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Does the Policy Lending of the Government Financial Institution Mitigate the Credit Crunch? Evidence from the Loan Level Data in Japan

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Abstract

Using the contract level data, we find that the lending by a Japanese state owned lending institution during the period of the credit crunch mitigated a firm's loss of borrowing from its main bank. We further find that the state owned institution's lending instrumented by the main bank's lending supply growth as explained by the bank's capital adequacy, which captures the lending to mitigate the loss of borrowing, had negative effects on the investment rate and that the JASME's lending had an weak effect to mitigate the cash sensitivity of cash that captures the firm's financial constraint.

Keywords: government financial institution, credit crunch, loan contracts
JEL classification: G01, G21, G28

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1. Introduction

In the 1980's, Japanese banks that had lost loans to large *keiretsu* firms reoriented their lending portfolios toward lending to the real estate sector since real estate lending was largely secured by real estates whose collateral values kept rising and banks had expected somewhat ex-post wrongly that they would never fall. Real estate prices finally began to fall in 1991 and soon saw rollercoaster slide in 1991. As a result, many of loans that had been made during the real estate price bubble period became non-performing as borrowers became underwater. Banks, however, decided to leave these problem loans unrecognized for the time being, partly expecting that real estate prices would bounce back shortly and partly being reluctant to see their capital severely eroded by disposing these non-performing assets.

It is in March 1998, or at the end of FY 1997, that the Ministry of Finance, then a banking regulator requested banks to rigorously self assess their assets as the Prompt Corrective Action (PCA) framework based on the capital adequacy was about to begin in April 1998, the beginning of the following FY 1998, so that an individual bank's capital adequacy needed to be more accurately measured. This resulted in large losses of banks' capital, triggering the credit crunch, as capital depleted banks attempted to drum up their capital adequacy ratios by reducing their risk assets, which are the weighted sum of classes of assets with a weight assigned to each asset class being positively associated with its perceived risk. Since under the Basel I that was in effect at that time all corporate loans were assigned the highest risk weight of 1 regardless of how risky a loan was, banks cut back on lending to firms across the board, or worse reduced lending more modestly to unhealthy or unproductive firms at the cost of aggressive reduction in lending to relatively healthy and potentially productive firms because banks attempted to avoid further recognitions of non-performing loans by defaulting unhealthy firms through treating them more generously using rescue lending. The banks' cutting back on lending

even to healthy firms became known as a credit crunch and well documented in the literature (Bernanke and Lown, 1991, Woo, 2003, Watanabe, 2007a).

The credit crunch is detrimental to the real economic activities because the reduced credit supply constrains firms' investments. Small and medium enterprises (SMEs) that constitute the lion's share of firms operating in Japan are generally less transparent than larger firms because very few SMEs are publicly listed so that they are not required to make their financial statements publicly available. Therefore, SMEs are mostly financially dependent on banks. As it is hard for these SMEs to raise capital externally, they cannot help but hold off investment when banks are reluctant to lend to them.

As such, the governments are entitled to conduct policies aiming at offsetting such adverse effects of the credit crunch inflicted on the real economic activities. The policy measures deployed by the Government of Japan can be divided into four types.

First, large amounts of public capital were infused into banks. This was aimed at strengthening banks' capital by raising the numerator of the capital adequacy ratio so that banks could resume lending. Two major public recapitalization programs targeting mostly systematically important banks, the first in March 1998 and the second in March 1999, were implemented in response to the capital crunch of FY 1997. The effects of these public recapitalization programs are well researched in the literature (Montgomery and Shimizutani, 2000; Allen et al., 2011; Giannetti and Simonov, 2013).[1]

Second, the protection of depositors by the deposit insurance system was greatly expanded. The insurance cap at 10 million yen for principals was abandoned in June 1996, making the system the unlimited (blanket) insurance until April 2002. The expansion of the deposit insurance protection was intended to relax banks' ability to lend by lowering their costs of funding through taking deposits, when their costs to raise funds from the markets had sharply increased due to wholesale lenders' concerns about their

[1] Duchin and Sosyura (2000), Bayazitova and Shivdasani (2012) and Li (2013) investigate the effects of TARP public capital infusions into US banks during the global financial crisis.

financial health.[2] [3]

Third, the public credit guarantees of loans originated by private financial institutions were greatly expanded. The Government launched the Special Guarantee Program, under which SMEs were fully guaranteed their repayments of loans, publicly complementing declining risk taking capabilities of private banks by guaranteeing their loans made to SMEs.[4]

Fourth, but not the least important, the Government expanded policy lending by government financial institutions (GFIs), particularly lending to SMEs. In December 1997, the Japan Finance Corporation for Small and Medium Enterprise (JASME) established the "Fund to Respond to Changes in Financial Environments" and began to help smooth SMEs raising working capital. It is the efficacy of the lending by this government lender who targets SMEs that we explore in this study. The roles played by state owned banks (SOBs) during economic downturns and financial crises have become the focus of the recently evolving literature particularly in light of the global financial crisis of 2008 and 2009 but the empirical results are mixed.[5]

To the best of our knowledge, we are the first to identify an SOB (SOBs)' lending in response to private lenders' reduction in credit supply during the financial crisis period and its effects on borrower firms' real and financial behavior as well as their ex-post performance. We examine whether the JASME was more aggressive in lending to SMEs that were more greatly affected by the credit crunch. More precisely, we examine

[2] The widening premiums Japanese banks had to pay above the rates charged to American and European counterparts in international interbank markets became known as the Japan premium.
[3] For details about the expansion of the deposit insurance coverage in response to the banking crisis in Japan, see Guizani and Watanabe (2016).
[4] Hancock and Wilcox (1998) and Uesugi et al. (2010) report that loans guaranteed by public credit guarantees made up for reduced lending caused by losses on bank capital in the United States in the early 1990s and in Japan in the late 1990s to early 2000s, respectively.
[5] Chapter 4, " Direct State Interventions", of the World Bank (2013) is a good survey of the relevant empirical studies.

whether the JASME extended larger amounts of loans to the firms whose main banks reduced lending more greatly. The extent of an individual bank's reduction in lending supply is computed based on Watanabe (2007a) who estimates the effect of the shortage of the capital adequacy relative to its target on the lending growth for the sample of domestically licensed banks during the period of the credit crunch.

We are interested not only in the JASME's response to the credit crunch but also how loans aimed at mitigating the effects of credit crunch affected the firm's real and financial behavior as well as its ex-post performance. To this end, we examine how the JASME's lending as explained by the extent of reduced lending supply of a firm's main bank affected its concurrent overall borrowing, concurrent and ex-post cash holdings, ex-post investment and employment as well as its ex post profitability. A caveat when interpreting such effects is that the JASME as a policy institution is a non-profit organization that can afford to provide loans at subsidized lending rates but it is also required to complement private lenders rather than competing with them, which may force it to lend to inherently risky or underperforming borrowers at lower rates than those private lenders would lend at.

The primary sources of the data we use in this study are the data provided by the Japan Finance Corporation (JFC) that include the data of loan contracts extended by the JASME, a predecessor to the JFC's Small and Medium Enterprise Unit, the data about the firms that borrowed from the JASME, and the data about these firms' lenders.

Using the sample of loan contracts extended by the JASME during the period from December 1997 through March 1999, we find that the JASME extended the larger total amount of loans, particularly of working capital loans to the firms whose main banks reduced lending more greatly due to the poorer capital adequacy. Our findings are economically significant. On average, the JASME offset about a quarter of reduction in

lending by a firm's main bank due to poor capital adequacy.

As for the effect of JASME's real and financial behavior, our findings are a) the JASME's lending aimed at mitigating the adverse effects of the credit crunch was negatively associated with the concurrent overall borrowing, b) it is negatively associated with investment ratio for three years post borrowing (of JASME loans) c) it is positively associated with the two-year post borrowing employment growth, d) it likely mitigates a firm's financial constraint when making investment as indicated by its weak negative effect on the cash flow sensitivity of cash as measured by a negative coefficient of the cash flow to capital stock ratio in the regression for a change in the cash holdings to capital stock ratio.

The paper is arranged as follows. The next section discusses the credit crunch and policy measures including a state-owned bank's lending to deal with it and introduce the literature about state-owned banks. Section 3 explains the data and the empirical methodology. Section 4 presents the empirical results. Section 5 concludes.

2. The Credit Crunch, Policy Measures and the Literature About State-Owned Banks

2.1. The Credit Crunch

According to Bernanke and Lown (1991), a credit crunch is defined as a "a significant leftward shift in the supply curve of bank loans, holding constant both the safe real interest rate and the quality of potential borrowers." Finding that the loans outstanding of depository institutions decreased by 3.6% in 1991, while they had increased in previous recessions, Bernanke and Lown argue that declining bank lending caused firms to perform poorly. They also find that in New Jersey, a fall in the ratio of capital to total assets at the end of 1989 by 1 percent point is associated with a fall in the

annualized loan growth measured over the period from the third quarter of 1990 through the first quarter of 1991 by 2.7%.

A credit crunch is likely caused as a side effect of the capital adequacy requirements, which are primary regulations meant to ensure banks' financial health under the modern regulatory framework. The requirements request a bank to hold capital no less than the minimum amount of capital proportional to the bank's risk assets that increase in risks of its assets. The basic premise behind the requirements is that a better capitalized bank is resilient to negative shocks to its assets such as asset devaluations caused by writing off non-performing loans, thus less susceptible to insolvency.[6]

The capital adequacy requirements, however, likely exacerbate a bank's unwillingness to lend. This is a well-known problem of procyclicality. Because the capital adequacy ratio is defined as the ratio of capital to risk assets, in response to losses on capital, a bank compresses its risk assets by reducing assets designated as high risk assets under the regulatory framework such as corporate loans. This reduction in lending is detrimental to investment of firms that are liquidity constrained and seek external credits to finance their investment. Theoretically speaking, poorly capitalized banks can issue equity to prop up their capital adequacy ratios, but as Stein (1998) discusses, it is impractical for capital depleted banks to raise equity in the presence of asymmetric information between banks and their potential shareholders. [7] [8]

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[6] Holmstrom and Tirole (1997) develop a model to show the mechanism through which a credit crunch occurs even in the absence of capital adequacy requirements. They discuss that, in the presence of informational asymmetry about a firm's use of a loan that allows a firm to engage in moral hazard of diverting the borrowed fund to less productive use, a poorly capitalized bank resorts to reducing lending to firms.

