: Firm Sales over a measure of industry Total Sales. Item name for Total Sales is FC001.

ROA: Net Income divided by Total Asset. Item name for Net Income is FC051.

ROE: Net Income divided by Shareholder's Equity. Item name for Shareholder's Equity is FB125

Sale : Logarithm of Sales revenue adjusted by Industrial Producer Price Index.

Sales Growth : The growth in Sales over the previous years

Scale of State Owned Bank Loan: State Owned Bank Loan outstanding scaled by Total Asset

Wage: Average Labor Expenses for employees and adjusted by Industrial Producer Price Index. Item name for Labor Expenses for employees is FE087

Variables Based on Accounting Information and Stock Price Information

3 -Year Buy and Hold Abnormal Return: 3 year Buy and Hold Stock Return minus 3 year Buy and Hold Market Return.

Book to Market: The ratio of Book Value of Common Equity (previous fiscal year) to Market Value of Common Equity (6 Month After filing data). Book Value of Common Equity is the sum of Book Common Equity and Deferred Taxes. Item name for Deferred Taxes is FE019.

Stock Return: Annual return over the fiscal year

Tobin's q: the Market Value of Assets scaled by their replacement values. It can be proxy by the sum of Market Value of Common Equity, Value of preferred Stock, Book Value of Long and Short Term Liability net of Short Term Assets, divided by Total Asset. Item names for preferred Stock, Current Asset, Current Liability, Total Liability, Retain Earning and Interest expense are FB123, FB001, FB068, FB121, FC059 and FC016 respectively.

Z-Score: $3.3 * \text{Earnings Before Interest and Taxes} + 1.2 * (\text{Current Asset} - \text{Current Liability}) / \text{Total Assets} + 0.6 * \text{Market Value of Equity} / \text{Book Value of Total Liabilities} + 1.4 * \text{Retain Earnings} / \text{Total Asset} + 0.999 * \text{Sales} / \text{Total Assets}$.

Figure 1

Capital investment and employment.

Capital investment is defined as the change in capital plus depreciation. It is scaled by total capital in previous year. Employment is defined as total number of total employees. It is scaled by total sales.

