Forgiveness versus financing: The determinants and impact of SME debt forbearance in Japan*

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Abstract

This paper examines the determinants and impact of Japan's debt forbearance policies with regard to small and medium-sized enterprises (SMEs) to test the theoretical predictions of Krugman's (1988) "financing vs. forgiving a debt overhang" analysis. Using unique Japanese firm survey data that identify firms that received "financing" (such as through the deferral of debt repayments) and firms that received "debt forgiveness" (such as through a reduction in principal and/or interest), we find the followings. First, banks choose debt forgiveness for firms with large net borrowing ratios, which is consistent with the theory of debt overhang. Second, banks that are financially sounder than other banks are more likely to choose debt forgiveness for firms with large net borrowing ratios. Third, we find mixed evidence for the argument that banks choose financing to engage in "evergreening". One the one hand, we do not find any associations between banks' financial soundness and their provision of financing for firms with large net borrowing ratios. On the other hand, compared to firms that had not received any debt forbearance, firms that received financing had lower profitability before they received debt forbearance and exhibited worse ex-post performance.

Keywords: debt forbearance, debt overhang, evergreening loans
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1. Introduction

The recent global financial crisis shed light on the long-standing issue in finance as to whether a high level of household and corporate debt generates significant deadweight losses and whether debt forbearance provides significant positive effects on the economy. Theory predicts that a debt overhang distorts borrowers' incentives so that the borrower may forego necessary investments, exert too little effort, and strategically pay out cash to themselves, since the benefits of new investments and business restructuring mainly accrue to creditors (debt holders) rather than equity holders (Myers 1977, Krugman 1988). Myers (1977: 161) argues that "voluntary forbearance would be the simplest and best solution to the investment incentive problem," and some empirical studies find evidence that debt forbearance can correct the incentive problem and improve borrower performance (Giroud et al. 2011, Melzer 2017). Some other studies find evidence that a lender's provision of liquidity can alleviate financial difficulties of distressed firms (e.g., Schäfer 2018). On the other hand, debt forbearance and liquidity provision may generate moral hazard problems on the part of borrowers as they may abuse a culture of prudent borrowing and repayment (Kanz 2016), and may amplify moral hazard on the part of lenders by allowing the "evergreening" of loans to persist (Isagawa et al. 2010, Inoue et al. 2010, Bergant and Kockerols 2017).

Against this background, this paper empirically investigates the determinants and impact of debt forbearance by examining the large-scale debt forbearance policy with regard to SMEs (small and medium-sized enterprises) stipulated in the "Act concerning Temporary Measures to Facilitate Financing for SMEs" (referred to as the "SME Financing Facilitation Act" hereafter), which was implemented between December 2009 and March 2013 in Japan. As explained below, the almost-mandatory nature of the SME Financing Facilitation Act provides a good testing ground for Krugman's (1988) theoretical insights on "financing vs. forgiving debt overhang." Throughout this study, we use the term "financing" for the type of debt forbearance that effectively refinances firms' existing debts, including the extension of borrowing terms and the deferral of debt repayment, while we use the term "debt forgiveness" for the type of debt forbearance that reduces the amount of principal and/or interest firms incur.[1] The main theoretical insights of Krugman (1988) are as follows. First, financing gives lenders an option value in the sense that if it turns out that debtors perform well, lenders will not have to write down their claims. Second, however, it may be in the interest of lenders, as well as that

[1] Following Arrowsmith et al. (2013), we use the term "forbearance" to include both "financing" and "forgiving." Chart 2 of Arrowsmith et al. (2013) classifies debt forbearance into payment delay (which is equivalent to financing) and payment relief (debt forgiveness).

of borrowers, to forgive existing debts if borrowers have a debt overhang, as a result of which the benefits of good borrower performance go largely to lenders.

Based on Krugman's discussion, we hypothesize that lenders choose debt forgiveness if firms suffer from a debt overhang and their expected value of future debt repayment after having their debt forgiven is sufficiently high, while they choose financing otherwise. We examine this hypothesis making use of a unique firm survey of Japanese SMEs that contains detailed information on the debt forbearance they received, if any, after the implementation of the SME Financing Facilitation Act. More specifically, we conduct a probit estimation to examine the determinants of the type of debt forbearance provided by financial institutions after the SME Financing Facilitation Act.

Next, we consider the following possible scenarios to take into account lenders' incentives and institutional features in Japan, which are not taken into account in Krugman (1988). First, the SME Financing Facilitation Act provided an incentive for lenders to provide debt forbearance by allowing lenders under certain conditions to not classify the forborne loans as nonperforming. Thus, the Act may have aggravated the possible moral hazard problem on the part of lenders, as revealed by the so-called evergreening of loans found in previous studies on corporate finance in Japan (Peek and Rosengren 2005, Caballero et al. 2008). The evergreening loan problem is likely to be more acute for firms that received financing than for firms that received debt forgiveness and for banks that are financially unhealthier. We therefore hypothesize that lenders choose financing for firms in a debt overhang if lenders themselves are in financial distress. Second, on the other hand, previous studies suggest that lenders that establish close relationships with distressed firms provide liquidity insurance to them (Schäfer 2018) and that lenders that have a high market share internalize any adverse spillovers that arise from the negative shock to distressed firms (Giannetti and Saidi 2018). These scenarios suggest that lenders are more likely to choose debt forgiveness to firms in a debt overhang when lenders have close relationships with distressed firms and/or when lenders have a high market share. We examine these hypotheses regarding lenders' incentives by conducting additional probit estimations that take into account lenders' incentives to provide financing or debt forgiveness.

Finally, we examine the availability of credit and ex-post performance of firms that received debt forbearance. In this examination, we expand our estimation sample to include firm that had demand for debt forbearance but did not receive it. In order to address the possible selection bias that whether a firm receives debt forgiveness, financing, or does not receive any forbearance measure is endogenous, we use the propensity score matching estimation approach,

where the propensity scores are calculated based on the results of the first-stage multinomial logit estimation. In the propensity score matching, we also use the difference-in-differences strategy to eliminate time-invariant firm characteristics (PSM-DID approach).

We obtain the following empirical results. First, we find that banks are more likely to forgive existing loans if firms are more leveraged as indicated by their net borrowing ratio, which is consistent with the theory of debt overhang. Second, banks that are financially sounder than other banks are more likely to choose debt forgiveness for firms with large net borrowing ratios. In contrast, we do not find that unhealthier banks are more likely to choose financing for debt-laden firms, which is inconsistent with the argument that the banks engage in evergreening by financing existing loans. We do not find strong evidence that banks choose debt forgiveness for firms in a debt overhang when they have close relationships with the firms or when they have a high market share. Third, compared to firms that had not received any debt forbearance, firms that received financing had lower profitability as indicated by their return on assets (ROA) before they received debt forbearance and exhibited worse ex-post performance as indicated by changes in their credit scores. These results are consistent with banks' evergreening of loans, and overall, we obtain mixed empirical results on whether banks provided financing to evergreen loans.

To the best of our knowledge, this study is the first to empirically assess the theoretical insights of Krugman (1988) to examine the determinants and impact of different types of debt forbearance to SMEs. Previous studies either employ event study methodologies to examine stock price reactions to the announcement of debt forbearance (e.g., Isagawa et al. 2010) or examine the ex-post performance of firm that received debt forbearance (e.g., Inoue et al. 2010), but most of these studies do not distinguish the type of debt forbearance. The paper that is the closest to ours is Bergant and Kockerols (2017), which identifies the type of debt forbearance using data on the commercial loans of Irish banks after the Global Financial Crisis. But they do not pay close attention to the type of debt forbearance neither, presumably because they focus on the evergreening of loans by lenders. We also note that many previous studies examine the debt forbearance of either listed firms (Kroszner 1998, Sekine et al. 2003, Inoue et al. 2010, Isagawa et al. 2010) or households (Agarwal et al. 2017, Kanz 2016), while this study examine the debt forbearance of SMEs.

The remainder of the paper proceeds as follows. Section 2 describes the SME Financing Facilitation Act in Japan. Section 3 presents our empirical hypotheses, while Section 4 explains our data, key variables, and the empirical strategy. Section 5 presents the empirical results. Finally, Section 6 concludes.

2. Institutional background

The recent global financial crisis threw the Japanese economy into a severe recession and badly affected many SMEs. In response, the Japanese government, along with a variety of other measures, introduced policy measures to improve credit availability for SMEs.

To lighten the debt burden of existing debt on SMEs, the Japanese government implemented the SME Financing Facilitation Act in December 2009. The Act required financial institutions to make their best effort to respond positively to requests by client SME borrowers to amend loan contract terms, such as deferring loan repayments and reducing the principal of and/or the interest on loans. In order to provide an incentive for financial institutions to accept such requests from borrowers, the Act allowed the amended loans to not be classified as nonperforming loans as long as borrowers made a credible business restructuring plan.[2] While the Japanese government introduced the Act as a temporary measure and initially planned to end it in March 2011, the government extended the Act twice and finally ended it in March 2013. According to statistics provided by the Financial Service Agency, the cumulative number of loans for which firms applied to have the loan contract terms amended was more than 4.37 million, which is remarkable given that the number of SMEs in Japan is about 4 million.[3] In addition, 97.3 percent of the requests by borrower SMEs were accepted. This high acceptance rate suggests that financial institutions felt almost obliged to provide debt forbearance to SMEs due to pressure from the government and/or sufficient incentives to do so voluntarily.

3. Empirical hypotheses and literature review

3.1. Hypotheses development

3.1.1. Determinants of debt forbearance type: debtors' incentives

[2] To be more precise, the amended loans were not classified as nonperforming as long as the borrower firm committed itself to submitting a business restructuring plan to the lender within one year.

[3] The figures are taken from the following website: http://www.fsa.go.jp/news/25/ginkou/20140627-9.html (in Japanese). Note, however, that the number of firms that applied to have their loan contract terms amended likely was much smaller than 4.37 million, because many firms seem to have applied for several loans to be amended and/or applied several times for the same loan to be amended. For example, the *Nikkei Shinbun* (December 30, 2013) reported that in practice about 400,000–500,000 SMEs, i.e., only slightly more than 10 percent of the total SMEs in Japan, were able to amend their loan contract terms.