[7] For the theoretical explanations of the difficulty to raise equity externally faced by a bank when its capital is depleted, see Stein (1998).

[8] As another mean to prop up capital adequacy, the practice known as forbearance lending or evergreening to prevent loans from being classified as non performing by conducting rescue lending to borrowers to whom existing loans outstanding are de fact non-performing became widespread among Japanese banks. For details about this practice, see Sekine et al. (2003) and Peek and Rosengren (2005).

2.2. The Japanese Credit Crunch of 1997-1998 and JASME's Policy Responses

Watanabe (2007a) disentangles the effect of bank capital on bank lending supply with the positive association between the slower (greater) demand for loans and capital losses (retained earnings) due to the contemporaneous economic downturn (economic upturn) by employing an instrumental variable for bank capital, the share of loans to the real estate industry among total loans at the end of the bubble period, which captures a structural cause of capital losses after the bust of the bubble in the late 1990s that is independent of a contemporaneous business cycle fluctuation. By doing so, one is able to measure the causal effect of bank capital on bank lending supply. Measuring a bank's capital adequacy by the differential between the bank's actual capital adequacy and its target, Watanabe (2007a) finds that in FY 1997, in aggregate, the bank's insufficient capital adequacy reduced lending to the manufacturing industry and the lending to "healthy" non-manufacturing industries, which exclude the industries to which the share of loans that became non-performing was higher than the industry wide average, by 5.7% and 8.5%, respectively, confirming that the credit crunch made the access to bank credit by relatively healthy firms challenging.

The primary objective of the JASME, which was established in August 1953, was to make loans to SMEs whose access to private credit is relatively limited. By laws, the JASME was stipulated to lend long-term loans with maturity no less than one year. The loans outstanding of the JASME stood at 1,820 billion yen as of the end of FY 1997. The JASME was disestablished in October 2008 and was consolidated into a newly established GFI, the Japan Finance Corporation (JFC) as the JFC's Small and Medium Enterprise Unit.

As a credit crunch became increasingly evident, the Government of Japan took a

wide range of actions to ease the stress felt by the firms, particularly bank dependent SMEs that were having increasing difficulty in meeting their financing needs. The Government announced three comprehensive policy packages in which the adverse effects of the credit crunch from late 1997 through 1998 were explicitly addressed. The three are the "Emergency Economic Measures to Clear a Path for the 21st Century" (hereafter referred to as the "Emergency Economic Measures") released at the Meetings of Ministers for Economic Measures in November 1997, the "Comprehensive Economic Measures" released in April 1998 and the "Outline of the Measures for SMEs Affected by the Banks' Less Willingness to Lend", which the Cabinet approved in August 1998.

Among these three, it is the first package, the "Emergency Economic Measures", that lead to the creation of the largest counter credit crunch program of the JASME. This package specifically requested government financial institutions to launch the lending programs targeting SMEs potentially having a hard time financing because of, for instance, having difficulty securing working capital after undergoing substantial changes in transactions with (private) financial institutions. In response to the request in this package, by inaugurating the working capital targeting "Fund to Respond to Changes in Financial Environments" (hereafter referred to as the "Fund"), the JASME became more committed to greatly expanding its policy lending to SMEs likely adversely affected by the credit crunch.

The amount of JASME's loans outstanding under the "Fund" at 336 billion yen as of FY 1998 is far greater than the total amount of its loans outstanding under various measures the JASME employed under two later packages. Thus, our primary interests lie in the JASME's lending behavior after its establishment of the "Fund" in December 1997. As Figure 1 shows, the JASME's working capital loans the "Fund" targeted grew more rapidly during the period from FY 1997 through FY 1999 than before, while its

equipment loans did not.[9]

2.4. The Relevant Literature about State Owned Banks

The World Bank (2013) reports that, in developed economies, the asset share of state owned banks in the financial system increased from 6.7 percent during the period 2001-2007 to 8 percent during the period 2008-2010, while in developing economies the share decreased from 20.5 percent to 17.3 percent.

The extant studies using the bank level data or the firm level data report the mixed results about SOBs in relation to the business cycle or the financial crises. Cull and Peria (2013) find that, during the crisis period of 2008 and 2009, lending by SOBs was counter-cyclical in Latin America but that it was not in Eastern Europe. Bertay et al. (2015) find that lending by SOBs is less pro-cyclical than lending by private banks in developing countries and that it is counter-cyclical in developed economies. Duprey (2015) find that SOBs are less cyclical than private banks in high income and middle income countries but are not in low-income countries. Coleman and Feler (2015) find that in Brazil the share of government bank branches in a locality during the crisis period of 2008 and 2009 is associated with greater lending in that locality. Bonomo et al. (2015) find that, in Brazil, government oriented credit rose after 2008. Using the same JASME provided data as ours, Ogura (2015) finds that, during the period of the global financial crisis, Japanese SMEs increased the share of borrowing from GFIs if their main

[9] The amount of equipment loans outstanding had substantially exceeded that of working capital loans outstanding over the 1990s until FY 1996. The latter almost overtook the former at the end of FY 1997. The latter had exceeded the former since FY 1998, reflecting the faster growth of the latter than that of the former. During the period from December 1 through March 31. 1999 (the end of FY 1998), 81 percent of firms in our sample described in 3.1 borrowed working capital loans only, while only 9 percent and 10 percent of firms borrowed both working capital loans and equipment loans, and equipment loans only, respectively. This suggests that, during the credit crunch period, the JASME shifted its focus toward working capital loans in order to help mitigate financial difficulties faced by firms.

banks were large banks whose loans outstanding to SMEs decreased in aggregate.

Another concern about SOBs is whether their lending help firms become more productive or profitable, particularly their counter-cyclical lending during the crisis period does so.

Using the data of localities in Brazil, Coleman and Feler (2015) find that, the share of government bank branches in a locality is not statistically significantly associated with the firm productivity of that locality as measured by output per firm, wage bill per firm and exports per firm during the crisis of 2008 and 2009. Using the data about publicly listed firms in Brazil, Bonomo et al. (2015) find that the post crisis government oriented lending is not positively associated with the firm investment. Using the data of Japanese listed firms over the period from 1978 through 1996, however, Lin et al. (2015), find that the lending to a listed firm by GFIs is positively associated with the contemporaneous investment and ex-post ROA one year later and these associations are stronger in the crisis period of 1991 through 1994 when the real GDP growth slowed down markedly.

Using the plant level data of manufacturing firms in Brazil during the non-crisis period from 1995 through 2005, Carvalho (2014) finds that the firms eligible for borrowing loans from SOBs shift their employment to the states politically attractive to incumbents but do not expand the overall employment. Using the data of listed firms in Brazil over the period from 2002 through 2009, Lazzarini et al. (2015) find that the amount of loans a firm borrows from BNDES, a government development bank, affects the firm's performance as measured by ROA, the EBTDA to total assets ratio and Tobin's q neither positively nor negatively. Using the establishment level data of manufacturing firms in Colombia from 2004 through 2009, Eslava et al. (2014) find that small firms that borrowed loans from Bancoldex, a public development bank, are associated with larger employment, larger investment and larger output. Using the data of firms in China over

the period from 1998 through 2009, Ru (2017) finds that the public funding of state owned enterprises (SOEs) through the lending to a local government by state owned China Development Bank is associated with greater employment by SOEs and smaller employment by private firms in the locality.

3. Data and Methodology

3.1. The Hypothesis and the Empirical Models

Our primary objective is to examine the efficacy of the JASME's policy to expand lending aimed at mitigating adverse effects the credit crunch inflicted on SMEs. If the JASME's lending achieved its policy objective, it should have lent more aggressively to a firm that faced a financial constraint by the credit crunch more greatly, and thereby played a role of compensating private financial institutions (banks). Therefore, the hypothesis we need to test on is, "the amount of loans the JASME lent to a firm whose main bank cut bank on more lending supply was greater."

The empirical model to test on this hypothesis we employ is the following equation (1).

$$JASME_i = \alpha_0 + \alpha_1 CAPSUR_i + \alpha_2 Z_i + \alpha_3 Industry_i + \varepsilon_i \quad \cdots (1)$$

$JASME_i$ is a measure for the amount of loans the JASME extended to firm i during the period from December 1997 through March 1999, which we call the JASME credit crunch policy period.[10] Z_i is a set of control variables. $Industry_i$ and ε_i are a set of

[10] We end the policy period on March 31, 1999 because, according to a Nikkei newspaper report, reduction in lending supply by viable solvent banks, which Watanabe (2007a) defines as the credit crunch, subsided by this time. The JASME's "Fund" continued to provide loans to firms from FY 1999 on but the same report also mentions that these loans targeted firms that faced failures of their

industry dummy variables and an error term, respectively. Following Gopalan et al. (2011), we employ, as control variables, the logarithm of total assets, ROA as defined by net income divided by total assets and the leverage as defined by total liabilities, which equals total assets less net wealth, divided by total assets.[11] [12] [13] These financial statement based variables are measured as of the fiscal year closing for a firm between April 1997 and March 1998 if the earliest loan contract was extended until March 1998, and are measured as of FY closing for a firm between April 1998 and March 1999 if the earliest contract was extended after April 1998. $CAPSUR_i$ is the growth rate of lending (supply) by firm i's main bank due to the bank's capital adequacy in excess of its target. We will explain the way CAPSUR is constructed shortly.

For $JASME_i$, we examine amounts of two types of loans grouped in the JFC contract data, equipment loans and working capital loans as well as total loans that are a sum of amounts of equipment loans and working capital loans. If the JASME extends multiple loans to a firm during the JASME credit crunch policy period, we obtain the total amount of loans for each loan type by summing loan amounts.

We construct CAPSUR based on the regression run by Watanabe (2007a). Watanabe estimates the following regression equation using the data about domestically licensed banks extracted from the Nikkei NEEDS bank financial data.

lenders that are not reflected on lower CAPSUR that is based on the sample of banks employed by Watanabe (2007a) that excludes failed banks.