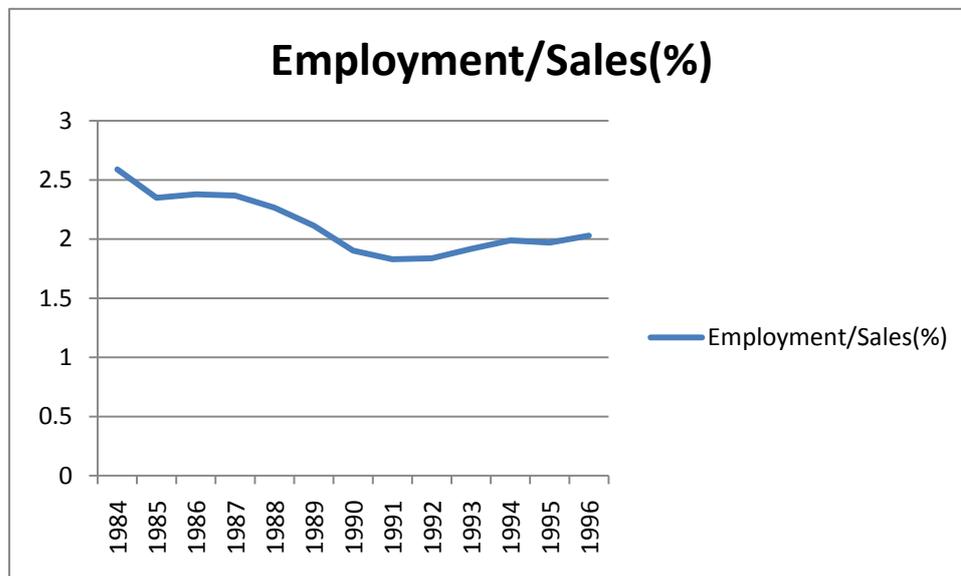
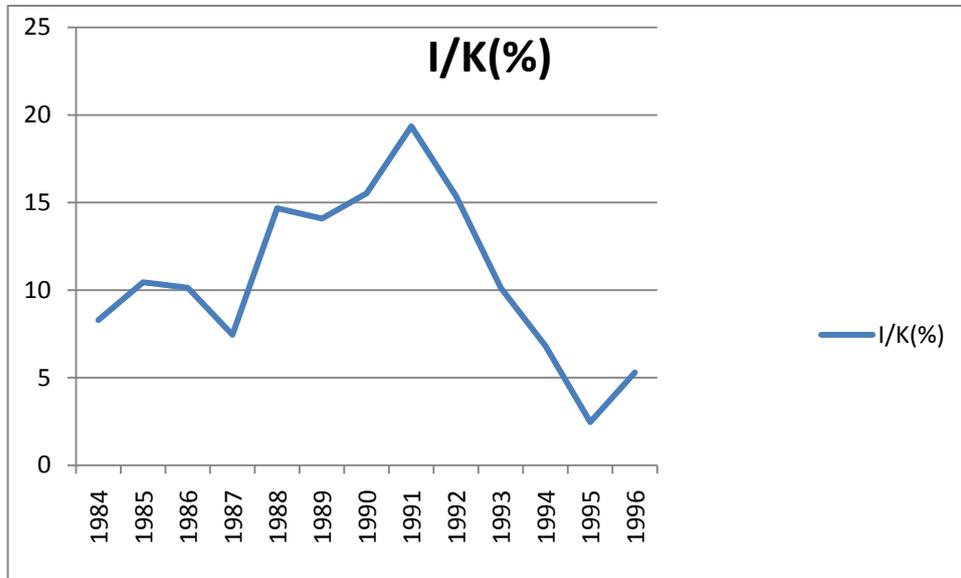
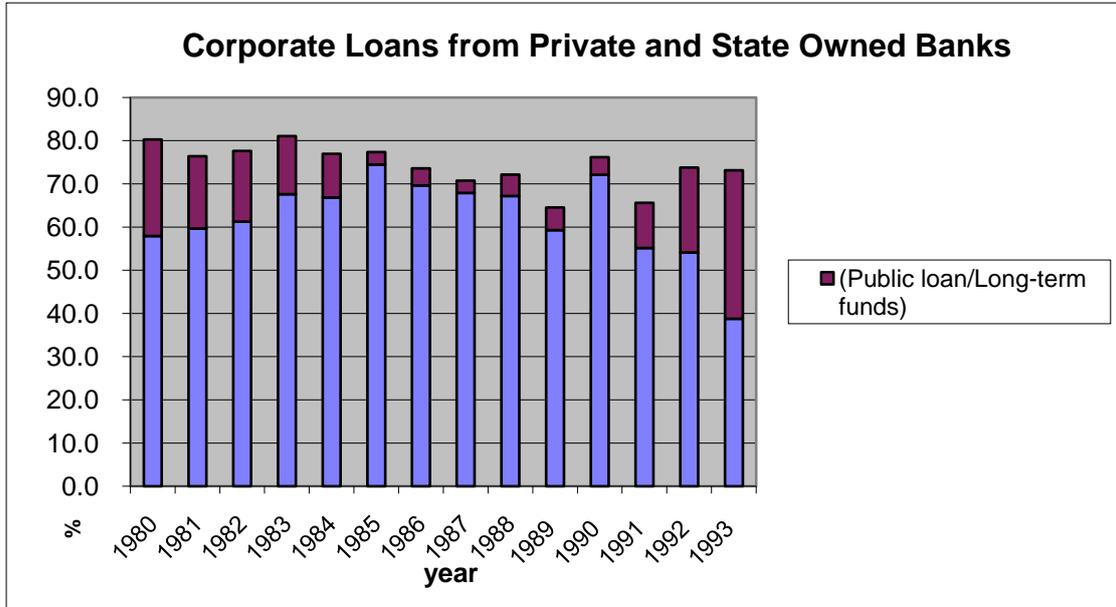


Figure 2

State Owned Bank loan and Private Bank loan

Corporate loans from private banks and state owned banks during 1980 to 1993 in for the whole economic and for the listed firms.

Whole Economy (Source: The Bank of Japan)