Our empirical hypotheses closely follow the theoretical insights of Krugman (1988) on debt overhang.[4] We consider the case that the debtor (a firm in our case) has existing debt and is unable to repay part of the debt in due time. The borrower can service the debt by obtaining new loans or by receiving some form of forbearance of existing debt from the lender. If the borrower cannot service the debt, there is a disorderly default.

Assuming that the future is uncertain and that borrower effort is unobservable by the lender, Krugman (1988) theoretically shows the following. First, the lender may provide new money to the borrower even if the expected present value of the future funds that the borrower obtains to service the debt is negative. This is because there exists an option value for the lender to postpone default, which may result in full repayment of existing debt if the borrower turns out to perform well in the future. Thus from the viewpoint of the lender, it has an incentive to "finance" existing debt at an expected loss, as long as the expected present value of financing is larger than that of what the lender can collect in the case of default (liquidation value). Second, while the lender has an incentive to lend, financing existing debt may distort the incentives for a debt-laden borrower, since the benefits of good performance in the future largely go to the lender rather than the firm itself (debt overhang problem). In such cases, forgiving part of the existing debt rather than financing is in the interest of the lender as a way to induce the borrower to make an effort to repay the remaining debt, which will eventually increase the expected value of debt repayment. On the other hand, forgiving existing debt clearly entails the cost of writing down existing claims, so the lender faces a tradeoff. Under such a tradeoff, we would expect the lender to choose partial debt forgiveness only if the borrower faces a debt overhang and the debt forgiveness increases the expected value of future repayment by the borrower. In sum, we put forward the following empirical hypotheses:

Hypothesis 1 (Debtors' characteristics to receive debt forgiveness): Lenders choose forgiving if debtor firms face a debt overhang and the expected value of debt repayment after forgiving debt claims is sufficiently high.

Given the almost-mandatory nature of the SME Financing Facilitation Act described in Section 2, we think that the debt forbearance induced by the Act provides a good testing ground for Krugman's (1988) predictions. The reasons are as follows. First, Krugman (1998) considers

[4] While Krugman (1988) considers debt overhang in public finances, his model can be applied to other borrowers such as households (Kanz 2016) and firms (Giroud et al. 2011, Kroszner 1998). Based on Krugman (1988), we provide a simple theoretical illustration in the Appendix.

a situation in which borrower effort is important for future debt repayment but is unobservable by lenders. Since many SMEs tend to be informationally opaque, this assumption is likely to hold for the sample of this study. Second, Krugman (1998) assumes that the expected liquidation value of a loan and the transaction costs of debt renegotiation are sufficiently small, so that the lender's option to liquidate a loan is not explicitly considered in his analysis. This poses a potential problem, since in practice, as highlighted by Gilson (1997), both the liquidation value of a loan when a firm defaults and the transaction costs involved in debt renegotiation can be quite large. However, because loans to SMEs tend to be small when compared to loans to listed firms, it is likely that the liquidation value of loans to firms in our sample is also relatively small. Regarding transactions costs, it may be costly for banks to renegotiate loan terms with SMEs, but the high acceptance rate of debt forbearance (97.3 percent) highlighted in Section 2 suggests that renegotiation costs were not prohibitively high. Nevertheless, to control for transactions costs, we include proxies for firm size in our empirical analysis.

3.1.2. Determinants of debt forbearance type: lenders' incentives

The theoretical model in Krugman (1988) illustrated above implicitly assumes that lenders are homogenous. However, in reality, lenders' incentives to provide debt forbearance to distressed firms may differ. In this study, we focus on three aspects: lenders' financial soundness, strength of their relationships with firms, and their concentration of loan exposures to a specific region or industry. The literature on which our argument is based is provided in subsection 3.2.

First, as argued above, it is in the interest of a lender to provide debt forgiveness when a firm faces a debt overhang. However, when the lender itself is in financial distress, it may prefer to finance existing loans to avoid the cost of writing down and wait for the full repayment of existing debt, which is suggested by the literature on the so-called evergreening of loans or zombie lending (e.g., Peek and Rosengren 2005, Caballero et al. 2008, Bruche and Llobet 2013). In addition, the SME Financing Facilitation Act may have adversely affected lender incentives by allowing the forborne loans to not be classified as nonperforming loans. Critics of the SME Financing Facilitation Act worried that the Act would generate moral hazard problems on the part of lenders by allowing the evergreening of loans to persist (e.g., International Monetary Fund 2012). With respect to the type of debt forbearance, the evergreening issue is likely to be more acute for firms that received financing than for firms that received debt forgiveness. Then we expect that unhealthy lenders choose financing relative to healthy lenders for firms facing a debt overhang.

Second, lenders that have established close relationships with client firms may offer liquidity insurance when the firms are in distress in order to extract long-term rents and secure future businesses (e.g., Schäfer 2018). If that is the case, we expect that lenders that have more intimate relationships with firms are more likely to provide debt forgiveness to firms facing a debt overhang.

Third, when deciding to provide debt forbearance, lenders with a high market share in a region and/or an industry may internalize any adverse spillovers from negative shocks to their client firms (e.g., Giannetti and Saidi 2018). If that is the case, we expect that lenders that have a more concentrated loan exposures to a particular region or industry are more likely to provide debt forgiveness to firms facing a debt overhang.

Based on the above discussion, we put forward our second empirical hypothesis:

Hypothesis 2 (Lenders' incentives to provide debt forgiveness): Lenders are more likely to provide financing to debtor firms in a debt overhang when their financial conditions are worse than other lenders. Lenders are more likely to provide debt forgiveness to firms in a debt overhang when they have more intimate relationships with the firm and more concentrated loan portfolios.

3.2. Related literature

This study contributes to the following two strands of literature. First, the study contributes to the literature on the impact of debt forbearance on debtor outcomes. Since the seminal theoretical studies by Myers (1977) and Krugman (1988), many empirical studies have examined the theory of debt overhang by investigating the ex-post outcomes of borrowers (households and firms) that experienced legal bankruptcy settlements or private (out-of-court) debt workouts. The results of previous studies are mixed. Studies consistent with the theory of debt overhang include that by Giroud et al. (2011), who examine the private debt restructuring of a sample of highly leveraged Austrian ski hotels and find that a decrease in borrowers' leverage due to private debt restructurings leads to a significant improvement in operating performance. Meanwhile, Kroszner (1998) examines asset price responses to the decision of the U.S. government during the Great Depression to repudiate the gold indexation clauses attached to long-term debts, which effectively reduced the debt-burden of firms that had issued corporate bonds with gold indexation clauses. Kroszner (1998) finds that corporate bond price increased after the Supreme Court upheld the government's decision to repudiate the gold indexation clauses, which suggests that bond investors saw the debt forgiveness in a positive

light. Agarwal et al. (2017) evaluate the impact of the 2009 Home Affordable Modification Program (HAMP) implemented in the United States during the global financial crisis, and report that renegotiations under HAMP resulted in a modest reduction in the rate of foreclosures, although the number of reduced foreclosures was substantially smaller than the program target. In contrast with these studies, Kanz (2016) obtains empirical results that are inconsistent with the theory of debt overhang. Specifically, examining the impact of the 2008 debt relief initiative in India, Kanz (2016) finds that the debt relief led to reduced investment and lower productivity of households that were targeted in the initiative. Kanz (2016) also shows that beneficiaries of the debt relief became less concerned about the reputational consequences of future default, which suggests that debt forbearance policies potentially exacerbate moral hazard on the part of debtors by abusing a culture of prudent borrowing and repayment.

As compared to these preceding studies, we contribute to the literature by examining whether determinants and impacts of the type of debt forbearance (i.e., forgiveness or financing) is consistent with theory of debt overhang. Existing studies do not pay close attention to the type of debt forbearance, presumably because of a data limitation.[5] A notable exception in this regard, and the paper that is the closest to ours, is Bergant and Kockerols (2017), which identify 5 types of debt forbearance (i.e., rollover, amortization stop, term extension, interest rate change, and limit extension). However, unlike this study, they do not provide theoretical reasoning on why lenders choose a particular form of debt forbearance.

The second strand of literature this study is related to is the literature on a lender's liquidity provision when firms are in distress. First, the literature on relationship lending suggests that relationship banks offer liquidity insurance to viable firms that are in temporary distress in order to extract long-term rents and secure future businesses. For instance, Schäfer (2018) finds that, compared to other banks, relationship banks are more likely to provide follow-up financing to client firms when loans become delinquent, but that relationship banks do not experience higher defaults when loans mature and charge higher interest rates on subsequent loans. Meanwhile, Giannetti and Saidi (2018) find that banks that have a large market share in an industry extend more credit than other banks to firms in the same industry during periods of distress. They argue that the result obtains because high-market-share banks

[5] Meanwhile, studies on loan modifications (e.g., Roberts and Sufi, 2009; Roberts, 2015) examines which contract terms are modified in debt renegotiations more frequently and what factors are associated with the type and timing of loan modifications. Unlike this study, these studies do not focus on firms in financial distress.

internalize the negative spillovers of industry downturn. Second, the literature on the so-called evergreening of loans (Peek and Rosengren 2005), forbearance lending (Sekine et al. 2003), and zombie lending (Caballero et al. 2008, Bruche and Llobet 2013), where lenders extend additional loans to insolvent firms in order to gamble on their resurrection, suggests that liquidity insurance to firms in distress may do more harm than good. While the evergreening issue may be especially relevant in Japan, the same problem may exist in other countries as well, e.g., European countries after the Global Financial Crisis (see, for instance, Arrowsmith et al. (2013) for the U.K., Bergant and Kockerols (2017) for Ireland, Schivardi et al. (2017) for Italy, and Homar et al. (2015) and Acharya et al. (2019) for several European countries). In particular, there are several studies that examine the evergreening of loans in the context of debt forbearance. Examining the ex-post performance of Japanese listed firms that experienced out-of-court debt restructuring between 1990 and 2005, Inoue et al. (2010) find that the operating performance of such firms was significantly lower than the industry median. They argue that this result provides evidence of evergreening in the sense that lenders extended insufficient out-of-court debt restructuring in order to avoid accounting losses of their own. Examining the stock price reactions to lending banks' announcement of debt forgiveness between 1999 and 2005, Isagawa et al. (2010) find that banks experience a significant negative announcement effect and the announcement effect is negatively correlated with the bank's financial healthiness. Finally, using loan level data of Irish banks between 2011 and 2016, Bergant and Kockerols (2017) find that banks are more likely to grant forbearance measures to the riskiest group of borrowers when banks face higher levels of non-performing loans relative to their tangible equity. They also find that borrowers who received forbearance measures are more likely to default, which suggests that debt forbearance serves as evergreening of loans. Our study contributes to the literature on the liquidity provision to firms in distress by investigating whether debt forbearance served as a liquidity insurance to firms or evergreening of loans using Japan's SMEs unique data.