[11] To avoid taking logarithm of 0, when taking logarithm of a variable such as total assets, we take logarithm of 1 plus the value for that variable.

[12] For a reader's reference, a firm is undercapitalized when its leverage is greater than 1.

[13] Sapienza (2004), Khwaja and Mian (2005) and Imai (2009) find the evidence that SOBs conduct politically motivated lending in Italy, Pakistan and Japan, respectively, while Ianonetta et al. (2010) find the same using the cross country data from Europe. As our data do not provide information that implies a firm's political affiliation such as a firm's location, we are unable to discuss whether the JASME lent to ex-ante unprofitable firms for political objectives.

$$\Delta lnL_{j,97} = \beta_0 + \beta_1 \Delta lnL_{j,96} + \beta_2 \left\{ \frac{K_{j,97}}{A_{j,97}} - \left(\frac{K_j}{A_j} \right)^{target} \right\} + \beta_3 X_j + \epsilon_j \quad \cdots (2)$$

Where $ln\Delta L_{j,97}$ is the growth rate of bank j's loans excluding loans to "troubled" industries that consist of real estate, construction, services and wholesale and retail industries, which are the industries where the share of non-performing loans exceeds the average across the entire industries . $\frac{K_{j,97}}{A_{j,97}}$ is the ratio of capital to total assets of bank j, $\left(\frac{K_j}{A_j}\right)^{target}$ is its time invariant target as estimated by the time series average of bank j's ratio of capital to total assets over the three year period from FY 1992 through FY 1994. X_j is a set of dummy variables for such bank types as city banks, trust banks and regional banks while regional 2 banks are a base group. ϵ_j is an error term. Watanabe (2007a) identifies the estimate of β_2, $\widehat{\beta_2}$ by employing a bank's share of lending to the real estate industry in FY 1989 and the bank's 10 year-growth of lending share to the real estate industry since FY 1980 as instrumental variables that are independent of the business cycle driven correlation between bank capital and borrowing demand.[14]

CAPSUR is constructed as the product of the differential between the actual ratio of capital to total assets and its target, which Watanabe calls the capital surplus, $\left\{\frac{K_{j,97}}{A_{j,97}} - \left(\frac{K_j}{A_j}\right)^{target}\right\}$ and $\widehat{\beta_2}$, $\widehat{\beta_2}\left\{\frac{K_{j,97}}{A_{j,97}} - \left(\frac{K_j}{A_j}\right)^{target}\right\}$. CAPSUR is the growth rate of

[14] Ideally, we could employ a change in a firm's loans outstanding owed to its main bank in FY 1997 as an independent variable and then instrument this variable by CAPSUR. The loans outstanding of a firm's main bank are available in the JFC financial institutions data. Thus, theoretically, one could compute $\Delta lnL_{ij,97} = lnL_{ij,97} - lnL_{ij,96}$, which is the log growth of loans firm i borrows from bank j, a firm i's main bank, in FY 1997, and then compute a firm specific CAPSUR. By doing so, we could capture the JASME's direct response to a firm's finances affected by its main bank's capital adequacy. To do so, one requires the data about firm i's loans outstanding borrowed from bank i for FY 1996. As we will report in Table 1-1, there are 2,061 firms in our base sample. Among these firms, it is only for 107 firms that the information about their main bank including the loans outstanding they are owed to it are available for FY 1996. Thus, using the individual firm level data about the loan growth would substantially reduce the number of observations and be impractical.

loans excluding loans to "troubled" industries that can be explained by the capital surplus of a bank. A negative CAPSUR means that to what extent a bank's inadequate capital slowed the bank's lending growth. Thus, (the negative of) CAPSUR is a measure for the extent of bank j's reduction in lending supply due to poor capital adequacy, which is a variable to measure the extent of the credit crunch a firm that borrows from bank j faces.[15]

We also attempt to assess the JASME's policy lending by examining the effect of its lending on a borrowing firm's concurrent and ex-post real and financial behavior as well as its ex-post performance. In practice, we run the following regression.

$$y_i = \gamma_0 + \gamma_1 JASME_i + \gamma_3 W_i + \gamma_4 Industry_i + \nu_i \quad \cdots (3)$$

Where y_i is a variable to measure firm i's real or financial behavior or its performance as of FY1998 or later. $JASME_i$ is the logarithm of total loans firm i borrowed from the JASME during the period from December, 1997 through March, 1999. W_i is a set of additional independent variables. For y, we employ the following six variables, two variables to measure the firm profitability, the ROA, the EBITDA to total assets ratio, the investment rate, a change in the cash to capital stock ratio, the borrowing growth and the employment growth. For each of these dependent variables employed as y_i, we employ a different set of additional independent variables as represented by W_i. $Industry_i$ and ν_i are a set of industry dummy variables and an error term, respectively. We instrument $JASME_i$ by independent variables employed in equation 1 including CAPSUR so as to identify a firm's borrowing demand with the JASME's lending supply and run two-stage least squares regressions (2SLS). We add more

[15] For details about estimating equation (2), see Watanabe (2007a).

instrumental variables to take care of other endogenous variables included in W if necessary. We explain a dependent variable as well as control variables and instrumental variables associated with it shortly.

Firm profitability

We employ two measures for firm profitability, namely ROA as defined by current income divided by total assets, and EBITDA to total assets ratio. For additional independent variables, we employ the logarithm of total assets to control for firm size. We run two stage least squares (2SLS) regressions where the excluded instrumental variables are independent variables in equation (1), CAPSUR, the logarithm of total assets, ROA and the leverage measured during the policy period as described before. When running regressions, we intentionally exclude the logarithm of the lagged total assets as an instrumental variable because it is an ex post variable that is measured after the JASME extended all the loans.

Methodologically, our empirical approach most closely resembles that employed by Aiyar et al. (2014). Using the bank level data of the United Kingdom, they run the regressions of the lending growth by a foreign bank branch not subject to the Basel capital requirements on the local lending growth by domestic banks subject to the requirements instrumented by changes in their regulatory requirements in order to examine the effects of changes in capital requirements on unregulated foreign banks competing with regulated domestic banks through the (negative) impacts of the more stringent requirements on lending by domestic banks. We believe that our approach improves over theirs because a dependent variable is a firm level measure for new borrowing rather than the bank level lending growth employed by them. This is because our firm level measure for a firm's borrowing from the JASME is constructed by summing all the loans

each firm borrowed from the JASME during the fixed policy period and is a measure for the JASME's new lending to that firm, whereas the lending growth is not a secular measure for new lending but is affected by any other changes in the amount of total loans outstanding including loan write-offs and redemptions of loans.

Investment rate

The investment rate is defined as an increase in fixed assets plus depreciation divided by capital stock, which is defined by fixed assets less lands, at the previous fiscal year end. For a set of additional independent variables, we employ (a proxy of) marginal q, cash flow to capital stock ratio and CAPSUR. Among these variables, CAPSUR is an only variable treated as exogenous. For a definition of the marginal q denoted as Mq, we follow Ogawa (2003) and Imai (2016), where the q for firm i is constructed by the following formula.

$$Mq = \frac{\pi_i}{P^I}\frac{1+r_i}{r_i+\delta}$$

Where π_i and r_i are the profit rate as defined by the ratio of the operating profit to the capital stock at the previous fiscal year end and the discount rate as defined by the ratio of the interests paid and the discounts on note to the sum of the short-term loans outstanding, the long-term loans outstanding and the notes payable outstanding. P^I and δ are the investment good deflator published by the Bank of Japan and the depreciation rate set to equal 0.0772, respectively. The cash flow to capital stock ratio is the sum of current income and depreciation divided by the capital stock at the previous fiscal year end. We can think of (a negative of) CAPSUR and instrumented $JASME$ as exogenous shocks to tighten and relax a firm's financial constraint. In the investment literature starting from Fazzari et al. (1988), the positive coefficient of the cash flow to capital stock ratio, which is often called the cash flow sensitivity of investment as an evidence of a

firm's financial constraint when making investment but a counterargument to this that the cash flow is a proxy for a firm's investment opportunities and thus endogenous, has become dominant.[16] The excluded instrumental variables are independent variables in equation (1) excluding CAPSUR, the logarithm of total assets, ROA and the leverage measured during the policy period as well as the logarithm of sales during the policy period, which is added to ensure the overidentification of the 2SLS regressions.

Cash to capital stock ratio

For the cash regressions, we follow the regression model of Almeida et al. (2004). A dependent variable is a change in the sum of cash and deposits divided by the capital stock at the previous fiscal year end as a dependent variable. The additional independent variables are the marginal q and the cash flow to capital stock ratio, which are treated endogenous and the logarithm of total assets and CAPSUR, which are treated as exogenous. The excluded instrumental variables are the same as those employed for the investment rate regression described immediately above.

Borrowing growth

For the borrowing growth regressions, a dependent variable is the log growth of total loans outstanding a firm is owed. The additional independent variables and excluded instrumental variables are the same as those employed for the investment rate regressions. Independent variables treated as endogenous and those treated as exogenous are also the same as those for the investment rate regressions.

Employment growth

[16] For a review of the empirical investment function literature, see Bond and Van Reenen (2007).

For the employment growth regressions, a dependent variable is the log growth of employment. An additional independent variable is the logarithm of employment in FY 1998 that is treated as exogenous. Excluded instrumental variables are all the independent variables in equation (1).

3.2. Data

The data used in this study are primarily firm level and contract level micro data provided by the JFC. We select contracts agreed over the period of one year and four months from December 1, 1997 through March 31, 1999, which corresponds to the period from the date of inauguration of the "Fund to Respond to Changes in Financial Environments" through the end of FY 1998.

The data provided by the JFC are the data about loan contracts extended by the JFC (the JFC contract data) along with the data about financial statements of the firms collected by the JFC (the JFC financial statements data) and the data about the information about financial institutions each firm borrows from including the JFC (the JFC financial institutions data). Our loan contract data are not randomly sampled but cover all the contracts extended by the JFC.