Listed Firms in our sample

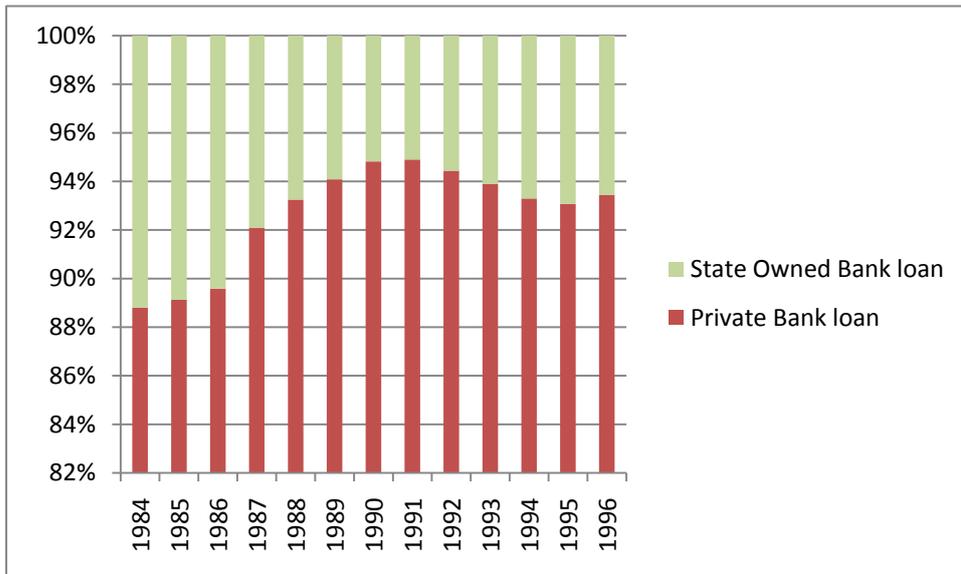


Table 1**Summary Statistics**

Panel A shows summary statistics for the sample of firms in different periods. Panel B shows the summary statistics for key variables in different period. Investment is defined as changes in tangible fixed asset plus depreciation, scaled by total capital in last year. Cash Flow is net income before extraordinary items and depreciation, scaled by total capital in last year. Employment is number of total employees including part time employees. Capital is defined tangible fixed asset (Billion Yen). Wage is defined as a ratio of labor expenses to number of employees and adjusted by industrial producer price index. Market Share is defined as the ratio of firm sales over a measure of industry total sales. Book Leverage is total debt divided by total asset. Sale is adjusted by industrial producer price index. Cash Surplus is defined as the amount of cash available to finance new projects, scaled by assets. Tobin's q, defined as the ratio of the market value of assets to their replacement values, as a proxy for investment opportunities. Panel C shows comparison between firms that borrow from state owned bank and firms do not. Panel C shows comparison between firms that state owned bank increase lending and firms do not, conditional on borrowing from state owned banks. ***, ** and * indicate statistically significant at 1% ,5% and 10% level respectively.

Panel A – Details on firm year sample

	1984-1996	1984-1989	1990-1994	1995-1996
Number of Firm Years	24429	9962	9501	4966
Number of Firm Years that Have Loans	21585	8939	8316	4330
Number of Firm Years with state owned bank loan	10669	5103	3873	1693
Number of Firm Years with increase in state owned bank loan	2365	865	1224	276

Panel B – Firm characteristics

	1989-1996			1990-1994			1984-1989&1995-1996		
	Obs	Mean	Std	Obs	Mean	Std	Obs	Mean	Std
Investment	21715	0.0592	0.1020	9395	0.0742	0.1052	12320	0.0478	0.0979
Cash flow	21715	0.2444	0.2442	9395	0.2446	0.2477	12320	0.2442	0.2415
Employment	24429	2042	3449	9501	2104	3490	15076	2002	3421
Capital (Billion Yen)	24429	40	218	9501	46	240	15076	35	204
Wage	20757	1.5705	0.5663	8006	1.6379	0.5666	12751	1.5282	0.5619
Book leverage	23425	0.2878	0.1593	9177	0.2838	0.1578	14248	0.2904	0.1603
Cash Surplus	24429	0.1351	0.0746	9501	0.1303	0.0773	14928	0.1382	0.0727
Sales (Billion Yen)	24429	186	926	9501	209	1045	14928	170	842
Tobin's Q	14112	1.2214	0.4197	5659	1.2329	0.4006	8453	1.2137	0.4318
State Owned Bank Loans /Total loan	21585	0.0564	0.1400	8316	0.0550	0.1393	13269	0.0573	0.1405

Table 1 (continued)

Panel C – Firm characteristics by firms that borrow stratified by state owned bank lending