4. Data, variables, and empirical approach

4.1. Data and sample selection

The data used in this paper are mainly taken from the Kinyuenkatsukaho Shuryogo ni okeru Kinyu Jittai Chosa (Survey on the Aftermath of the SME Financing Facilitation Act, RIETI survey hereafter) in October 2014.[6] The survey was conducted by the Research Institute of

[6] A paper summarizing the results of this survey is available in Japanese (Uesugi et al. 2015).

Economy, Trade and Industry (RIETI), a research institution affiliated with the Ministry of Economy, Trade and Industry of Japan. The main aim of the RIETI survey was to investigate the effects of the introduction and termination of the SME Financing Facilitation Act on the financing of affected SMEs and on their business conditions. More specifically, the survey asked SMEs about whether they had received debt forbearance from their lenders since December 2009, and if so, about details of the debt forbearance including the date(s) and type, the identity of the lender that provided debt forbearance, the use of public credit guarantees for the forborne loans, and so on. The RIETI survey also asked about the ex-post performance of firms after they received debt forbearance including their general business and financing conditions as well as their relationship(s) with the lender(s) that provided debt forbearance.

The RIETI survey was sent to 20,000 SMEs chosen from the database of Tokyo Shoko Research (hereafter TSR database), a major business database company in Japan. In order to increase the number of respondent firms that experienced debt forbearance, firms to which the survey questionnaires were sent were selected based on the following criteria. First, 4,087 firms for which the words "Joken henko" (amendment of contract terms) and/or "Enkatsukaho" (SME Financing Facilitation Act) were included in the TSR credit reports were selected from the TSR database in order to increase the number of firms that received debt forbearance. Second, 5,207 firms that had responded to a previous RIETI survey conducted in 2008 were selected in order to constitute a control group (firms that did not receive any debt forbearance). Third, because less creditworthy firms are more likely to receive debt forbearance, 10,706 firms with a TSR credit score, which measures a firm's creditworthiness, of less than 50 points were chosen. The number of firms that responded to the RIETI survey is 6,002, for a response rate of about 30%.

Other than the RIETI survey, we employ various additional data sources. First, we use the TSR database to obtain firms' financial statement information. We then match the data obtained from the TSR database with the data in the RIETI survey to construct a firm-level dataset. Because of missing answers to particular questions in the RIETI survey and missing observations in the TSR database, we are left with a sample of 838 firms, at a maximum, for our main analysis in Sections 5.1 and 5.2, which only includes firms that experienced debt forbearance. As we explain below, the number of firms that experienced debt forbearance reduces to 657 when we use covariates other than the key variables. To conduct further analyses in Section 5.3, we also employ an expanded sample with 873 firms, which additionally includes

firms that had demand for but did not receive any debt forbearance.[7] Second, from the RIETI survey, we not only identify firms that experienced debt forbearance but also banks that provided it at the first time after the SME Financing Facilitation Act was implemented. To obtain these banks' financial data, we use the Nikkei Financial Quest database provided by Nikkei Media Marketing, Inc., and Shinyo-kinko Zaimu Shohyo (Financial Statements of Shinkin banks) and Shinyo-kumiai Zaimu Shohyo (Financial Statements of Credit Cooperatives) provided by Kinyu Tosho Consultant sha. The number of banks we use in our estimation sample is 201 at a maximum.

4.2. Key variables

The key variables in our analysis are those that represent the type of debt forbearance that a firm received after the implementation of the SME Financing Facilitation Act. In the RIETI survey, Question 19-2 asked respondent firms about debt forbearance ("Kashitsuke-saiken no hennsai jouken no henko (Amendment of loan contract terms regarding repayments)") during December 2009 to October 2014. Specifically, respondent firms were asked to select one of the following five choices: (1) if a firm had applied for debt forbearance and was approved; (2) if a firm had applied for debt forbearance but was rejected; (3) if a firm wanted to apply for debt forbearance but did not do so in anticipation of being rejected; (4) if a firm wanted to apply for debt forbearance but did not do so in consideration of possible negative effects on its relationship with the lender; (5) if a firm had not applied because it did not need any debt forbearance. If a firm chose "(1) (applied and approved)," then in Question 29 of the RIETI survey, the firm was asked to choose the type of the first debt forbearance it received.[8] Table 1 shows the results using our sample for the main analysis. The most frequently used type of debt forbearance is the deferral of principal (Choice 3 in Question 29) and term extensions (Choices 1 and 2). These types of debt forbearance are effectively equivalent to providing new loans to finance existing debt due and we consequently regard these as "financing." On the other hand, we regard a reduction in the interest rate (Choice 4) and a partial write-off (Choice 5) as "debt forgiveness."[9]

[7] The number of observations when we conduct the treatment effects estimation (explained in Section 4.3.3) is smaller than 873, because not all variables are available for all firms.

[8] As noted in footnote 3, a respondent firm may have experienced debt forbearance on a loan several times. In this case, firms were asked to report the type of debt forbearance and the bank that provided it at the first time.

[9] In Question 29 of the RIETI survey, there are other choices including a debt-equity swap (Choice 6), a debt-debt swap (Choice 7), and other (Choice 8). We regard these as neither financing nor debt forgiveness

[Table 1 here]

More specifically, from Question 19-2 and Question 29 of the RIETI survey, we construct the following debt forbearance variables: FINANCE, FORGIVE, and DF_TYPE (also see Table 2 for definitions). For our analyses in Sections 5.1 and 5.2, we use the sample of firms that experienced debt forbearance to construct FINANCE and FORGIVE. The dummy variable FINANCE takes a value of 1 if a firm answered with Choices 1, 2, or 3 to Question 29 in the RIETI survey. Similarly, the dummy variable FORGIVE takes a value of 1 if a firm answered with Choices 4 or 5 to Question 29 in the RIETI survey. If a firm chose multiple answers (i.e., a firm received more than one type of debt forbearance for a particular loan), we classify the firm based on the most generous forbearance type (i.e., the highest-numbered choice).

We exclude firms that answered *only* "Reduction of interest rate" (Choice 4) to Question 29, as these firms might renegotiate loan interest rates because of their good financial conditions and strong bargaining powers against banks.[10] In an unreported table, we find that firms that selected only Choice 4 are better than other firms that received debt forbearance in terms of business conditions. Because our focus is firms in distress, we decide to exclude these firms from our sample. Note, however, that if a firm answered, for instance, deferral of principal (Choice 3) and reduction of interest rate (Choice 4), we include the firm in our sample and regard it as receiving debt forgiveness because it is unlikely that firms in good financial conditions receive deferral of principal.

For our analyses in Section 5.3, we additionally include firms in our sample that had demand for but did not receive debt forbearance and construct an index variable, DF_TYPE, which takes a value of 0 if firms did not receive any debt forbearance, a value of 1 if firms received financing (FINANCE=1), and a value of 2 if firms received debt forgiveness (FORGIVE=1).

4.3. Empirical approach

and exclude firms that select them from our sample. However, if a firm answered Choice 6, 7, or 8 as well as one of the other choices (Choices 1 to 5), we classify the type of debt forbearance based on its other choice(s).

[10] Roberts and Sufi (2009) report that renegotiations of loan contract terms are rarely a consequence of borrower distress and that increases in borrowers' assets and decreases in their financial leverage increase the probability of receiving lower interest rates.

4.3.1. Determinants of debt forbearance type: Borrowers' characteristics

We begin our analysis by focusing on the determinants of the type of debt forbearance that lender banks chose in order to examine Hypothesis 1 in Section 3.1.1. We use the sample of firms that either received financing (FINANCE=1) or debt forgiveness (FORGIVE=1). We use FINANCE as the dependent variable. In addition, several proxies to examine Hypothesis 1 as well as a range of control variables are used as independent variables. Table 2 presents a list of the variables used in the following analyses, together with their definitions and sources.

[Table 2 here]

Specifically, we first estimate the following probit models:

$$\Pr(\text{FINANCE}_i) = \psi\left(\alpha + \sum_k \beta_{1k}\text{NBRATIO}_{ik} + \beta_2\text{ROA}_i\right) \tag{1}$$

$$\begin{aligned}\Pr(\text{FINANCE}_i) &= \psi\Bigg(\alpha + \sum_k \beta_{1k}\text{NBRATIO}_{ik} + \beta_2\text{ROA}_i + \beta_3\text{PUBG}_i + \beta_4\ln\text{NUMEMP}_i \\ &\quad + \beta_5\ln\text{NUMBANK}_i + \beta_6\text{SALESGROWTH}_i + \beta_7\text{AGE}_i + \mathbf{IND\beta_8}\Bigg)\end{aligned} \tag{2}$$

where subscript *i* denotes each firm. To examine Hypothesis 1, we need variables that represent whether a firm has a debt overhang problem and whether a firm's expected present value of repayment is positive. As a proxy for debt overhang, we use the net borrowing ratio (NBRATIO), which is defined as a firm's net interest-accruing liabilities (interest-accruing liabilities minus cash equivalents) divided by its total assets in (or before) 2008 accounting year, i.e., before the SME Financing Facilitation Act was implemented.[11] According to Hypothesis 1, we expect that banks select forgiving for firms whose net borrowing ratio is above a certain threshold. Because we do not know a priori the level of this threshold, we employ a dummy variable, NBRATIO_k=NBRATIO_X_Y, which indicate whether a firm's NBRATIO is equal to or greater than X percentile point and smaller than Y percentile point. In our estimations, we alternatively use the following 3 patterns of X and Y (the default is

[11] Accounting year 2008 starts in April 2008 and ends in March 2009. If a firm's NBRATIO is missing in 2008 in the TSR database, we use the most recent NBRATIO before 2008. Unless otherwise stated, we apply this procedure for all the variables using the TSR database in equations (1)–(3).