The JFC contract data record the contract details such as the facility size and the date of loan execution. The JFC financial statements data record the financial statements of the firms at dates of their annual fiscal closing. Similarly, the JFC financial institutions data record the details about the financial institutions a firm borrows from at dates of their annual fiscal closing. Firms' industries are provided by the JFC in a separate file. Our dataset is compiled by merging the data about firms extracted from the JFC financial statement database, the data about firms' lenders extracted from the JFC financial institutions database and the data about contracts that were extended from December 1st,

1997 through March 31st, 1999 extracted from the JFC contract database so that every firm recorded in it has at least one contract the JFC extended to during this period.

We link the abovementioned dataset constructed based on the data provided by the JFC with the data about firms' main banks. We utilize the data about firms' main banks used by Watanabe (2007a) originally collected from the Nikkei NEEDS databank. As Watanabe analyzes 126 domestically licensed banks under the Banking Act that operated as of the end of FY 1997, we drop the contracts extended to the firms whose main bank was not a domestically licensed bank under the Banking Act such as a *shinkin* bank. [17] After consolidating multiple contracts for a firm, we are left with 2,061 firms in our base sample.[18]

Although the JFC financial institutions database records the information about a firm's lenders that are neither the firm's main bank nor the JFC, we utilize the information about the firm's main bank only because in our view it is when the firm's main bank becomes less willing to lend to the firm that the firm is the most severely adversely affected by the credit crunch. [19] [20]

4. Results

[17] Watanabe (2007a) examines the relationship between the actual capital to asset ratio and its target year by year and finds that all 14 large banks failed to meet their target in FY 1997, that many large banks were able to meet their target in FY 1998 thanks primarily to the massive public capital infusions and that all but three large banks achieved their target in FY 1999.

[18] We consolidate all loans extended to a given firm because we are interested in how the JASME responded to the credit crunch. The JASME did not necessarily deal with a firm affected by the credit crunch in a single loan contract. Any follow up loan contract subsequent to the first contract was likely intended to mitigate the effect of the credit crunch on the firm.

[19] A firm's main bank is self-reported by the firm to the JASME.

[20] For details about assembling our data, see the Appendix. The relatively small number of firms in our sample despite that the original data are the population of contracts extended by the JASME has to do with its recording policy on the financial statements and the information about financial institutions of its borrower, which will be explained in greater details in the Appendix.

4.1. Descriptive statistics

Table 1-1 presents descriptive statistics of variables used to construct dependent variables and independent variables used in equation (1) and sales used as an additional instrumental variable when running regressions of equation (3).

As for measures for loans we use for dependent variables, amounts of total loans, working capital loans and equipment loans are on average 78 million yen, 61 million yen and 16 million yen, respectively. The median of the amount of equipment loans is 0 presumably because equipment loans are borrowed to replace equipment such as machineries every several years. Total assets are on average 1.62 billion yen.

As for independent variables, CAPSUR, a measure for the lending growth due to a firm's main bank's capital surplus is on average negative at -2.4 percent. The ratio of capital to total assets of main banks of our sample firms is on average falls short of its target at the end of FY 1997 so that they reduced lending. The average ROA and the average leverage of our sample firms are -0.008 and 0.88, respectively, suggesting that our sample firms on average incur small accounting losses and are highly leveraged.

Table 1-2 presents the descriptive statistics of dependent and independent variables used when running the regressions of equation (3).[21]

4.2. The JASME Loans Regressions

Table 2 presents the regression results of equation (1) when a dependent variable is either the logarithm of total loans, that of equipment loans or that of working capital loans.

[21] When performance regressions of equation (3) are run, the sample size is substantially smaller than the base sample described in Table 1-1 because we use the sample of firms in the base sample whose necessary financial statements after FY 1998 are available.

The regressions are run using the OLS.[22] [23]

The coefficient of CAPSUR, which is a measure for the loan growth by a firm's main bank caused by the bank's capital surplus, is negative and significant when a dependent variable is either the logarithm of total loans or that of working capital loans, but it is not when the dependent variable is the logarithm of equipment loans. These results show that the JASME made a larger amount of new working capital loans to a firm whose poorly capitalized main bank reduced lending. The coefficient of CAPSUR is not significant for the regression with the logarithm of equipment loans most likely because it is working capital loans rather than equipment loans that were targeted by the JASME's "Fund". The coefficient estimate of -0.971 for total loans means that a decrease in CAPSUR by one standard error (3.1 percent) is associated with an increase in total loans by about 3.1 percent, or 2.4 million yen when evaluated at the sample mean of the amount of total loans. Similarly, a decrease in CAPSUR by one standard error is associated with an increase in working capital loans by 5.1 percent or 3.1 million yen when evaluated at the sample mean of the amount of working capital loans.[24] A monetary increase in total

[22] As we described in footnote 10, for more than 80% of firms in our dataset, the amount of equipment loans is zero. For the fewer but still great number of firms, the amount of working capital loans is zero. Therefore, we also used the Tobit model with left censoring at zero for regressions when either the amount of working capital loans or that of equipment loans is used to construct a dependent variable. The results are qualitatively similar to those obtained using the OLS (results are not reported).

[23] When running the regression of JASME as a first stage regression for the regressions of equation (1), the logarithm of sales is added to ensure the overidentification. The results for the JASME regression are qualitatively unaltered regardless of including the logarithm of sales as an independent variable (results are not reported). We report the results of the regressions without this variable because total assets and sales are very highly correlated.

[24] Recall that CAPSUR is a variable to measure to what extent a firm's main bank reduced its overall lending due to how far it was from achieving its target for capital adequacy. In this regard, one may suspect that the effect of CAPSUR on JASME loans made to a firm should be negative only when the firm had borrowed from its main bank with negative CAPSUR. To answer this suspicion, we run the regressions for JASME loans of three definitions on subsamples of firms with positive CAPSUR (the positive CAPSUR sample) and those with negative CASPUR (the negative CAPSUR sample) to see if the effects of CAPSUR vary between firms that are threatened by reduced lending from their main bank more greatly than those that are not. We find that the effect is significant for neither of subsamples irrespective of how JASME loans are defined but that, when working capital loans, the "Fund", the JASME's counter credit crunch facility, specifically targeted, are employed as a dependent

loans associated with a decrease in CAPSUR and that in working capital loans associated with a decrease in CAPSUR of the equal magnitude are similar, reflecting the fact that the effect of CAPSUR on the JASME's lending appears only in working capital loans. The average loans outstanding borrowed from a main bank for the 2,061 firms we use for our regressions and the average CAPSUR are 412.7 million yen and -0.024, respectively, suggesting that the average decrease in the amount of loans borrowed from a main bank due to a main bank's poor capital adequacy is 9.8 million yen. This means that on average the JASME loans offsets 24.2% ($= \frac{2.6}{9.8} \times 100$) of a decrease in a firm's loans borrowed from its main bank. As mentioned above, since the JASME lends only long-term loans with maturity no less than one year, this exercise may be more appropriate for a main bank's long-term loans. The average long-term loans outstanding borrowed from a main bank for the 2,061 firms is 219.0 million yen, suggesting that the average decrease in the amount of long-term loans borrowed from a main bank is 5.2 million yen. This means that on average JASME loans offsets 45.6% of a decrease in a firm's long-term loans borrowed from its main bank. These numbers are economically very significant.

As for variables other than CAPSUR, the coefficient of the logarithm of total assets

variable, a negative coefficient estimate is far larger in absolute value for the negative CAPSUR sample than for the positive CAPSUR sample. When, however, total loans are used as a dependent variable, the coefficient estimates are marginally positive and negative for negative and positive CAPSUR samples, respectively. We suspect that this counterintuitive result is likely a statistical artifact produced by the facts that the effects of CAPUR on equipment loans, which were not targeted by the "Fund", are positive and almost equal in magnitude for both subsamples and that the standard error associated with the coefficient of CAPSUR is much smaller for the negative CAPSUR sample than for the positive CAPSUR sample (results are not reported). Indeed, Watanabe (2007 b) presents the evidence that is not very supportive of this possible non-linearity that lies between positive and negative values for CAPSUR. He finds that the effect of the capital surplus, the actual capital adequacy less its target on total bank lending as appearing in equation (2) is positive but is statistically insignificant regardless of the surplus being negative or positive, implying that banks did not change their response to their capital adequacy depending on whether they achieved their targets or were short on them. This further suggests that the JASME had no reason to change their policy stance in accordance with whether their borrowers faced positive CASPUR (increased lending by their main banks) or negative CAPSUR (reduced lending by their main banks).

is positive and significant when a dependent variable is either the logarithm of total loans or that of working capital loans, confirming that a firm with larger total assets generally tends to borrow a larger amount of loans. The coefficient of ROA is negative and significant when a dependent variable is either the logarithm of total loans or that of working capital loans. This is presumably because the "Fund" was aimed at providing working capital loans to firms with less cash flow that suffered from liquidity constraints due to insufficient supply of loans from poorly capitalized private banks.

The effects of leverage on equipment loans and that on working capital loans are opposite each other as the coefficients of leverage are negative and positive when dependent variables are the logarithms of equipment loans and working capital loans, respectively. The effect of leverage on the size of loans or its growth is found to be positive by both Gopalan et al. (2011) and Bharath et al. (2011). Our finding of a negative effect on working capital loans reflects the fact that a lender in our data is a single public lender rather than private lenders whose loan contracts are investigated in aforementioned studies. The positive effect of leverage on working capital loans suggests that, taking advantage of the "Fund", the JASME meant to increase working capital loans to firms with a higher leverage that were more vulnerable to reduced supply of lending by their private lenders during the period of the credit crunch. The negative effect of leverage on equipment loans, on the other hand, suggests that when making equipment loans that were not the target of the "Fund", similarly to private lenders, the JASME was reluctant to lend to greatly leveraged firms whose credit risks were generally greater.[25]

[25] Bharath et al. (2011) employ the ratio of the amount of loans a firm borrows to its total assets rather than the logarithm of the amount of loans. Following Bharath et al. (2011), we replicate the regressions whose results are reported in Table 2 by replacing the dependent variable with the ratio of the amount of corresponding type of loans a firm borrows from the JASME to its total assets. The coefficients of CAPSUR turn out to be largely insignificant, suggesting that, when determining its exposure to a firm, as a policy institution whose mission is to compensate private lenders, the JASME

4.3. The Regression Results for Firm Performance, Real and Financial Behavior

Firm profitability

Table 3 shows the regression results of equation (3) with ROA as of FY 2001 as a dependent variable.[26] The first column shows the results without control variables, whereas the second and the third columns show the results of the regressions with independent variables that include the logarithm of lagged total assets (as of FY 2000) and with this additional variable and an ex-ante ROA that is an independent variable used to run the regression of equation (1), respectively. Except in column 1 where the corresponding J statistic shows that the null of instrumental variables being independent of an error term is rejected, the coefficients of the logarithm of JASME total loans are negative and statistically significant at the 5 percent significance level. The effect of JASME loans is substantially smaller when the ex-ante ROA is included as an independent variable than when it isn't. Since the coefficients of two control variables are often significant in regressions whose results are reported later, from now on, we will report the results of the regressions with these variables as independent variables. The effect is economically significant. An estimated coefficient of -0.161 reported in column 2 means that an increase in the amount of JASME loans by one standard error leads to a decrease in ROA by 17 percent when the logarithm of JASME loans is evaluated at its mean.[27]

Table 4 reports the regression results for equation (3) with the ROA in column 1 and

does not take into account of the firm's size in contrast to some private lenders who may prefer sharing a risk of a firm with other lenders rather than taking over a firm's entire risk.