	1984-1996					1990-1994				
	Obs	State owned bank loan	Obs	No state owned bank loan	Difference	Obs	State owned bank loan	Obs	No state owned bank loan	Difference
Investment	10669	0.0575	12065	0.0606	-0.0031**	3873	0.0744	5628	0.0741	0.0003
Cash flow	10669	0.1810	12065	0.2950	-0.1140***	3873	0.1778	5628	0.2922	-0.1145***
Employment	10669	2029	13760	2135	-106*	3873	2097	5628	2151	-54
Capital	10669	41	13760	30	9***	3873	48	5628	34	14***
Wage	9167	1.6753	11351	1.4836	0.1917***	3282	1.7643	4631	1.5457	0.2186***
Book leverage	10669	0.3385	12515	0.2436	0.0949***	3873	0.3392	5211	0.2416	0.0977***
Cash Surplus	10669	0.1193	13760	0.1477	-0.0284***	3873	0.1086	5628	0.1455	-0.0370***
Sales	10652	190	13708	149	51***	3864	216	5604	165	51***
Tobin's Q	7027	1.2020	6884	1.2414	-0.0390*	2562	1.2137	3019	1.2497	-0.0359*

Panel D – Firm characteristics by increase in state owned bank lending

	1984-1996					1990-1994				
	Obs	Increase in state owned bank lending	Obs	No increase in state owned bank lending	Difference	Obs	Increase in state owned bank lending	Obs	No increase in state owned bank lending	Difference
Investment	2365	0.0847	7127	0.0478	0.0369***	1224	0.0939	2649	0.0647	0.0292***
Cash flow	2365	0.1602	7127	0.1884	-0.0281***	1224	0.1497	2649	0.1918	-0.0421***
Employment	2365	3811	8304	1852	1959***	1224	4115	2649	1750	2365***
Capital	2365	130	8304	30	130***	1224	146	2649	31	115***
Wage	1892	1.7604	7275	1.6516	0.1088***	994	1.8243	2288	1.7364	0.0879***
Book leverage	2365	0.3788	8304	0.3264	0.0524***	1224	0.3725	2649	0.3229	0.0496***
Cash Surplus	2365	0.1037	8304	0.1240	-0.0203***	1224	0.0969	2649	0.1142	-0.0173***
Sales	2365	485	8297	154	331***	1218	573	2646	154	319***
Tobin's Q	1783	1.2038	5385	1.2019	-0.0018	873	1.2394	1689	1.1672	-0.0722***

Table 2**Summary Statistics on firms obtaining loans from state owned banks**

The table shows that number of firm years that obtained loans from state owned banks in 32 industries based on 2-digit industry code. Financials and Utility firms are excluded from the sample. The crisis period is defined as years 1990-1994 All other years in the sample (1984-1996) are defined as non-crisis periods. All observations are presented in terms of firm year panel data. The proportion of loans provided by state owned bank loan is the mean value of loans outstanding from state owned banks relative to the total loans outstanding loans in the given firm year, for firms that obtained a state owned bank loan in the given firm year. Thus, it is the means fraction of state owned bank funding, conditional on the firm obtained non-zero loans from state owned banks in the given year.

Industry	Non-crisis period			Crisis period		
	Total number of firm years	Number of Firm-years with state owned bank loan increase	Proportion of loans provided by state owned bank	Total number of firm years	Number of Firm-years with state owned bank loan increase	Proportion of loans provided by state owned bank
Foods	831	59	11.70%	531	65	11.50%
Textile Products	494	34	6.00%	305	40	8.60%
Pulp & Paper	219	31	10.40%	138	39	9.30%
Chemicals	1192	118	12.60%	749	150	13.70%
Drugs	299	20	27.20%	199	18	13.10%
Petroleum	94	20	21.90%	60	24	23.20%
Rubber Products	145	13	10.40%	88	20	18.10%
Stone, Clay & Glass Products	464	33	12.10%	294	35	15.80%
Iron & Steel	456	52	12.80%	280	40	9.50%
Non ferrous Metal & Metal Products	781	49	12.30%	486	74	13.00%
Machinery	1481	81	7.40%	931	86	12.30%
Electric & Electronic Equipment	1510	84	13.10%	988	89	9.60%
Shipbuilding & Repairing	49	2	7.20%	30	7	4.50%
Motor Vehicles & Auto Parts	509	24	6.90%	316	77	14.80%
Transportation Equipment	133	7	4.10%	85	8	39.80%
Precision Equipment	288	12	37.10%	175	9	9.30%
Other Manufacturing	455	16	19.40%	296	22	29.10%

Table 2 (continued)