NBRATIO_0_50 in all cases): (1) NBRATIO_50_100, (2) NBRATIO_50_75, NBRATIO_75_90, and NBRATIO_90_100, (3) NBRATIO_50_60, NBRATIO_60_70, NBRATIO_70_80, NBRATIO_80_90, and NBRATIO_90_100. We expect a negative relationship between NBRATIO_X_Y and the probability that bank selects financing for firms whose NBRATIO is equal to or greater than X. As proxies for a firm's net present value, we use ROA in/before 2008. ROA is defined as operating profits divided by total assets. We expect a negative relationship between ROA and the probability that banks select financing.

In addition to these variables, in equation (2), we include various other control variables representing loan and firm characteristics (see Table 2). We construct from the RIETI survey a dummy variable, PUBG, that takes a value of 1 if the loan on which a firm received forbearance was covered by public credit guarantees. During the period of our study, Japan had regular loan guarantee programs as well as a temporary guarantee program called the Emergency Credit Guarantee (EGC) program to facilitate the provision of new loans to SMEs.[12] Under these guarantee programs, loans to SMEs extended by a private financial institution are covered by credit guarantee corporations, which are financially backed by the governments. Because credit guarantees extend to 80–100 percent of the loan amount, the option value of financing existing debt for the lender is larger for loans covered by the guarantee program. Thus we expect that banks select financing if a firm's existing loans are covered by public credit guarantees. lnNUMEMP is defined as the natural logarithm of the number of employees as of December 2009. This variable is included to control for differences in firm size among our sample firms. As noted in Section 3.1, it is important to control for firm size, since the transactions costs involved in debt renegotiations may well be higher for smaller firms. lnNUMBANK is the number of banks a firm transacts with. We include this variable to control for possible coordination failure among lender banks in providing debt forbearance, from which Krugman (1988) abstracts. SALESGROWTH measures the growth rate of gross sales between the two consecutive accounting periods prior to December 2009.[13] We include this variable because firms with higher SALESGROWTH are likely to have a larger working capital demands and are more likely to receive financing, ceteris paribus. AGE is the firm age measured in the number of years since a firm was established as of December 2009. We also include industry dummies to take industry-specific characteristics into account.

[12] The Japanese government introduced the ECG program at the end of October 2008 and ended in April 2011. For details of the ECG program and its effect on the availability of credit for and the ex-post performance of SMEs, see Ono et al. (2013).

[13] To deal with possible outliers, we exclude firms for which SALESGROWTH fall in the upper 1 percentile of the sample.

Table 3 presents descriptive statistics of the variables used in equations (2). They are reported separately for the entire sample and for the subsamples of firms that received financing and firms that received debt forgiveness, to allow comparisons between the two subsamples. Univariate comparisons between firms that received financing and firms that received debt forgiveness show that the mean of the net borrowing ratio (NBRATIO) was higher for firms that received debt forgiveness. Regarding ROA, we find the mean was slightly higher for firms that received debt forgiveness. As for other firm characteristics, firms that received financing had higher growth rate in gross sales (SALESGROWTH) on average.

[Table 3 here]

4.3.2. Determinants of debt forbearance type: Lenders' characteristics

To examine Hypothesis 2 regarding the effects of lenders' incentives to provide debt forgiveness, we estimate the following probit model that includes a bank characteristics variable and its interaction term with NBRATIO$_k$:

$$\begin{aligned}\Pr(\text{dum\_FINANCE}_i) &= \psi\Bigg(\alpha + \gamma_1 \text{BANK}_j + \gamma_2 \text{BANK}_j \times \sum_k \text{NBRATIO}_{ik} + \sum_k \beta_{1k} \text{NBRATIO} \\ &+ \beta_2 \text{ROA}_i + \beta_3 \text{PUBG}_i + \beta_4 \ln\text{NUMEMP}_i + \beta_5 \ln\text{NUMBANK}_i \\ &+ \beta_6 \text{SALESGROWTH}_i + \beta_7 \text{AGE}_i\Bigg),\end{aligned} \tag{3}$$

where BANK_j denotes the characteristics of the bank *j* that provided debt forbearance measures to a firm *i* at the first time between December 2009 and October 2014. In equation (3), we particularly focus on the coefficient β_{1k} to examine Hypothesis 2. As we explain later, we use dummy variables for BANK_j which represent the bank's financial soundness, intimacy of their relationships with the firm, and the concentration of their loan portfolios. For example, suppose that the dummy variable BANK_j indicates whether the bank *j* is financially healthier relative to the other banks. Then, β_{1k} captures whether *unhealthy* banks are more willing to provide financing to the firm, conditional on the level of NBRATIO$_k$=NBRATIO_X_Y. That is, while debt overhang hypothesis (Hypothesis 1) suggests a negative relationship between NBRATIO_X_Y and dum_FINANCE for firms whose NBRATIO is equal to or greater than X in equations (1) and (2), we expect a positive relationship between NBRATIO_X_Y and

FINANCE if unhealthy banks provide financing to evergreen existing loans (Hypothesis 2) in equation (3).

Specifically, we employ following variables for BANK_j. First, as a proxy for the bank's financial soundness, we employ TEXASRATIO, which is defined as:

$$\mathrm{TEXASRATIO} = \frac{\mathrm{Non-performing\ loans}}{\mathrm{Tangible\ equity + Loan\ loss\ allowance}}.$$

As a proxy for a bank's financial soundness to examine whether unhealthy banks are more likely to provide evergreening loans, some studies used banks' capital ratio (e.g., Schivardi et al. 2017) while some other studies used banks' credit risk in their loan portfolios such as the non-performing loans ratio (e.g., Isagawa et al. 2010). Taking these two concepts into account, Bonaccorsi di Patti and Kashyap (2017) construct the dummy variable which indicates whether a bank is "prudent banks" or "gamblers" by combining the bank's capital ratio and the default rate of loan portfolio. Similarly, Bergant and Kockerols (2017) use TEXASRATIO, which is a convenient measure that reflects the level of a bank's capital buffer and the quality of its loan portfolio. We follow Bergant and Kockerols (2017) to use TEXASRATIO as a proxy for banks' financial soundness. Specifically, we construct two dummy variables, TEXASRATIO_HI and TEXASRATIO_LOW. TEXASRATIO_HI takes a value of 1 for banks whose TEXASRATIO is equal to or larger than the sample median and zero otherwise. In contrast, TEXASRATIO_LOW takes a value of 1 for banks whose TEXASRATIO is smaller than the sample median and zero otherwise. We expect β_{1k} is positive for banks with TEXASRATIO_HI if unhealthy banks provide evergreening loans by financing existing loans to firms in a debt overhang.

Second, as a proxy for the strength of firm-bank relationships, we employ BANK_DUR, which measures the length of a firm-bank transaction relationships (in months) as of the month when a bank provided debt forbearance measure at the first time between December 2009 and October 2014. Again, we construct two dummy variables BANK_DUR_HI and BANK_DUR_LOW, where the former (latter) indicates whether a bank's BANK_DUR is equal to or larger (smaller) than the sample median. We expect β_{1k} is negative and larger in absolute values for BANK_DUR_HI-banks compared to BANK_DUR_LOW-banks if banks that have more close relationships with client firms have a larger likelihood to extend debt forgiveness.

Third, as a proxy for the bank's concentration of loan portfolio, we employ HHI_PREFC and HHI_IND which respectively measure the Herfindahl-Hirschman Index

(HHI) constructed from the number of the bank's borrowing firms in each prefecture and in each industry. We construct these measures from the TSR database (KJ file), which contains about 1.5 million firms in Japan and identifies firms' transacting banks. Similar to the manner in which we construct _LO and _HI dummy variables for TEXASRATIO and BANK_DUR, we construct HHI_PREFC_HI, HHI_PREFC_LOW, HHI_IND_HI, and HHI_IND_LOW. We expect β_{1k} is negative and larger in absolute values for HHI_PREF_HI-banks (HHI_IND_HI-banks) compared to HHI_PREF_LOW-banks (HHI_IND_LOW-banks) if banks that have more concentrated loan portfolios extend forgiving more.

4.3.3. The effects of debt forbearance: Treatment effect estimation

In addition to investigate the determinants of the type of debt forbearance, we examine the effect of debt forbearance on credit availability and ex-post performance of firms to investigate whether firms that received financing and debt forgiveness exhibit better outcomes. In this examination, we expand our estimation sample to include firms that had demand for debt forbearance but did not receive it.[14]

Specifically, we employ propensity score matching (PSM) estimation. We allow for multiple treatments and employ a multinomial logit model to obtain propensity scores for each outcome. That is, we employ the index variable DF_TYPE, whose values in the set $\{0,1,2\}$ correspond to three mutually exclusive debt forbearance outcomes: DF_TYPE=0 (the firm did not receive debt forbearance), DF_TYPE=1 (the firm received financing), and DF_TYPE=2 (the firm received debt forgiveness). By matching treatment firms (e.g., firms that received debt forgiveness) with the appropriate control firms (e.g., firms that did not receive debt forbearance) that have the "closest" propensity scores, which are calculated based on the multinomial logit model, we create a sample that is assumed to be sufficiently similar to the one generated by randomization. In addition, as we explain below, we use difference-in-differences (DID) measures to difference time-invariant unobservable characteristics between the treatment and control observations.