[26] For performance regressions, firms with firm a performance measure (ROA or EBIDA to total assets ratio) is either above the 1 percentile or at or below the 99 percentile are dropped as outliers.

[27] A change in a firm's ROA resulting from an increase in JASME loans by one standard error (84.5 million yen) equals $-0.161 \times \frac{84.5}{80.8\ (=\text{the mean of the amount of JASME loans})} = -0.168.$

those with EBITDA to total assets ratio in column 2 as a performance measure in every fiscal year after the period from December 1997 through March 1999, the period of JASME loan executions we examine, until FY 2003. We find that the coefficients of the instrumented logarithm of JASME loans are negative and statistically significant at least at the 10 percent significance level for ROA of fiscal years 2000 and 2001 but that the coefficients are insignificant for other years. The results for the EBITDA to total assets ratio are qualitatively similar to the results for ROA.

Investment rate

Table 5 reports the results of regressions of the investment rate in FY 1999. Columns 1 and 2 report the results of regressions with and without CAPSUR and JASME as independent variables, respectively. Columns 3 and 4 report the results for a sample of the firms whose total assets are less than the median (a small firm sample) and a sample of the firms whose total assets are no less than the median (a large firm sample).[28] The coefficient of JASME is negative and significant for the full sample and the small firm sample but is not significant for the large firm sample. The coefficients of the marginal q and the cashflow to capital stock ratio are all positive but insignificant for one but all of them. An estimated coefficient of -0.032 reported in column 2 means that an increase in the amount of JASME loans by one standard error leads to a decrease in investment rate by 3.1 percent when the logarithm of JASME loans is evaluated at its mean.[29]

Cash to capital stock ratio

[28] For investment rate regressions, firms whose investment rate, marginal q or cash flow to capital stock ratio is either above the 1 percentile or at or below the 99 percentile are dropped as outliers.

[29] A change in a firm's investment rate resulting from an increase in JASME loans by one standard error (81.7 million yen) equals $-0.032 \times \frac{79.1}{81.7\ (=\text{the mean of the amount of JASME loans})} = -0.031$

Columns 1 through 3 of Table 6 report the results of the regressions of a change in the cash to capital stock ratio in FY 1999.[30] For cash to capital stock ratio regressions, since a coefficient of CASPUR is not statistically significant for a regression of new JASME capital loans and it is for a regression of new JASME working capital loans, we employ the logarithm of working capital loans as an independent variable. Columns 1, 2 and 3 report the results of the regression without any interaction term, the results of the regression with an interaction term between JASME working capital loans and the cash flow to capital stock ratio and the results of the regression with an interaction term between CAPSUR and the cash flow to capital stock ratio.[31] These interaction terms are meant to capture effects of the main bank's lending supply and the JASME's lending to mitigate a firm's financial constraint as captured by a firm's cash flow sensitivity of cash (CFSC). While the coefficients of the cash flow to capital stock ratio and CAPSUR are significant and positive and significant and negative, respectively, the coefficient of the interaction term between the cash flow to capital stock ratio and the JASME working capital loans is almost significant and negative at the 10 percent significance level, suggesting that the JASME lending has a weak effect of reducing the CFSC, which further implies that the JASME loans likely mitigate the financial constraint of a firm when making investment.

Borrowing growth

Column 4 of Table 6 reports the results of the regression of the borrowing growth in

[30] For cash to capital stock ratio regressions, firms whose change in the cash to capital stock ratio, marginal q or cash flow to capital stock ratio is either above the 1 percentile or at or below the 99 percentile are dropped as outliers.

[31] When an interaction term is included as an additional independent variable, in order to ensure that the number of instrumental variables be greater than that of endogenous variables, following Almeida et al. (2004), we add the lagged capital stock in logarithm, the twice lagged capital stock in logarithm, the lagged net working capital to total assets ratio, and the lagged short-term debt to total assets ratio as additional instrumental variables.

FY 1998 because, by definition, new loans borrowed are supposed to affect a firm's borrowing simultaneously.[32] As in the case of the cash ratio regressions, the logarithm of working capital loans is employed as an independent variable as a coefficient of CAPSUR is significant for a regression of this variable. The coefficient of JASME working capital loans is negative and statistically significant.[33] An estimated coefficient of -0.073 reported in column 4 means that an increase in the amount of JASME loans by one standard error leads to a decrease in the borrowing growth by 7.8 percent when the logarithm of JASME loans is evaluated at its mean.[34]

Employment growth

Column 5 of Table 6 reports the results of the regression of the employment growth in FY 1999. Neither a coefficient of new JASME loans nor that of the ex-ante employment in FY 1998 is statistically significant.

Medium-term effects of JASME loans on investment rate and employment growth

Columns 1 and 2 of Table 7 report the effects of JASME loans on investment rate and employment growth in every fiscal year after the policy period until FY 2003. The negative effect of JASME loans on investment rate continues for three years until FY 2001 and then dies out whereas the effect on employment growth is not statistically significant at the 10 percent significance level except for the weakly significant and

[32] For the borrowing growth regression, firms whose borrowing rate, marginal q or cash flow to capital stock ratio is either above the 1 percentile or at or below the 99 percentile are dropped as outliers.

[33] For this regression, the corresponding J statistic shows that the null of instrumental variables being independent of an error term is rejected.

[34] A change in a firm's borrowing growth resulting from an increase in JASME working capital loans by one standard error (68.2 million yen) equals $-0.073 \times \frac{68.2}{63.9\ (=\text{the mean of the amount of JASME working capital loans})} = -0.078$

positive effect on the employment growth measured over two years until FY 2000.

Discussion

The JASME loans affect a borrowing firm's ex-post profitability and investment negatively for three years and these effects of the JASME loans dissipate thereafter. The JASME loans' negative effects on profitability and investment could reflect the fact that, by design, the JASME's policy loans were bound to lending to firms that had temporary difficulty with working capital management due to external financial environments, which could further mean that the larger loans were targeting the firms that would be expected to be less profitable and make less investment at least in a few years during the recovery from financial difficulties.

To deal with this selection concern, we rerun ROA and investment rate regressions for three years when the effects are negative without ex-ante ROA and leverage, which the JASME likely use when selecting firms vulnerable to the external financial shock, as instrumental variables.[35] The effects of JASME loans on ROA reported in Table 8 are not statistically significant, suggesting that the negative effects found in Table 4 result from this selection problem. The effects of JASME loans on investment remain negative and significant except in FY 2000. Since larger JASME loans a firm borrowed may have allowed the firm larger debt repayments to its private lenders, the firm may have prioritized repayments over investment temporarily so that JASME loans likely induced firms to hold off investment at least temporarily.[36]

[35] For the regressions whose results are reported in column 1, excluded instrumental variables (IVs) are CAPSUR, the logarithm of initial total assets and the logarithm of initial sales. For those whose results are reported in column 2, IVs are the logarithm of initial total assets as well as that of sales, lagged and twice lagged capital stock, the lagged net working capital to total assets ratio and the lagged short-term debt to total assets ratio.

[36] Another concern is that the negative effects of JASME loans on the borrowing growth per se is simply the evidence that the JASME selected firms that would have difficulty repaying their debts owed to their private lenders and, thus, ex-ante ROA and leverage are not valid instrumental variables.

A weak but positive effect of JASME loans on the ex-post two-year employment implies that the JASME loans were lent to firms with a growth potential. Besides, the fact that the loans lent by the JASME generally have longer maturities than those lent by private lenders means that the positive effects on the former if any tend to emerge later than those on the latter.[37] [38] [39]

Uesugi et al. (2010) who find that the firms that were provided public credit guarantees on the loans borrowed from private lenders under the Special Credit Guarantee program that was in effect from October 1998 through March 2001, the period that partially coincides the period of the JASME's expanding lending, and whose aim was very similar to the JASME's "Fund", performed more poorly than those that were not up to two years argue that the results reflect borrowers' moral hazard of misusing borrowed

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To deal with this concern, we run the regression of the borrowing growth with ex-ante ROA and leverage replaced by the lagged capital stock in logarithm and the lagged net working capital to total assets ratio. The effect of JASME loans on the borrowing growth remains negative and statistically significant (results are not reported).

[37] The average maturity of all the loan contracts agreed from December 1997 through March 1999 weighted by the amount of respective loan recorded in the original JFC contract data is 8.5 years. The average maturities of equipment loans and working capital loans are 12.8 years and 6.3 years, respectively. It is harder to compute the average maturity of loans by private banks because our data do not contain loan contracts extended by private banks. So a guesswork is needed. In the dataset used for the regression of ROA in FY 1999 as a dependent variable, the averages of short-term loans and of long-term loans over the sample of 1988 firms are 290 million yen and 609 million yen, respectively. A short-term loan is a loan whose maturity is equal to or less than one year. Thus, we assume that the average maturity of short-term loans is 0.5 years. For long-term loans, we use the only available average maturity of long-term loans surveyed in "the Fact-Finding Survey on Transactions between Enterprises and Financial Institutions", which was conducted in February 2008 by the RIETI, 5.2 years. We estimate the average maturity of loans extended by private banks to be 3.7 years by computing the weighting average of 0.5 years and 5.2 years with 290 million yen and 609 million yen as respective weights. The average maturity of loan contracts extended by private banks estimated as such is far shorter than 8.5 years, the average maturity of loan contracts extended by the JASME.