Industry	Non-crisis period			Crisis period		
	Total number of firm years	Number of Firm-years with state owned bank loan increase	Proportion of loans provided by state owned bank	Total number of firm years	Number of Firm-years with state owned bank loan increase	Proportion of loans provided by state owned bank
Fish & Marine Products	49	9	3.30%	31	10	3.80%
Mining	72	14	28.90%	45	13	32.30%
Construction	1218	80	9.60%	734	65	4.40%
Wholesale Trade	1357	46	9.60%	863	51	7.20%
Retail Trade	671	44	7.00%	488	33	5.00%
Credit & Leasing	152	7	1.10%	114	20	0.70%
Real Estate	318	46	6.50%	233	38	12.30%
Railroad Transportation	242	137	26.20%	151	101	29.40%
Trucking	143	10	6.90%	89	5	10.40%
Sea Transportation	166	34	47.50%	100	20	52.40%
Air Transportation	41	10	38.20%	25	9	55.80%
Warehousing & Harbor Transportation	252	26	10.60%	151	27	20.40%
Communication Services	61	4	32.30%	36	8	28.80%
Services	786	19	15.40%	490	21	18.10%

Table 3
State owned bank effect on Employment

The control variables in the regressions follow Nickell and Nicolitsas, 1999. The dependent variable is the logarithm of the employment for firm i at time t . The definition of employment includes temporary employee and full time employee. All regressions include constant terms “state owned bank” takes a value of 1 if the borrowing from state owned bank increases in the given year and 0 otherwise. “state owned bank (a)” takes a value of 1 if the ratio of government loan to capital increases in the given year and 0 otherwise. “state owned bank (b)” takes a value of 1 if the ratio of government loan to total borrowing increases in the given year and 0 otherwise. The sample period in this table is from 1984 to 1996. The standard errors are corrected for within-firm clustering. ***, ** and * indicate statistically significant at 1%, 5% and 10% level respectively. The table also report t value in brackets.

	(1)	(2)	(3)	(4)
State owned bank	0.0668*** (4.45)	0.0774*** (5.33)	0.0483*** (3.45)	0.0297*** (2.75)
State owned bank ×Crisis dummy	0.000205 (0.01)	-0.00806 (-0.52)	0.000588 (0.04)	-0.00717 (-0.60)
Log(capital)	0.206*** (13.32)	0.207*** (12.03)	0.208*** (12.05)	0.208*** (12.05)
Wage	-0.0970*** (-4.42)	-0.0493** (-1.99)	-0.0493** (-1.98)	-0.0489** (-1.97)
Sales	0.514*** (33.61)	0.509*** (30.57)	0.509*** (30.57)	0.509*** (30.48)
Book leverage		-0.121** (-1.99)	-0.118* (-1.94)	-0.107* (-1.76)
Market share		16.71*** (7.32)	16.84*** (7.37)	16.82*** (7.35)
Cash Surplus		0.148 (1.64)	0.151 (1.67)	0.142 (1.56)
Scale of state owned bank loan		0.161 (0.53)	0.176 (0.58)	0.188 (0.62)
Crisis dummy	-0.0984*** (-18.23)	-0.0841*** (-16.59)	-0.0845*** (-16.64)	-0.0811*** (-15.31)
State owned bank (a)			0.0483*** (3.45)	
State owned bank (a) ×Crisis dummy			0.000588	
State owned bank (b)			(0.04)	
State owned bank (b) ×Crisis dummy				0.0297*** (2.75)
				-0.00717 (-0.60)
3-digit industry fixed effect	YES	YES	YES	YES
N	20538	17345	17345	17345
adj. R-sq	0.869	0.883	0.883	0.883

Table 4**Effect of distress on State owned bank effect**

The sample period in this table is from 1984 to 1996. Crisis dummy equals to 1 if the year is in the interval of 1990 to 1994 and 0 otherwise. The dependent variable is the logarithm of the employment for firm i at time t . The definition of employment includes temporary employee and full time employee. The sample period in this table is from 1984 to 1996. All regressions include industry dummies. The standard errors are corrected for within-firm clustering. ***, ** and * indicate statistically significant at 1%, 5% and 10% level respectively. The table also report t value in brackets.