[14] As noted in Section 4.2, Question 19-2 of the RIETI survey asked respondent firms about debt forbearance and firms were asked to select one of the following choices: (1) if a firm had applied for debt forbearance and was approved; (2) if a firm had applied for debt forbearance but was rejected; (3) if a firm wanted to apply for debt forbearance but did not do so in anticipation of being rejected; (4) if a firm wanted to apply for debt forbearance but did not do so in consideration of possible negative effects on its relationship with the lender; (5) if a firm had not applied because it did not need any debt forbearance. We regard firms that answered either (2), (3), or (4) as those that had demand for debt forbearance but did not receive it.

We use two measures of credit availability and five measures of ex-post firm performance to examine the effects of the SME Financing Facilitation Act on firms that received different types of debt forbearance. Panel (c) of Table 2 shows the definition of each measure and the data sources. Regarding credit availability, we construct two variables from the RIETI survey that measure the change in a firm's credit availability between December 2009 (i.e., when the SME Financing Facilitation Act was implemented) and October 2014 (i.e., when the RIETI survey was conducted). D_FINCOND is a dummy variable representing the change in a firm's financial conditions. Similarly, D_BANK_ATTITUDE is a dummy variable representing the change in banks' lending attitude. These variables take a value of 1 when responding firms' financial condition or banks' lending attitude improved.[15]

As for variables representing firms' ex-post firm performance, we employ D_SCORE, D_lnNUMEMP, D_TANGIBLERATIO, D_ROA, and D_SALESGROWTH. We construct these ex-post performance variables from the TSR database. D_SCORE is the change in the TSR score (1-100 points), where a higher value indicates a greater creditworthiness. D_lnNUMEMP is the change in the number of employees in natural logarithm. D_TANGIBLERATIO is the change in tangible assets divided by total assets and serves as a proxy of a firm's new investment. D_ROA is the change in ROA, while D_SALESGROWTH is the change in sales growth. We measure the change as the difference between 2008 accounting year (i.e., before the firm received debt forbearance) and 2013 accounting year (i.e., after the firm received debt forbearance).

We expect that firms that received debt forbearance, either forgiveness or financing, exhibit better availability of credit and ex-post performance than firms that did not receive any debt forbearance measures and therefore should take a larger value for the variables described above. However, if debt forbearance exacerbates moral hazard problem on the part of borrowers by abusing the culture of prudent borrowing and repayment (Kanz 2016) or on the part of lenders by allowing the evergreening of loans to persist (Caballero et al. 2008), we expect that firms that received debt forbearance exhibit worse outcomes. When we compare firms that received debt forgiveness and those that received financing, we expect that firms that received debt forgiveness (financing) exhibit better (worse) credit availability and performance because of improved debtor incentives by debt forgiveness and/or evergreening of loans by financing.

[15] In the RIETI survey, firms were asked to indicate whether it (1) improved; (2) improved somewhat; (3) remained unchanged; (4) worsened somewhat; or (5) worsened. We assign a value of 1 if a firm responded (1) or (2).

5. Results

5.1. Probit estimation: Debtors' incentives

Table 4 presents the results of the probit estimation to examine Hypothesis 1 presented in Section 3.1.1. Model-1 and Model-2 respectively correspond to equations (1) and (2) in Section 4.3.1. First, we find that the marginal effect on NBRATIO_50_100 is significantly negative (default is NBRATIO_0_50). The result implies that firms whose net borrowing ratio is above the sample median are more likely to receive debt forgiveness compared to firms below the median, which is consistent with debt overhang hypothesis. When we divide NBRATIO_50_100 into quartile or 10 deciles, we find that the statistical significance and the quantitative impact of NBRATIO on receiving debt forgiveness is larger for firms whose net borrowing ratio is above the 80 percentile point. These results are also in line with debt overhang hypothesis. The coefficients on ROA are negative but insignificant in all cases.

[Table 4 here]

As for other control variables that represent firm and loan characteristics, we find that the marginal effect on SALESGROWTH is significantly positive, indicating firms with higher growth in gross sales are more likely to receive financing. This suggests that banks provide financing to firms with larger working capital demands. None of the other control variables are statistically significant.

5.2. Probit estimation with the interaction term: Lenders' incentives

In this subsection, we investigate whether the financial soundness of banks that provided debt forbearance, strength of the firm-bank relationships, and concentration of the bank's loan portfolio affected the likelihood that a firm received debt forgiveness. Figures 1–4 show the estimation results for β_{1k}, coefficient on NBRATIO, in equation (3). Figure 1 shows estimation results when we use TEXASRATIO as the bank characteristics variable, while Figure 2 shows those when we use BANK_DUR. Figures 3 and 4 show estimation results when using HHI_PREFC and HHI_IND, respectively. In Figures 1–4, each dot corresponds to the point estimate of β_{1k}, while the vertical line represents 90% confidence interval. Panel (a) and (b) respectively show estimation results when we alternately use (a) NBRATIO_50_100 and (b) (b) NBRATIO_50_60, NBRATIO_60_70, NBRATIO_70_80, NBRATIO_80_90, and

NBRATIO_90_100. In each panel, dots and lines on the left correspond to β_{1k} when the bank characteristics variable is smaller than the sample median (e.g., TEXASRATIO_LOW), while those on the right correspond to β_{1k} when the bank characteristics variable is equal to or larger than the sample median (e.g., TEXASRATIO_HI).

[Figure 1–4 here]

Figure 1 shows that β_{1k} is significantly negative on NBRATIO_50_100 in Panel (a) and on NBRATIO_80_90 and NBRATIO_90_100 in Panel (b) for the subsample of TEXASRATIO_LOW. These results suggest that banks are more likely to provide debt forgiveness to firms with higher NBRATIO (i.e., firms in debt overhang) when these banks are financially sound. On the other hand, β_{1k} are insignificant for the subsample of TEXASRATIO_HI. Thus we do not find evidence that banks provided financing to evergreen existing loans to debt-laden firms.

In Panel (a) of Figure 2, β_{1k} is insignificant for both subsamples, BANK_DUR_LOW and BANK_DUR_HI. In Panel (b) of Figure 2, we find that β_{1k} is significantly negative on NBRATIO_90_100 for the subsample of BANK_DUR_LOW and on NBRATIO_80_90 for the subsample of BANK_DUR_HI. Overall, we do not find evidence that banks are more likely to extend debt forgiveness to firms in debt overhang when the duration of firm-bank relationships is longer.

In Panel (a) of Figure 3, β_{1k} is significantly negative on NBRATIO_50_100 for the subsample of HHI_PREFC_HI, which suggests that banks are more likely to provide debt forgiveness to firms in debt overhang when their loan portfolios are more concentrated geographically. However, when we look into Panel (b) of Figure 3, we find that β_{1k} are insignificant for the subsample of HHI_PREFC_HI. Turning to the subsample of HHI_PREFC_LOW, β_{1k} is significantly positive on NBRATIO_70_80 and negative on NBRATIO_80_90. Overall, the effect of banks' geographical concentration of loan portfolios on their choice of debt forbearance types is ambiguous. Finally, Figure 4 shows that β_{1k} are insignificant in all cases, which suggest that banks' concentration of loan portfolios in terms of industry did not affect their choice of debt forbearance types.

5.3. Treatment effect estimation using multiple treatments

In this subsection, we investigate the effect of debt forbearance on firms' availability of credit and performance using an expanded sample, which, in addition to the firms included in the sample in the previous sections, also includes firms that had demand for but did not receive debt forbearance, i.e., firms with DF_TYPE=0. As a result, the number of firms in the sample increases from the 657 firms in the previous two sections to 873 firms. We use firms for which DF_TYPE=0 as the control group for multiple treatment groups, namely, either for firms that received financing or firms that received debt forgiveness. We also report the estimation result when we use firms that received financing as the control group and firms that received debt forgiveness as the treatment group.

[Table 5 here]

[Table 6 here]

Table 5 reports descriptive statistics separately for firms that received debt forbearance and firms for which DF_TYPE=0, while Table 6 presents the results of the multinomial logit estimation. In Table 6, the marginal effect of each covariate evaluated at the mean on DF_TYPE is shown. Column (1) shows the marginal effects on the likelihood that a firm will receive no debt forbearance. The results indicate that firms with a larger net borrowing ratio (NBRATIO_X_Y) and firms with a lower growth in gross sales (SALESGROWTH) are more likely to receive debt forbearance. Turning to columns (2) and (3), we find that the determinants of the probability that a firm will receive debt financing or debt forgiveness are basically the same as those obtained in the probit estimation in Table 4, but we also note several differences. To be more precise, we find that the marginal effects of NBRATIO_X_Y on receiving debt forgiveness are significantly positive in column (3) while those on receiving financing are insignificant in column (2), which are qualitatively the same as those in Table 4. However, from column (2), we find that the marginal effect of ROA on receiving debt financing is significantly negative. This result indicates that firms with lower profitability are more likely to receive financing, possibly because of evergreening of loans by lender banks. Turning to other covariates in columns (2) and (3), we find that firms with lower growth in gross sales (SALESGROWTH) are more likely to receive debt forgiveness, while firms with a higher growth in sales (SALESGROWTH) and younger firms (AGE) are more likely to receive debt financing.

[Table 7 here]

Next, Table 7 presents the estimation results for the treatment effects based on the propensity scores calculated from the multinomial logit model in Table 6. When we use firms that did not receive debt forbearance as the control group, we find that the PSM-DID estimates of D_FINCOND and D_BANK_ATTITUDE, which represent changes in the availability of credit, are insignificant. These results suggest that the availability of credit of firms that received debt forbearance did not improve after they received debt forbearance. When we look at the estimation result in which firms that received financing are the control group and firms that received debt forgiveness are the treatment group, the PSM-DID estimate of D_BANK_ATTITUDE is significantly positive, which suggests that the lending attitude of banks that provided debt forgiveness to firms improved compared to that of banks that provided financing.