[38] We employ a change in a firm's ex-post profitability from FY 1998 to FY 2001 or to FY 2003 instead of its level per se as a dependent variable but find that the effect of JASME loans is statistically insignificant (results are not reported).

[39] Interpreting the results for later years needs a greater caution. A number of events should have happened between the time at which a firm borrowed loans from the JASME and the time at which its performance was measured. But we are unable to take these events into account in our regressions. The weaker effects of JASME loans on firm profitability in later years may also be partially attributable to the survivorship bias. Underperforming firms are more likely to go out of business as time goes by. Therefore, the more time elapses, the more inherently less profitable firms that contribute to a negative effect in earlier years drop out of the sample.

funds because failure to repay contractual dues would not mean a firm's default. Since loans a firm borrowed from the JASME were not publicly guaranteed, a firm should have had less incentive to get indulged in moral hazard. As the Special Guarantee Program and the Fund have virtually the same policy objective, the negative effects of these government programs, however, may capture policy's social goals rather than borrowers' moral hazard.[40]

At the first glance, the JASME loans' negative effect on a firm's overall borrowing growth is puzzling. This most likely reflects the fact that, in practice, the JASME loans were aimed at helping a firm repay preexisting loans outstanding the firm is owed to its private lenders that may have even demanded to quicken debt repayments.

In a long run, our findings are not inconsistent with the extant studies we introduced earlier where the effect of lending by SOBs on borrower firms' ex-post performance is found to be mostly neutral.[41]

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[40] One may wonder that some branches apply more stringent lending standards to other applicants than others as critics allege regarding local Credit Guarantee Corporations (CGCs) when reviewing credit guarantees. We think that this is less so for the JASME's lending because the JASME is a centralized organization where the headquarters have ultimate decision authority, whereas each local CGC is independently run and has ultimate decision authority.

[41] One interesting question to ask is what would have happened to firm profitability or investment if the JASME had not acted to mitigate the adverse effects of the credit crunch as it seems have done so. One way to address this is to run the firm profitability regression without CAPSUR as an instrumental variable and to run the investment rate regression without CAPSUR as an independent variable. As our 2SLS regressions are two-stage regressions where the firm profitability measure or the investment rate is run on JASME, the amount of loans made by the JASME to a firm during the policy period (in logarithm), which is predicted by instrumental variables, when CAPSUR is excluded from a set of instrumental (exogenous) variables for JASME, a component of JASME dependent on CAPSUR, which is the JASME's response to reduced lending to a firm by the firm's main bank in providing loans to the firm, is absorbed in a residual in the first stage regression for JASME, so that the resulting coefficient of JASME in the second stage should not reflect the JASME's policy response. We find that the negative point estimates of the coefficients of JASME for firm profitability measures when CAPSUR is excluded as an instrumental variable are generally larger in absolute value albeit less accurately estimated than those when it is not and that the negative point estimates of the coefficients of JASME for the investment rate regression when CAPSUR is excluded as an exogenous independent variable are virtually the same as those when it is not. This implies that, though the JASME's policy lending did not lead to greater firm profitability ex post, it may likely have prevented firm profitability from further deterioration. The JASME's lending, though, may not have affected a firm's investment behavior, regardless of whether it was meant to mitigate the effects of the credit crunch.

5. Conclusion

In this paper, using the data of loan contracts extended by the JASME, we examined whether its lending behavior was consistent with its policy mission of mitigating adverse effects on SMEs caused by the credit crunch of the late 1990s. As the JASME launched the "Fund to Deal with Changes in Financial Environments" on December 1, 1997, whose primary objective was to deal with the credit crunch, we selected the sample of the JASME's loan contracts extended over the period from December 1997 through the end of the next fiscal year, March 1999, and examined whether the JASME made a larger amount of loans to firms that were more vulnerable to the credit crunch. We found that the JASME made a larger amount of working capital loans to the firms whose main bank was more poorly capitalized and reduced lending more greatly, confirming that the JASME's lending policy was aligned with its mission.

We then found that the logarithm of JASME's total loans instrumented by the main bank's lending supply growth as explained by the bank's capital adequacy have negative effects on the investment rate until three years post borrowing but the effects die out afterward and that the JASME's lending have a weak effect to mitigate the cash sensitivity of cash that captures a firm's financial constraint.

Appendix

In this appendix, we detail the steps to compile the dataset we use in this study. When constructing the dataset, we combine the data extracted from three databases about the firms borrowing from the JASME and contracts it extends to the firms as well as the Nikkei NEEDS databank for the data about the JASME's borrowers' private main banks, which was originally used by Watanabe (2007a). Three databases we are provided by the JFC are the database about loan contracts extended by the JFC (hereafter referred to as the JFC contract database), the database about firms' financial statements (the JFC financial statement database) and the database about firms' transactions with financial institutions (the JFC financial institution database).

The JFC contract database records all the contracts extended by the JASME and the JFC's Small and Medium Enterprise Unit, the JASME's successor institution from FY 1995 through FY 2011. The database records 25,161 contracts and 25,321 contracts extended by the JASME in FY 1997 and FY 1998, respectively. Since the JASME may extend multiple loan contracts to a single firm in a given fiscal year, the number of contracts extended by the JASME in a respective year does not necessarily equals that of firms the JASME extends loan contracts to in the same fiscal year.

The JFC financial statement database contains 772,686 firm - fiscal year observations over the period from FY 1954 through FY 2012.[42] The JFC financial institution database, on the other hand, contains 3,638,020 financial institution - fiscal year observations over the period from FY 1982 through FY 2012.[43] In the latter database, for each firm in each fiscal year, the information about multiple financial

[42] In the JFC financial statement database, any financial statements dated from April of a given year , say year X, through March of year X+1 are treated as those dated fiscal year for X.
[43] The fiscal year for financial institutions in Japan including GFIs such as the JFC (JASME) runs from April through March of the following calendar year. Fiscal years for non-financial firms do not necessarily coincide with those for financial institutions.

institutions are recorded if the firm has a debt outstanding owed to multiple institutions in the year. These institutions include the JASME (JFC). The JFC collects financial statements of each firm and the information about its lenders for up to 10 most recent fiscal years as of the latest fiscal year in which the debt outstanding the firm owed to the JSAME (JFC) is positive. Thus, for example, if a firm borrowed a loan from the JASME in FY 1997 and keeps the positive loans outstanding owed to the JFC in FY 2011, the firm's financial statements recorded in the JFC financial statement database and the information about its lenders recorded in the JFC financial institution database are those from FY 2002 through FY 2011 only. Thus, the financial statements of that firm and the information about its lenders as of FY 1997, the year in which a loan was originated, or earlier are unavailable. Conversely, if a firm borrowed a loan from the JASME in FY 1997, the firm's financial statements and the information about its lenders of that year remain available only when the firm either lost its debt outstanding owed to the JASME by FY 2007 or it became out of business while leaving its debt not fully repaid to the JASME by that year. Since until FY 1998 the JASME was not required to record the information about all the non JASME financial institutions on the financial institution database, the number of firms whose financial statements are available and that of firms for which information about its main bank is available are not equal.

We divide the JFC financial statement database and the JFC financial institution database by the April - March fiscal year pertaining to financial institutions. As a result, we are left with financial statements for 19,108 firms and of 20,025 firms for FY 1997 and FY 1998, respectively. Similarly, we are left with the information about a firm's lenders for 3,820 firms and 14,280 firms for FY 1997 and FY 1998, respectively.

We, then, merge the data extracted from three databases provided by the JFC year by year using an identification number assigned to each firm commonly employed in these

databases. First, we merge the data extracted from the JFC contract database with the data extracted from the JFC financial statement data, leaving us with 5,881 contracts extended by the JASME and 5,848 contracts for FY 1997 and FY 1998, respectively. Next, we merge these data with the data extracted from the JFC financial institution database, leaving us with 1,194 contracts and 3,107 contracts for FY 1997 and for FY 1998, respectively. As it turns out, these 4,301 contracts extended in FY 1997 and FY 1998 remaining in our data are made to 3,297 different "firms". The caveat is that at this stage some of these 3,297 "firms" may appear in the data twice, once in FY 1997 and another time in FY 1998.

We, then, merge the data of 3,297 "firms" with the data about an increase (a decrease) in the lending growth of a firm's main bank in response to its capital surplus (shortage) in excess (shortage) of its target for the capital (to asset ratio) estimated over 126 domestically licensed banks examined by Watanabe (2007a), which do not include such depository institutions as *shinkin* banks and credit cooperatives that are not chartered under the Banking Act. The number of "firms" is reduced to 2,580.

Dropping firms whose loan contracts in our data were all dated before December 1, 1997, the date of the inauguration of the "Fund to Respond to Changes in Financial Environments", the number of "firms" is reduced to 2,394. Finally, subtracting 333 firms that appear twice (both in FY 1997 and FY 1998) in the data from 2,394 "firms", the final number of firms in our dataset is 2,061.

The samples used for the regressions of equation (3) are constructed by merging this dataset of 2,061 firms with the financial data of firms for respective fiscal year and for its previous year (the data of the previous year are used for a lagged variable) extracted from the JFC financial data.