	Sort by Leverage		Sort by Z-score	
	<=25%	=>75%	<=25%	=>75%
State owned bank	0.132*** (3.34)	0.0289 (1.11)	0.0487** (1.99)	0.137*** (3.11)
State owned bank ×Crisis dummy	-0.119** (-1.97)	0.0502* (1.8)	0.0755*** (3.02)	-0.0892 (-1.49)
Log(capital)	0.166*** (6.21)	0.278*** (7.58)	0.229*** (5.29)	0.249*** (7.79)
Wage	-0.0371*** (-4.77)	-0.0288*** (-3.12)	-0.0345*** (-3.95)	-0.0153 (-1.68)
sales	0.528*** (20.75)	0.453*** (12.54)	0.516*** (12.32)	0.443*** (13.43)
Book leverage	-0.163 (-1.37)	-0.496*** (-2.88)	-0.267* (-1.83)	-0.277* (-1.88)
Market share	0.501 (1.41)	0.171 (1.14)	1.236 (0.53)	-0.182 (-0.10)
Cash Surplus	0.231* (1.74)	0.796*** (3.44)	0.415** (1.97)	0.0452 (0.27)
Scale of state owned bank loan	0.642*** (3.72)	0.0109 (0.03)	-0.225 (-0.53)	-1.014 (-1.31)
Crisis dummy	-0.0902*** (-9.90)	-0.0874*** (-8.05)	-0.0767*** (-7.98)	-0.0798*** (-8.70)
3-digit industry fixed effect	YES	YES	YES	YES
N	3815	4311	2940	2515
adj. R-sq	0.884	0.871	0.898	0.896

Table 5**State owned bank effect on Investment**

The dependent variable is the investment for firm i at time t . The investment is defined as changes in tangible fixed asset plus depreciation. All regressions include industry dummies and constant term. In column (1) to (8), “state owned bank” is constructed which takes a value of 1 if the borrowing from state owned bank increases in the given year and 0 otherwise. The sample period in this table is from 1984 to 1996. The standard errors are corrected for within-firm clustering. ***, ** and * indicate statistically significant at 1%, 5% and 10% level respectively. The table also report t value in brackets.

	Sort by Leverage				Sort by Z-score	
	(1)	(2)	<=25%	=>75%	<=25%	=>75%
State owned bank	0.0475*** (10.04)	0.0469*** (9.94)	0.0123 (0.77)	0.0594*** (7.40)	0.0509*** (6.63)	0.0278** (2.00)
State owned bank × Crisis dummy	-0.00630 (-1.11)	-0.00682 (-1.20)	0.00970 (0.42)	-0.00732 (-0.78)	-0.0218** (-2.56)	0.0293 (1.50)
Tobin's q(t-1)	0.0179*** (6.59)	0.0177*** (6.53)	0.165*** (11.33)	0.163*** (8.98)	0.169*** (9.09)	0.181*** (14.08)
Cash flow	0.174*** (23.55)	0.182*** (22.17)	0.0245*** (5.51)	0.00839* (1.74)	0.0295*** (5.14)	0.0181*** (5.72)
Book leverage		0.0343*** (3.22)				
Cash surplus		-0.0102 (-0.54)				
Scale of state owned bank loan(t-1)		-0.0846 (-1.65)				
Crisis dummy	0.0292*** (12.87)	0.0293*** (12.81)	0.0308*** (6.59)	0.0293*** (5.86)	0.0373*** (7.76)	0.0245*** (5.33)
3-digit industry fixed effect	YES	YES	YES	YES	YES	YES
N	12913	12856	2953	2967	3336	2908
adj. R-sq	0.177	0.178	0.184	0.184	0.188	0.187

Table 6

Impact of state owned bank lending increase on firm performance

Panel A – Return on Equity (ROE)

The control variables in ROE regression follow Gompers, Ishii, and Metrick (GIM, 2003). Book to Market is defined as the book value of equity plus book value of deferred taxes divided by market value of equity; ROE, defined as net income divided by total equity; Sale growth, defined as the increase annually sales revenue scaled by the sales revenue in previous year; log(Asset), defined as logarithm of total asset. The sample period in this table is from 1984 to 1996. Industry mean ROE, defined as mean ROE of the corresponding 3-digi industry. The standard errors are corrected for within-firm clustering. ***, ** and * indicate statistically significant at 1%, 5% and 10% level respectively. The table also report t value in brackets.