Next, turning to the outcome variables representing firms' ex-post performance, when we use firms that did not receive debt forbearance as the control group, we find that the PSM-DID estimate of D_SCORE is significantly negative for firms that received financing. This result indicates that the creditworthiness of firms that received financing worsened, and suggests that the bank provided financing in order to engage in evergreening loans. However, when we look at the estimation results in which firms that received financing are the control group and firms that received debt forgiveness are the treatment group, we find that none of the PSM-DID estimates are significant, which suggest that the impacts of debt forbearance on firms' ex-post performance are weak.

To summarize, the results in Table 7 indicate that firms that received debt forgiveness did not exhibit better availability of credit and ex-post performance than firms that did not receive any debt forbearance. For firms that received financing, their creditworthiness as indicated by the TSR score turned worse than firms that did not receive any debt forbearance, and banks' lending attitude to these firms worsened more than to firms that received debt forgiveness.

6. Conclusion

In this paper, we empirically investigated the determinants and effects of different debt forbearance policies toward small and medium-sized enterprises (SMEs) in Japan using a unique firm survey dataset with which we are able to identify firms that received financing and

firms that received debt forgiveness after the implementation of the SME Financing Facilitation Act. Our main findings can be summarized as follows.

First, we found that banks choose debt forgiveness in the case of firms that are more leveraged, which is consistent with the theory of debt overhang. Second, we found that banks choose debt forgiveness for leveraged firms when they are financially sounder. In contrast, we did not find any associations between banks' financial soundness and the provision of financing, which is inconsistent with the argument that banks provide financing to engage in evergreening. We did not find strong evidence that banks choose debt forgiveness to firms in a debt overhang when they have close relationships with the firm or when they have a high market share. Third, compared to firms that did not receive any debt forbearance, firms that received financing had lower profitability before they received debt forbearance and exhibit worse ex-post performance. These results are consistent with banks' evergreening of loans, and overall, our empirical findings on banks' evergreening are mixed.

Appendix. A simple model of debt forbearance

We provide a simple model based on Krugman (1988), which describes a bank's decision to forgive a loan to a firm by reducing the amount of debt in order to resolve inefficiency caused by the debt overhang problem of the borrowing firm. To make the point clear, this model focuses only on the determination of debt forgiveness and does not deal with option value for deferring debt repayment; i.e., we consider debt overhang without uncertainty.

We consider an economy with three dates, $t = 0, 1, 2$. There are a bank and a firm. The bank is risk-neutral, has no discounting across the periods, and maximizes the value of the loan to the firm. The firm is also risk neutral, has no discounting across the period, borrows only from the bank, and maximizes the firm value accruing to its shareholders that are subject to limited liability.

Now, consider a situation where the firm comes into the initial date, date 0, with a bank loan that has a face value D_F and matures at date 0. We assume that the firm cannot repay D_F, and so at the same date, the bank reviews the loan and decides whether it rolls over the loan with the same face value D_F ("financing") or reduces the debt's face value to D_G ("debt forgiveness"). We assume that liquidation of the loan is too costly. At date 1, the firm chooses whether it conducts a costly business restructuring in order to increase the firm value. At date 2, the firm value realizes and the debt matures. If the firm does not conduct the restructuring, the firm value will be X at date 2. On the other hand, if the firm conducts the restructuring, the

firm value at date 2 will increase by Y to $X + Y$, but the firm incurs non-pecuniary adjustment costs C. Note that Y represents the net amount of increased firm value after deducting the *pecuniary* adjustment costs. We assume that $Y > C > 0$ and that there is no uncertainty about the values of X, Y, and C.

Since the amount of debt affects the payoff to the firm at date 2, it also affects the incentive of the firm at date 1. As Krugman (1988) and many others point out, if the debt burden is too large, the firm may have an incentive not to conduct a value-enhancing restructuring. This is a debt overhang problem. Debt overhang also reduces the payoff to the bank since the firm fails to increase its value from which the debt is repaid. In order to resolve this problem, the bank tries to induce the firm to conduct a value-enhancing restructuring by reducing the debt burden that the firm incurs. Using our simple model here, we would like to derive the condition under which the bank forgives the debt to the firm.

To this end, let us denote by D the amount of debt that is due at date 2, which is determined at date 0. Then, the payoff to the firm at date 2 when it does not conduct the restructuring is given by

$$\mathrm{Max}[X - D, 0]. \tag{1}$$

The payoff to the firm at date 2 when it conducts the restructuring is given by

$$\mathrm{Max}[X + Y - D, 0] - C. \tag{2}$$

Now, suppose that $X - D \geq 0$. Then, we can easily see that $\mathrm{Max}[X - D, 0] = X - D < X + Y - D - C = \mathrm{Max}[X + Y - D, 0] - C$ (since $Y - C > 0$ by assumption). Thus, the firm conducts the value-enhancing restructuring at date 1, and there is no debt overhang problem. Note that the payoff to the bank at date 2 is D.

Suppose on the contrary that $X - D < 0$. Also, denote by D^* the debt level at which the firm is indifferent between conducting the costly restructuring and not conducting the restructuring. Note that D^* satisfies

$$\mathrm{Max}[X - D^*, 0] = \mathrm{Max}[X + Y - D^*, 0] - C. \tag{3}$$

From the above, we see that if $X - D^* \geq 0$, equation (3) cannot be met. Hence, D^* must satisfy $X - D^* < 0$. Then, since $\mathrm{Max}[X - D^*, 0] = 0 = \mathrm{Max}[X + Y - D^*, 0] - C$, $\mathrm{Max}[X + Y - D^*, 0] = C > 0$. Thus, $0 = X + Y - D^* - C$ or $D^* = X + Y - C$. We can easily check that if $D < D^*$, $\mathrm{Max}[X - D, 0] < X + Y - D - C = \mathrm{Max}[X + Y - D, 0] - C$ i.e., the firm conducts the value-enhancing restructuring at date 1. The payoff to the bank at date 2 is D in this case. On

the other hand, if $D > D^*$, then $\mathrm{Max}[X - D, 0] = 0 > \mathrm{Max}[X + Y - D, 0] - C$ i.e., the firm does not conduct the restructuring at date 1. The debt overhang by the firm occurs here and the payoff to the bank at date 2 is X ($< D$).

Now, consider the situation at date 0 where the firm bears the bank loan with the face value D_F. From the argument above, we can see that as long as the firm conducts the value-enhancing restructuring at date 1, the firm can repay the debt so that the bank receives the face value D_F at date 2. However, if the amount of debt D_F is so large that the debt overhang problem arises or the firm does not conduct the value-enhancing restructuring at date 1, it defaults at date 2 and the bank can recover only X, which is strictly less than D_F. In this case, it is in the interest of the bank to reduce the debt level to D_G in order to induce the firm to conduct the value-enhancing restructuring, and to recover D_G at date 2, which is larger than X. Assuming that the firm chooses to conduct the restructuring when the payoff from conducting the restructuring is the same as that from not conducting the restructuring, bank will set $D_G = D^*$ in order to induce the firm conducting the restructuring. Thus, we have the following proposition.

Proposition:

Let $D^* = X + Y - C$. Assume that the firm chooses to conduct the value-enhancing restructuring when the payoff from conducting the restructuring is the same as that from not conducting the restructuring. Then,

(i) If $D_F \leq D^*$, then the bank rolls over the original debt with the face value D_F at date 0, and the firm conducts the value-enhancing restructuring at date 1. In this case, the payoff to the bank at date 2 is D_F and that to the firm is $X + Y - D_F - C$.

(ii) If $D_F > D^*$, then the bank forgives the debt and reduces its face value to $D_G = D^*$ at date 0, and the firm conducts the value-enhancing restructuring at date 1. In this case, the payoff to the bank at date 2 is D_G and that to the firm is $X + Y - D_G - C$.

We state several implications of this proposition as the following corollary.

Corollary:

Other things being equal,

(i) the bank forgives the debt when the initial debt is large enough i.e., $D_F > D^*$. That is, the larger the amount of initial debt is, the more likely the bank is to forgive the debt.

(ii) as $Y - C$ increases, $D^* = X + Y - C$ increases or $D_F - D^*$ decreases. That is, the larger the net value added from the restructuring is, the smaller the amount of debt reduction is to induce the firm to conduct the restructuring.

(iii) as C increases, $D^* = X + Y - C$ decreases or $D_F - D^*$ increases. That is, the larger the non-pecuniary adjustment cost for the restructuring is, the larger the amount of debt reduction is to induce the firm to conduct the restructuring.

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Tables

Table 1 Distribution of types of debt forbearance

	Financing or Forgiving	Sample eqn. (1)	Sample eqn. (2)
Number of obs.		838	657
1. Term extension of up to one year	Financing	23.3%	21.8%
2. Term extension of more than a year	Financing	40.8%	42.3%
3. Deferral of principal	Financing	42.2%	43.1%
4. Reduction of interest rate	Forgiving	7.8%	8.4%
5. Partial write-off	Forgiving	10.7%	10.7%

Notes: This table presents the percentage shares of firms in terms of the type of debt forbearance they received (on the occasion of their first debt forbearance) between December 2009 and October 2014. Percentages add up to more than 100%, since firms may have received more than one type of debt forbearance for a particular loan.