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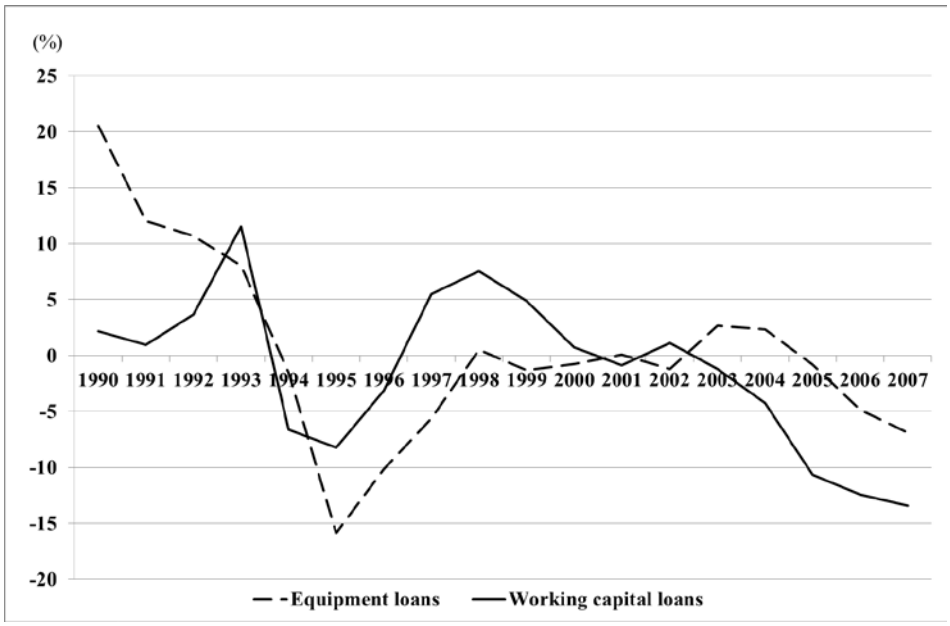
Figure 1. The Trends of Growths of Working Capital Loans and Equipment Loans by the JASME



Source: Disclosure reports of the Japan Finance Corporation for Small and Medium Enterprise

Table 1-1. Descriptive Statistics of the Variables Used in the Regressions for JASME Loans

Variable name	N	Mean	Median	Standard Error	Minimum	Maximum
JASME total loans	2061	77.54	50	79.73	5	900
JASME working capital loans	2061	61.35	40	66.13	0	520
JASME equipment loans	2061	16.19	0	56.08	0	900
CAPSUR	2061	-0.024	-0.032	0.031	-0.117	0.042
Total assets	2061	1623	875	2528	0.1	41632
ROA	2061	-0.008	0.002	0.087	-2.219	0.609
Leverage	2061	0.880	0.894	0.219	0.144	2.594
Sales	2061	1801	913	2783	0.1	41579

Note: ROA is defined as net income divided by total assets. The leverage is defined as total liabilities, which equals total assets less net wealth, divided by total assets. JASME loans, JASME working capital loans, JASME equipment loans, total assets and sales are all in million yen.

Table 1-2. Descriptive Statistics of the Variables Used in the Performance Measure Regressions

Fiscal year	Variable name	N	Mean	Median	Std. Err.	Min.	Max.
1998	Borrowing growth	1726	0.071	0.026	0.255	-0.508	2.170
	Marginal q	1726	0.388	0.396	1.775	-9.332	7.450
	CF to capital stock ratio	1726	0.045	0.054	0.175	-1.106	0.650
	JASME working capital loans	1726	63.90	42.5	68.23	0	520
1999	ROA	1988	-0.008	0.002	0.052	-0.421	0.098
	EBITDA/total assets	1988	0.031	0.031	0.057	-0.262	0.205
	JASME total loans	1988	78.55	50	81.39	5	900
	JASME working capital loans	1893	63.31	45	67.521	0	520
	Total assets	1988	1626	877	2540	0.1	41632
	Investment rate	1897	0.068	0.027	0.196	-0.353	1.536
	Marginal q	1897	0.504	0.402	1.769	-7.278	9.033
	CF to capital stock ratio	1897	0.055	0.061	0.162	-0.869	0.632
	Employment growth	1898	-0.087	-0.025	0.385	-3.689	1.922
	Employment in FY 1998	1898	51.56	33	54.00	1	360
	Cash to capital stock ratio (change)	1893	-0.006	-0.004	0.043	-0.153	0.147
	Lagged capital stock	1658	561	272	1092	2	16242
	Twice lagged capital stock	1658	558	269	1112	0	17733
	Lagged net working capital	1658	-0.033	-0.032	0.205	-1.038	0.674
	Lagged short-term debt	1658	-0.014	0.000	0.097	-1.616	0.932
2000	ROA	1862	-0.009	0.002	0.056	-0.365	0.115
	EBITDA/total assets	1862	0.031	0.031	0.06	-0.24	0.219
	JASME total loans	1862	79.36	50	82.98	5	900
	Total assets	1862	1613	865	2692	0.1	47722
	Investment rate	1779	0.052	0.021	0.161	-0.396	1.130
	Marginal q	1779	0.567	0.468	1.801	-6.298	8.888
	CF to capital stock ratio	1779	0.054	0.059	0.164	-0.777	0.577
	Employment growth	1785	-0.075	-0.022	0.357	-3.689	1.922
	Employment in FY 1998	1785	52.16	33	54.57	1	363

Table 1-2. Descriptive Statistics of the Variables Used in the Performance Measure Regressions, Cotd.

Fiscal year	Variable name	N	Mean	Median	Std. Err.	Min.	Max.
2001	ROA	1650	-0.016	0.001	0.079	-0.734	0.222
	EBITDA/total assets	1650	0.025	0.029	0.066	-0.352	0.227
	JASME total loans	1650	80.77	50	84.52	5	900
	Total assets	1650	1656	876	2942	13	51900
	Investment rate	1573	0.035	0.014	0.155	-0.475	0.850
	Marginal q	1573	0.340	0.373	1.874	-8.855	8.478
	CF to capital stock ratio	1573	0.039	0.050	0.180	-1.124	0.597
	Employment growth	1590	-0.334	-0.130	0.806	-4.466	2.140
	Employment in FY 1998	1590	52.93	34	55.86	1	376
2002	ROA	1425	-0.016	0.002	0.087	-0.707	0.352
	EBITDA/total assets	1425	0.027	0.029	0.064	-0.271	0.231
	JASME total loans	1425	81.09	50	84.61	5	900
	Total assets	1425	1604	827	2968	14	56767
	Investment rate	1357	0.019	0.007	0.163	-0.608	1.092
	Marginal q	1357	0.404	0.394	1.861	-7.954	9.089
	CF to capital stock ratio	1357	0.036	0.048	0.193	-1.048	0.770
	Employment growth	1375	-0.097	-0.043	0.218	-1.193	0.626
	Employment in FY 1998	1375	53.46	34	56.10	1	410
2003	ROA	1201	-0.019	0.002	0.106	-1.023	0.229
	EBITDA/total assets	1201	0.032	0.033	0.067	-0.295	0.248
	JASME total loans	1201	81.74	50	84.66	5	900
	Total assets	1201	1561	796	2894	33.7	59258
	Investment rate	1141	0.016	0.007	0.181	-0.639	1.014
	Marginal q	1141	0.454	0.435	1.921	-8.920	8.901
	CF to capital stock ratio	1141	0.037	0.053	0.218	-1.368	0.660
	Employment growth	1162	-0.088	-0.046	0.179	-0.904	0.545
	Employment in FY 1998	1162	54.16	34	56.90	1	410

Note: The fiscal year (FY) begins on April 1st and ends on March 31st of the next year. The ROA is defined as net income divided by total assets. The leverage is defined as total liabilities, which equals total assets less net wealth, divided by total assets. For definitions of other variables, see 3.1. JASME total loans, total assets and sales are all in million yen.

Table 2. The Regression Results for Equation (1): The Logarithm of Loans as a Dependent Variable

Variable name	(1) Total loans	(2) Equipment loans	(3) Working capital loans
CAPSUR	-0.971 **	1.004	-1.611 *
	(-2.020)	(0.884)	(-1.721)
Logarithm of total assets	0.496 ***	0.065 *	0.494 ***
	(30.239)	(1821)	(16.739)
ROA	-0.494 ***	0.346	-0.932 ***
	(-2.581)	(1.009)	(-2.752)
Leverage	0.027	-0.523 ***	0.478 ***
	(0.035)	(-3.259)	(3.592)
R-squared	0.400	0.052	0.185
N	2061	2061	2061

Note: *, ** and *** show that the estimated coefficient is statistically significant at the 10 percent significance level, the 5 percent level and the 1 percent level, respectively. t statistics based on robust standard errors are in parentheses. Industry dummies for manufacturing, utility, information, transportation, wholesale, retail, finance industries are included as additional independent variables. The other services industry is a base group.

Table 3. The Results of the Regressions of ROA in FY 2001

	(1)	(2)	(3)
Logarithm of JASME total loans (JASME)	0.011 ***	-0.205 **	-0.161 **
	(2.882)	(-2.295)	(-2.121)
Logarithm of lagged total assets		0.113 **	0.090 **
		(2.414)	(2.242)
Ex ante ROA			0.090
			(1.021)
Number of observations	1650	1650	1650
J	47.816	2.750	1.778
	(0.000)	(0.997)	(1.000)
First stage t value for the coefficient of CAPSUR97 on new JASME loans	-1.951 *	-1.951 *	-1.951 *

Note: *, ** and *** show that the estimated coefficient is statistically significant at the 10 percent significance level, the 5 percent level and the 1 percent level, respectively. t statistics based on robust standard errors are in parentheses. A dependent variable is a firm's ROA in FY 2001. Excluded instrumental variables are independent variables used in the regressions whose results are reported in Table 2, CAPSUR and three financial statement based variables, the logarithm of (ex-ante) total assets, (ex-ante) ROA and (ex-ante) leverage. Ex-ante independent and instrumental variables are measured as of the fiscal year closing for a firm between April 1997 and March 1998 if the earliest loan contract was extended until March 1998, and are measured as of FY closing for a firm between April 1998 and March 1999 if the earliest contract was extended after April 1998. Industry dummies for manufacturing, utility, information, transportation, wholesale, retail, finance industries are included as additional independent variables. The other services industry is a base group.