	Non-crisis period	Non-crisis period	Crisis period	Crisis period
State owned bank	-0.00663 (-0.66)	-0.0103 (-0.98)	-0.00338 (-0.53)	-0.0115 (-1.40)
Book to Market	-0.498*** (-5.23)	-0.414*** (-3.29)	-0.662*** (-3.59)	-0.0522 (-0.15)
Log(asset)	0.00292 (0.62)	0.0360* (1.71)	0.00387 (0.75)	0.195** (2.28)
Industry mean ROE(t)	1.025*** (11.20)	1.027*** (10.53)	1.375** (2.47)	1.385** (2.44)
Year fixed effect	Yes	Yes	Yes	Yes
Firm fixed effect	NO	Yes	NO	Yes
3-digit industry fixed effect	Yes	NO	Yes	NO
N	14488	14488	5767	5767
adj. R-sq	0.080	0.171	0.059	0.133

Panel B- Buy and Hold returns

These tables provide estimates of the mean and median difference for the 3 year long run stock buy and hold abnormal return between state owned banks supported observations and non-support observations. The 3 year long run buy and hold abnormal return is defined as 3 year buy and hold stock return minus 3 year buy and hold market return. ***, ** and * indicate statistically significant at 1%, 5% and 10% level respectively. The table also report t value in brackets.

A:	Firms that government loan increase		
B:	other firms		
Estimator(A-B)	Whole period	Crisis period	Diff
Mean	-0.0156*** (3.37)	0.0182*** (3.09)	0.0338*** (4.51)
Median	-0.0058 (1.28)	0.0200*** (3.01)	0.0258*** (3.21)

Table 7

State Owned Bank effect versus Private Bank effect

The dependent variable for panel A is the logarithm of the employment for firm *i* at time *t*. The definition of employment includes temporary employee and full time employee. The dependent variable for panel B and panel C is the investment for firm *i* at time *t*. The investment is defined as changes in tangible fixed asset plus depreciation. All regressions include all control variables as indicated in previous tables and constant terms. “Stated Owned Bank Support” is constructed which takes a value of 1 if the borrowing from state owned bank increases in the given year and 0 otherwise. “Private Bank” takes a value of 1 if the borrowing from private bank increases in the given year and 0 otherwise. The sample period in this table is from 1984 to 1996. The standard errors are corrected for within-firm clustering. ***, ** and * indicate statistically significant at 1%, 5% and 10% level respectively. The table also report t statistics

<i>Panel A – Employment</i>				
	Coefficient	T- value	Coefficient	T- value
Stated Owned Bank	0.0715***	(4.41)	0.0771***	(4.21)
Private Bank	-0.00269	(-0.31)	0.000820	(0.10)
Crisis dummy × State Owned Bank	-0.00374	(-0.22)	-0.0257	(-1.17)
Crisis dummy × Private Bank	0.00366	(0.34)	0.00515	(0.44)
State Owned Bank × Private Bank			-0.0224	(-0.95)
Crisis dummy × State Owned Bank × Private Bank			0.0517*	(1.70)
F test for coefficient: State owned bank-Private bank	Prob > F = 0.0001		Prob > F = 0.0000	
<i>Panel B - Investment</i>				
	Coefficient	T- value	Coefficient	T- value
Stated Owned Bank	0.0413***	(8.04)	0.0331***	(5.67)
Private Bank	0.0267***	(9.04)	0.0247***	(7.95)
Crisis dummy × State Owned Bank	-0.00530	(-0.86)	0.000828	(0.10)
Crisis dummy × Private Bank	0.000982	(0.23)	0.00236	(0.51)
State Owned Bank × Private Bank			0.0177*	(1.84)
Crisis dummy × State Owned Bank × Private Bank			-0.0144	(-1.19)
F test for coefficient: State owned bank-Private bank	Prob > F = 0.06		Prob > F = 0.20	

Table 7 (continued)
Panel C – Impact of *Q* and Cash flow

Investment	Non-Crisis		Crisis	
	Coefficient	T- value	Coefficient	T- value
Stated Owned Bank	-0.00108	(-0.06)	0.0176	(1.17)
Private Bank	0.0261**	(2.31)	0.0229***	(2.66)
State Owned Bank ×Q	0.0299**	(2.18)	0.0345***	(2.83)
State Owned Bank ×Cash flow	-0.00864	(-0.21)	-0.0771**	(-2.53)
Private Bank ×Q	0.00676	(0.80)	0.00815	(1.06)
Private Bank ×Cash flow	-0.0362*	(-1.75)	-0.0285*	(-1.70)

Table 8**Endogeneity corrections*****Panel A – Propensity score matching***

These tables provide estimates of the mean difference for the employment growth, investment to capital ratio and Tobin's Q between government support firms and other firms, using various estimators. We compute propensity scores, match government support firms with non-support firms. We use a probit model to calculate these scores. The dependent variable is "state owned bank". The independent variables are as follows: Capital, defined as logarithm of tangible fixed asset; Book Leverage, defined as total debt divided by total asset, ROA, defined as net income divided by total asset; Sale, defined as annually sales revenue adjusted by industrial producer price index, Industry, defined as a set of industry dummy variables based on 2-digit primary TSE code and Year dummy. Estimators are nearest neighbor matching using n non-support firms (NEAR NEIGHBOR) for all estimations; we present the sample averages of yield spread differences. We report t-ratios in parentheses, which are calculated using standard errors that are computed by bootstrapping with 50 replications. ***, ** and * indicates significantly different than zero at 1%, 5% and 10% level, respectively.