Table 2 Variables and their definitions

Variable	Definition	Data source[(a)]
Panel (a): Debt forbearance variables		
FINANCE	1 if a firm received debt forbearance including the postponement of interest and/or principal repayments between December 2009 and October 2014, 0 otherwise	RIETI
FORGIVE	1 if a firm received debt forbearance including a reduction in principal and/or interest between December 2009 and October 2014, 0 otherwise	RIETI
DF_TYPE	0 if 0 if a firm had demand for debt forbearance but did not receive it (either rejected, did not apply because the firm thought that the application would be rejected, or did not apply because the firm thought that the application would negatively affect the relationship with a lender), 1 if FINANCE=1, 2 if FORGIVE=1	RIETI
Panel (b): Determinant variables		
Firm and loan characteristics[(b)]		
NBRATIO_X_Y	NBRATIO=(interest-accruing liabilities−cash equivalents) / total assets, as of 2008 accounting year. NBRATIO_X_Y is 1 if a firm's NBRATIO is equal to or greater than X percentile point and smaller than Y percentile point in our sample, 0 otherwise.	TSR
ROA	Operating profit / total assets, as of 2008 accounting year	TSR
PUBG	1 if the forborne loan was covered by a public credit guarantee program, 0 otherwise	RIETI
lnNUMEMP	Natural logarithm of number of employees, as of December 2009	RIETI
lnNUMBANK	Natural logarithm of number of banks firm transacted with, as of December 2009	RIETI
SALESGROWTH	Growth rate of gross sales between the two consecutive accounting periods before December 2009.	TSR
AGE	Firm age, as of December 2009	RIETI
IND1-IND9	Industry dummies, as of 2008 accounting year: (1) construction, (2) manufacturing, (3) communication and information, (4) transportation, (5) wholesale, (6) retail, (7) real estate, (8) services, and (9) other	TSR
Bank characteristics[(c)]		
TEXASRATIO_{HI, LOW}	TEXASRATIO=non-performing loans / (tangible equity + loan loss allowance), as of March 2009. TEXASRATIO_HI (LOW) is 1 if a bank's TEXASRATIO is equal to or larger (smaller) than the sample median, 0 otherwise.	BANK
BANK_DUR_{HI, LOW}	BANK_DUR is the length (in months) of firm-bank transaction relationships, as of the month when a bank provided debt forbearance measure at the first time between December 2009 and October 2014. BANK_DUR_HI (LOW) is 1 if a bank's BANK_DUR is equal to or larger (smaller) than the sample median, 0 otherwise.	RIETI
HHI_PREFC_{HI, LOW}	HHI_PREFC is the Herfindahl-Hirschman Index regarding the number of a bank's customer firms in each prefecture. HHI_PREFC_HI (LOW) is 1 if a bank's HHI_PREFC is equal to or larger (smaller) than the sample median, 0 otherwise.	TSR
HHI_IND_{HI, LOW}	HHI_IND is the Herfindahl-Hirschman Index regarding the number of a bank's customer firms in each industry (2-digit level). HHI_PREFC_HI (LOW) is 1 if a bank's HHI_IND is equal to or larger (smaller) than the sample median, 0 otherwise.	TSR
Panel (c): Outcome variables[(d)]		
Credit availability		
D_FINCOND	1 if a firm's financing condition "improved somewhat" or "improved" between December 2009 and October 2014, 0 otherwise	RIETI
D_BANK_ATTITUDE	1 if a firm's transacting banks' lending attitude "improved somewhat" or "improved" between December 2009 and October 2014, 0 otherwise	RIETI

Ex-post firm performance		
D_SCORE	Change in TSR credit score (1-100 points; a higher score indicates greater creditworthiness) between 2008 and 2013	TSR
D_lnNUMEMP	Change in number of employees between 2008 and 2013	TSR
D_TANGIBLERATIO	Change in tangible assets / total assets between 2008 and 2013	TSR
D_ROA	Change in ROA (operating profit / total assets) between 2008 and 2013	TSR
D_SALESGROWTH	Change in SALESGROWTH between 2008 and 2013	TSR

Notes: (a) Regarding the data sources, "RIETI" stands for the RIETI Survey, "TSR" stands for the TSR database, and "BANK" stands for banks' financial data we obtained from Nikkei Financial Quest database, Shinyo-kinko Zaimu Shohyo, and Shinyo-kumiai Zaimu Shohyo. (b) For firms' accounting variables taken from "TSR", we use the figure in 2008 accounting year (April 2008–March 2009). If the figure in 2008 is missing, we use the most recent one before 2008. (c) For bank characteristics variables, the bank is the one that provided debt forbearance at the first time between December 2009 and October 2014. (d) For outcome variables with the prefix "D," the change (difference) between December 2009 and October 2014 is measured for variables taken from "RIETI", while the change (difference) between 2008 accounting year and 2013 accounting year is measured for variables taken from "TSR". If the figure in 2008 is missing in "TSR", we use the most recent one before 2008. We do not use observations if the figure in 2013 is missing in "TSR".

Table 3 Descriptive statistics: Debt forgiveness vs. financing

	All				FINANCE=1				FORGIVE=1			
	N	mean	sd	p50	N	mean	sd	p50	N	mean	sd	p50
(a) Debt forbearance variables												
FINANCE	657	0.820	0	1	539	1	0	1	118	0	0	0
FORGIVE	657	0.180	0	0	539	0	0	0	118	1	0	1
(b) Determinant variables												
Firm and loan characteristics												
NBRATIO	657	0.616	0.406	0.591	539	0.608	0.420	0.576	118	0.649	0.335	0.636
NBRATIO_50_100	657	0.487	0.500	0	539	0.464	0.499	0	118	0.593	0.493	1
NBRATIO_50_75	657	0.250	0.433	0	539	0.237	0.426	0	118	0.305	0.462	0
NBRATIO_75_90	657	0.139	0.346	0	539	0.134	0.341	0	118	0.161	0.369	0
NBRATIO_90_100	657	0.099	0.299	0	539	0.093	0.290	0	118	0.127	0.335	0
NBRATIO_50_60	657	0.099	0.299	0	539	0.091	0.288	0	118	0.136	0.344	0
NBRATIO_60_70	657	0.105	0.307	0	539	0.102	0.303	0	118	0.119	0.325	0
NBRATIO_70_80	657	0.100	0.301	0	539	0.106	0.308	0	118	0.076	0.267	0
NBRATIO_80_90	657	0.084	0.277	0	539	0.072	0.259	0	118	0.136	0.344	0
NBRATIO_90_100	657	0.099	0.299	0	539	0.093	0.290	0	118	0.127	0.335	0
ROA	657	-0.044	0.159	0.000	539	-0.047	0.168	0.000	118	-0.029	0.106	-0.001
PUBG	657	0.842	0.365	1	539	0.850	0.358	1	118	0.805	0.398	1
lnNUMEMP	657	3.208	1.072	3.135	539	3.204	1.054	3.178	118	3.225	1.155	3.135
lnNUMBANK	657	1.205	0.606	1.386	539	1.199	0.616	1.386	118	1.234	0.559	1.386
SALESGROWTH	657	1.017	1.600	0.914	539	1.073	1.752	0.918	118	0.760	0.410	0.904
AGE	657	40.985	16.213	41.000	539	40.605	16.383	40.000	118	42.720	15.356	42.000
IND1	657	0.279	0.449	0	539	0.278	0.449	0	118	0.280	0.451	0
IND2	657	0.338	0.473	0	539	0.336	0.473	0	118	0.347	0.478	0
IND3	657	0.027	0.163	0	539	0.032	0.175	0	118	0.008	0.092	0
IND4	657	0.041	0.199	0	539	0.045	0.206	0	118	0.025	0.158	0
IND5	657	0.111	0.315	0	539	0.106	0.308	0	118	0.136	0.344	0
IND6	657	0.084	0.277	0	539	0.083	0.277	0	118	0.085	0.280	0
IND7	657	0.030	0.172	0	539	0.030	0.170	0	118	0.034	0.182	0
IND8	657	0.006	0.078	0	539	0.007	0.086	0	118	0.000	0.000	0
IND9	657	0.084	0.277	0	539	0.083	0.277	0	118	0.085	0.280	0
Bank characteristics												
TEXASRATIO	545	0.498	0.284	0.435	447	0.492	0.284	0.432	98	0.525	0.285	0.490
TEXASRATIO_HI	545	0.514	0.500	1	447	0.503	0.501	1	98	0.561	0.499	1
TEXASRATIO_LOW	545	0.486	0.500	0	447	0.497	0.501	0	98	0.439	0.499	0
BANK_DUR	400	351.480	202.572	336.000	324	338.895	193.435	330.500	76	405.132	231.440	383.500
BANK_DUR_HI	400	0.518	0.500	1	324	0.500	0.501	1	76	0.592	0.495	1
BANK_DUR_LOW	400	0.483	0.500	0	324	0.500	0.501	1	76	0.408	0.495	0
HHI_PREFC	574	0.493	0.394	0.564	472	0.486	0.395	0.505	102	0.526	0.394	0.658
HHI_PREFC_HI	574	0.497	0.500	0	472	0.487	0.500	0	102	0.539	0.501	1
HHI_PREFC_LOW	574	0.503	0.500	1	472	0.513	0.500	1	102	0.461	0.501	0
HHI_IND	574	0.018	0.009	0.017	472	0.017	0.009	0.017	102	0.019	0.009	0.017
HHI_IND_HI	574	0.510	0.500	1	472	0.504	0.501	1	102	0.539	0.501	1
HHI_IND_LOW	574	0.490	0.500	0	472	0.496	0.501	0	102	0.461	0.501	0

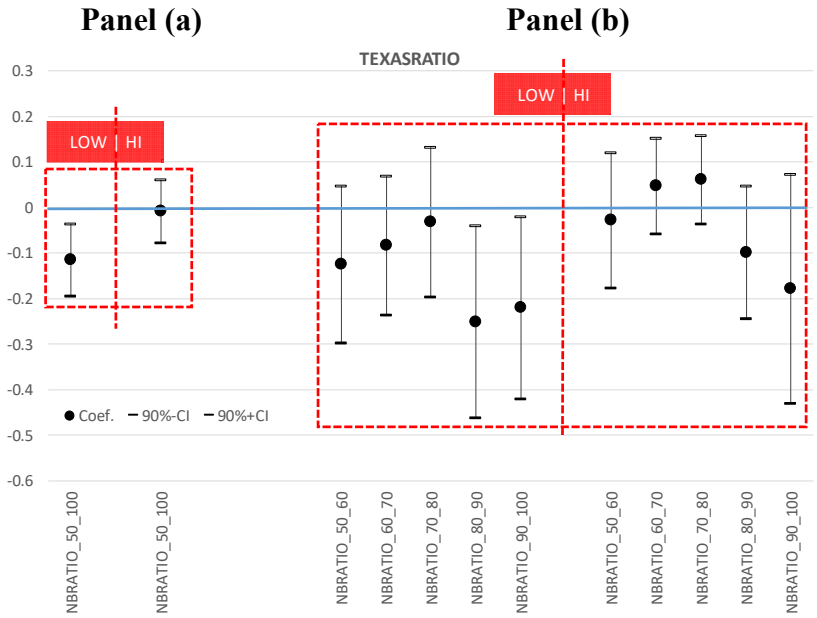
Notes: This table presents summary statistics of the dependent and independent variables used in the probit estimation in Table 4. Definitions of the variables are provided in Table 2. The block of columns labeled "FINANCE=1" reports summary statistics for firms that received financing. The block of columns labeled "FORGIVE=1" reports summary statistics for firms that received debt forgiveness.