Table 4. The Year by Year Results of the Regressions of ROA and the EBITDA to Total Assets Ratio

	(1) ROA			(2) EBITDA to total assets		
FY	coefficient	N	J statistic	coefficient	N	J statistic
1999	-0.131 *	1988	12.043	-0.144 *	1988	2.534
	(-1.825)		(0.442)	(-1.807)		(0.998)
2000	-0.121 *	1862	7.070	-0.096 *	1862	0.638
	(-1.861)		(0.853)	(-1.771)		(0.986)
2001	-0.161 **	1650	2.007	-0.112 *	1650	0.678
	(-2.121)		(0.848)	(-1.943)		(1.000)
2002	-0.088	1425	0.814	-0.043	1425	0.285
	(-1.521)		(1.000)	(-1.048)		(1.000)
2003	-0.139	1201	2.455	0.018	1201	0.049
	(-1.271)		(0.998)	(0.361)		(1.000)

Note: *, ** and *** show that the estimated coefficient is statistically significant at the 10 percent significance level, the 5 percent level and the 1 percent level, respectively. t statistics based on robust standard errors are in parentheses. The fiscal year (FY) begins on April 1st and ends on March 31st of the next year. The reported results for each fiscal year are based on the regression equations with a firm's ROA (column 1) or its EBITDA to total assets ratio (column 2) as a dependent variable and the logarithm of ex-ante total assets and the ex-ante ROA as additional independent variables. The presented coefficients are those of the logarithm of JASME total loans. Instrumental variables are independent variables used in the regressions whose results are reported in Table 2, CAPSUR and three financial statement based variables, the logarithm of total assets, ROA and leverage, which are measured as of the fiscal year closing for a firm between April 1997 and March 1998 if the earliest loan contract was extended until March 1998, and are measured as of FY closing for a firm between April 1998 and March 1999 if the earliest contract was extended after April 1998. Industry dummies for manufacturing, utility, information, transportation, wholesale, retail, finance industries are included as additional independent variables. The other services industry is a base group.

Table 5. The Results of the Investment Rate Regressions

	(1) Full sample	(2) Full sample	(3) Total assets less than its median	(4) Total assets no less than its median
Marginal q	0.003	0.024	0.011	0.052
	(0.390)	(1.070)	(0.435)	(0.687)
Cash flow to capital stock ratio	0.403 *	0.290	0.362	0.195
	(1.901)	(1.230)	(1.344)	(0.254)
CAPSUR		-0.040	-0.263	0.037
		(-0.229)	(-0.885)	(0.157)
New JASME loans (logarithm, JASME)		-0.032 ***	-0.113 ***	-0.015
		(-3.126)	(-3.855)	(-0.605)
N	1897	1897	948	949
Hansen's J statistic	10.950	1.256	0.428	1.913
p value for J statistic	(0.012)	(0.262)	(0.513)	0.167
First stage t value for the coefficient of CAPSUR97 on new JASME loans		-2.225 **	-2.926 ***	-0.346

Note: *, ** and *** show that the estimated coefficient is statistically significant at the 10 percent significance level, the 5 percent level and the 1 percent level, respectively. t statistics based on robust standard errors are in parentheses. Instrumental variables are CAPSUR and four financial statement based variables, the logarithm of total assets, ROA, leverage and the logarithm of sales, which are measured as of the fiscal year closing for a firm between April 1997 and March 1998 if the earliest loan contract was extended until March 1998, and are measured as of FY closing for a firm between April 1998 and March 1999 if the earliest contract was extended after April 1998. The marginal q, the CF to capital stock ratio, and the logarithm of new JASME loans are considered endogenous. Industry dummies for manufacturing, information, transportation, wholesale, retail, finance industries are included as additional independent variables. The other services industry is a base group.

Table 6. The Results of Cash, Borrowing Growth and Employment Growth Regressions

	(1)	(2)	(3)	(4)	(5)
	A change in cash to capital stock			Borrowing growth	Employment growth
Marginal q	-0.000	-0.004	-0.004	0.030	
	(0.006)	(-1.180)	(-1.348)	(0.038)	
Cash flow (CF) to capital ratio	0.142 **	0.497 **	0.111 *	-0.218	
	(2.325)	(2.026)	(1.663)	(-0.337)	
CAPSUR	-0.105 ***	-0.118 ***	-0.159	0.266	
	(-2.938)	(-2.710)	(-1.145)	(0.947)	
CAPSUR × CF to capital stock ratio			0.926		
			(0.391)		
New JASME working capital loans (WC) (logarithm)	0.006	0.004	-0.005	-0.073 ***	
	(0.669)	(0.560)	(-1.457)	(-4.049)	
New JASME WC loans (logarithm) × CF to capital ratio		-0.116			
		(-1.639)			
New JASME loans (logarithm)					0.025
					(1.061)
Total assets (logarithm)	-0.004	0.001	0.003		
	(-0.780)	(0.400)	(1.362)		
Employment in FY 1998 (logarithm)					-0.000
					(-0.035)
N	1893	1658	1658	1726	1899
Hansen's J statistic	0.060	9.787	19.254	10.927	4.923
p value for J statistic	0.807	0.044	0.001	0.001	0.178
First stage t value for the coefficient of CAPSUR97 on new WC loans	-1.952 *	-2.411	-2.314 **	-2.384 **	-2.770 ***

Note: *, ** and *** show that the estimated coefficient is statistically significant at the 10 percent significance level, the 5 percent level and the 1 percent level, respectively. t statistics based on robust standard errors are in parentheses. Instrumental variables (IVs) for the regression whose results are reported in columns 5 are three financial statement based variables, the logarithm of total assets, ROA and leverage, which are measured as of the fiscal year closing for a firm between April 1997 and March 1998 if the earliest loan contract was extended until March 1998, and are measured as of FY closing for a firm between April 1998 and March 1999 if the earliest contract was extended after April 1998. The logarithm of sales measured as of the same date is added as another IV for the regressions whose results are reported in columns 1 and 4. The logarithm of sales as well as the logarithms of lagged and twice lagged capital stock, the lagged net working capital to total assets ratio and the lagged short-term debt to total assets ratio are added as IVs for the regression whose results are reported in columns 2 and 3. The marginal q, the CF to capital stock ratio, the logarithm of new JASME WC loans and two interaction terms, the interaction term between CAPSUR and the CF to capital stock ratio, the interaction term between CAPSUR and new JASME WC loans capital are considered endogenous. Industry dummies for manufacturing, information, transportation, wholesale, retail, finance industries are included as additional independent variables. The other services industry is a base group.

Table 7. The Year by Year Results of the Regressions of the Investment Rate and the Employment Growth

	(1) investment rate			(2) Employment growth		
Fiscal Year	coefficient	N	J statistic	coefficient	N	J statistic
1999	-0.032 ***	1897	0.170	0.025	1899	4.923
	(-3.098)		(0.680)	(1.061)		(0.178)
2000	-0.019 **	1779	5.732	0.036 *	1784	2.792
	(-1.922)		(0.017)	(1.645)		(0.425)
2001	-0.034 **	1573	3.296	0.063	1589	5.273
	(-2.121)		(0.069)	(1.046)		(0.153)
2002	0.008	1357	2.161	0.014	1374	10.368
	(0.377)		(0.142)	(0.803)		(0.016)
2003	0.084	1141	2.165	0.021	1162	15.455
	(0.940)		(0.141)	(1.320)		(0.002)

Note: *, ** and *** show that the estimated coefficient is statistically significant at the 10 percent significance level, the 5 percent level and the 1 percent level, respectively. t statistics based on robust standard errors are in parentheses. The fiscal year (FY) begins on April 1st and ends on March 31st of the next year. The fiscal year (FY) begins on April 1st and ends on March 31st of the next year. The presented coefficients are those of the logarithm of JASME total loans. For the regressions whose results are reported in column 1, additional independent variables are the marginal q, the cash flow to capital stock ratio and CASUR. Among them, the marginal q and the cash flow to capital stock ratio are considered endogenous. For the regressions whose results are reported in column 2, additional independent variables are the (initial) employment in FY 1998. Instrumental variables (IVs) for the regressions whose results are reported in columns 2 are three financial statement based variables, the logarithm of total assets, ROA and leverage, which are measured as of the fiscal year closing for a firm between April 1997 and March 1998 if the earliest loan contract was extended until March 1998, and are measured as of FY closing for a firm between April 1998 and March 1999 if the earliest contract was extended after April 1998. For the regression whose results are reported in column 1, the logarithm of sales measured as of the same date is added as an IV. Industry dummies for manufacturing, information, transportation, wholesale, retail, finance industries are included as additional independent variables. The other services industry is a base group.

Table 8. The Year by Year Results of the Regressions of ROE and the Investment Rate without Ex-Ante ROA and Leverage as Instrumental Variables

	(1) ROA			(2) Investment Rate			
Fiscal Year	coefficient		N	J statistic	coefficient		N	J statistic
1999	-0.064		1988	6.849	-0.076	***	1658	2.030
	(-1.370)			(0.811)	(-3.030)			(0.170)
2000	-0.004		1862	0.9499	-0.022		1772	7.373
	(-0.093)			(1.000)	(-1.301)			(0.061)
2001	-0.014		1650	3.623	-0.048	***	1589	4.030
	(-0.270)			(0.980)	(-2.857)			(0.258)

Note: *, ** and *** show that the estimated coefficient is statistically significant at the 10 percent significance level, the 5 percent level and the 1 percent level, respectively. t statistics based on robust standard errors are in parentheses. The fiscal year (FY) begins on April 1st and ends on March 31st of the next year. The fiscal year (FY) begins on April 1st and ends on March 31st of the next year. The presented coefficients are those of the logarithm of JASME total loans and those of the logarithm of JASME working capital loans in columns 1 and 2, respectively. For the regressions whose results are reported in column 1, an additional independent variable is the logarithm of the ex-ante total assets. For the regressions whose results are reported in column 2, additional independent variables are the marginal q, the cash flow to capital stock ratio and CASUR Instrumental variables (IVs) for the regressions whose results are reported in column 1 are CAPSUR and the logarithm of total assets measured as of the fiscal year closing for a firm between April 1997 and March 1998 if the earliest loan contract was extended until March 1998, and are measured as of FY closing for a firm between April 1998 and March 1999 if the earliest contract was extended after April 1998. IVs for the regressions whose results are reported in column 2 are CAPSUR and the logarithm of total assets, the logarithm of sales, which are measured as of the fiscal year closing for a firm between April 1997 and March 1998 if the earliest loan contract was extended until March 1998, and are measured as of FY closing for a firm between April 1998 and March 1999 if the earliest contract was extended after April 1998 as well as the logarithms of lagged and twice lagged capital stock the lagged net working capital to total assets ratio and the lagged short-term debt to total assets ratio. Industry dummies for manufacturing, utility, information, transportation, wholesale, retail, finance industries are included as additional independent variables. The other services industry is a base group.