Employment growth

A:	Firms that government loan increase		
B:	other firms		
Estimator(A-B)	Whole period	Crisis period	Diff
NEAR NEIGHBOR(n =10)	0.0147*** (5.30)	0.0090 ** (2.31)	-0.0057 (-1.19)
NEAR NEIGHBOR(n = 50)	0.015 *** (4.39)	0.0090 ** (2.54)	-0.0060 (-1.22)

Investment to Capital ratio

Estimator(A-B)	Whole period	Crisis period	Diff
NEAR NEIGHBOR(n =10)	0.0297*** (9.47)	0.0311 *** (7.57)	0.0014 (0.27)
NEAR NEIGHBOR(n = 50)	0.0307 *** (10.29)	0.0317 *** (7.57)	0.0010 (0.19)

Tobin's Q

Estimator(A-B)	Whole period	Crisis period	Diff
NEAR NEIGHBOR(n =10)	0.0184* (1.66)	0.0193 (1.60)	0.0009 (0.05)
NEAR NEIGHBOR(n = 50)	0.0297*** (3.00)	0.0219 * (1.65)	-0.0078 (-0.47)

Table 8 (continued)***Panel B – Instrumental variable estimation***

Panel B reports the results of 2SLS for employment, investment and Tobin's respectively. All regressions include the all controls variables in previous tables, industry dummies and constant term. ***, ** and * indicate statistically significant at 1%, 5% and 10% level respectively. The table also report t value in brackets.

	Whole sample period		Crisis period	
	First step	Second step	First step	Second step
	Government support	Employment	Government support	Employment
Employment				
State owned bank (t)		1.341*** (2.72)		0.936*** (2.93)
Keiretsu dummy	0.113*** (7.30)		0.0474*** (3.52)	
adj. R-sq	0.179	0.731	0.117	0.812
Investment				
State owned bank (t)		0.0928*** (3.39)		0.0597*** (3.39)
Keiretsu dummy	0.119*** (9.84)		0.185*** (9.32)	
adj. R-sq	0.169	0.141	0.203	0.141
Tobin's- Q				
State owned bank (t)		-0.0446 (-0.59)		-0.100 (-1.37)
Keiretsu dummy	0.134*** (14.04)		0.207*** (13.25)	
adj. R-sq	0.184	0.484	0.214	0.510

Table 9**Robustness to alternative time periods**

The dependent variables are the employment capital investment and security investment respectively, for firm i at time t . “state owned bank” is constructed which takes a value of 1 if the borrowing from state owned bank increases in the given year and 0 otherwise. All regressions include all control variables as indicated in previous tables and constant terms. The sample period is from 1984-2006 and the crisis dummy is defined as from 1990 to 1994 and from 1997 to 2000. The standard errors are corrected for within-firm clustering. ***, ** and * indicate statistically significant at 1%, 5% and 10% level respectively. The table also report t value.

	Coefficient	Sort by Leverage		Sort by Z-score	
		<=25%	=>75%	<=25%	=>75%
Employment					
State owned bank (t)	0.0569*** (4.20)	0.0305 (0.84)	0.0265 (1.23)	0.0710** (2.50)	0.0260 (0.80)
State owned bank (t) ×Crisis dummy(1990-1994&1997-2000)	-0.0275* (-1.83)	-0.0308 (-0.62)	-0.0305 (-1.16)	-0.0292 (-0.88)	-0.0373 (-0.97)
Capital Investment					
State owned bank (t)	0.0983*** (6.70)	0.0533** (2.33)	0.110*** (4.31)	0.0663*** (4.15)	0.109*** (3.52)
State owned bank (t) ×Crisis dummy(1990-1994&1997-2000)	-0.0561*** (-3.53)	0.00245 (0.07)	-0.0612** (-2.13)	-0.0282 (-1.35)	-0.0440 (-1.34)