Table 4 Determinants of the type of debt forbearance (Probit model): Forgiveness vs. financing

Dependent variable:	Model-1		Model-2		Model-1		Model-2		Model-1		Model-2	
FINANCE	(1)		(2)		(3)		(4)		(5)		(6)	
	dy/dx	(S.E.)	dy/dx	(S.E.)	dy/dx	(S.E.)	dy/dx	(S.E.)	dy/dx	(S.E.)	dy/dx	(S.E.)
NBRATIO_50_100	-0.078	(0.026) ***	-0.0788	(0.029) ***								
NBRATIO_50_75					-0.066	(0.035) **	-0.073	(0.039) **				
NBRATIO_75_90					-0.091	(0.045) **	-0.078	(0.052) *				
NBRATIO_90_100					-0.130	(0.060) **	-0.152	(0.074) **				
NBRATIO_50_60									-0.075	(0.052)	-0.107	(0.060) **
NBRATIO_60_70									-0.063	(0.051)	-0.056	(0.054)
NBRATIO_70_80									-0.037	(0.050)	-0.002	(0.050)
NBRATIO_80_90									-0.130	(0.056) ***	-0.160	(0.072) ***
NBRATIO_90_100									-0.137	(0.060) ***	-0.151	(0.073) **
ROA	-0.130	(0.095)	-0.199	(0.141)	-0.154	(0.102)	-0.234	(0.149)	-0.159	(0.100)	-0.236	(0.148)
PUBG			0.034	(0.041)			0.033	(0.041)			0.033	(0.041)
NUMEMP			-0.006	(0.017)			-0.007	(0.017)			-0.006	(0.017)
NUMBANK			-0.002	(0.024)			-0.006	(0.025)			-0.008	(0.025)
SALESGROWTH			0.099	(0.035) ***			0.100	(0.035) ***			0.096	(0.035) ***
AGE			-0.001	(0.001)			-0.001	(0.001)			-0.001	(0.001)
Industry dummies	Yes		Yes		Yes		Yes		Yes		Yes	
Estimation method:	Probit											
Sample selection:	Firms that received debt forbearance (FINANCE=1 or FORGIVE=1)											
Obs.	838		653		838		653		838		653	
Wald chi2	14.250		23.170		15.590		24.070		17.440		30.510	
Prob>chi2	0.162		0.058		0.211		0.088		0.233		0.033	
Pseudo R-squared	0.020		0.043		0.022		0.045		0.024		0.053	

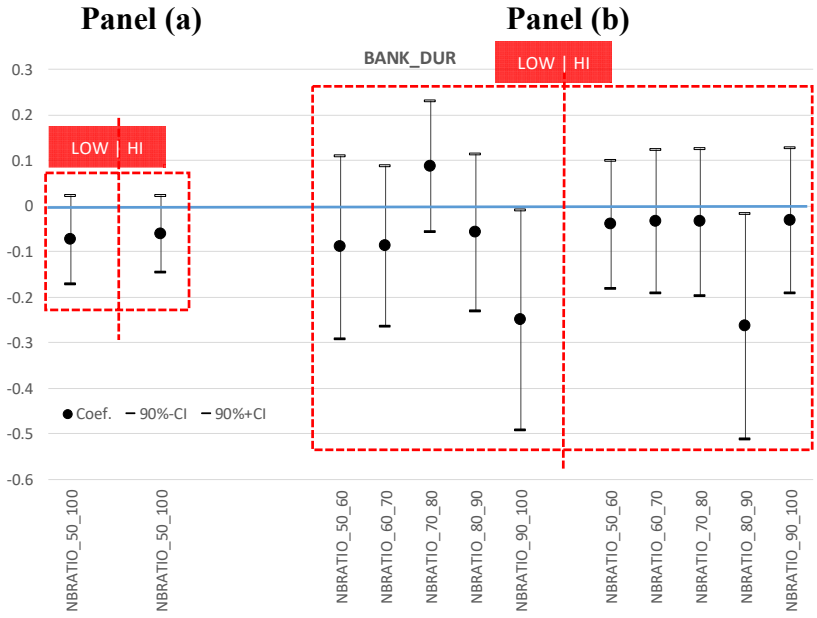
Notes: This table presents the probit estimation result for the determinants of firms that received financing. The column "dy/dx" shows the estimated marginal effect of each variable. All variables are defined in Table 2. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Figure 1 Determinants of the type of debt forbearance: Coefficients on NBRATIO_X_Y when interacted with TEXASRATIO_{HI, LOW}



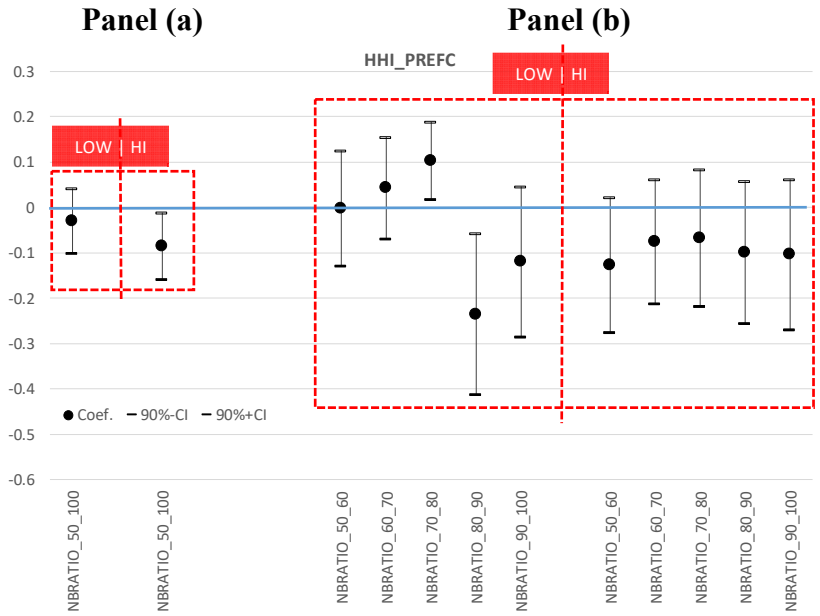
Notes: This figure presents the estimated coefficient on NBRATIO_X_Y, β_{1k}, in equation (3) in the text where we employ TEXASRATIO as the bank characteristic variable. Dots correspond to the point estimates and the vertical lines represent 90% confidence intervals. Panel (a) and (b) respectively shows the results when we divide NBRATIO by the sample median and 10 deciles.

Figure 2 Determinants of the type of debt forbearance: Coefficients on NBRATIO_X_Y when interacted with BANK_DUR_{HI, LOW}



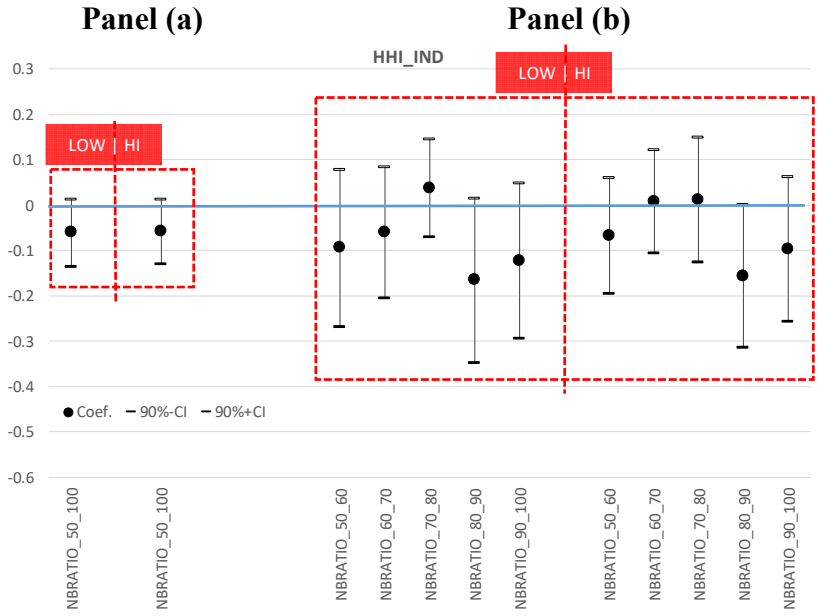
Notes: This figure presents the estimated coefficient on NBRATIO_X_Y, β_{1k}, in equation (3) in the text where we employ BANK_DUR as the bank characteristic variable. Dots correspond to the point estimates and the vertical lines represent 90% confidence intervals. Panel (a) and (b) respectively shows the results when we divide NBRATIO by the sample median and 10 deciles.

Figure 3 Determinants of the type of debt forbearance: Coefficients on NBRATIO_X_Y when interacted with HHI_PREFC_{HI, LOW}



Notes: This figure presents the estimated coefficient on NBRATIO_X_Y, β_{1k}, in equation (3) in the text where we employ HHI_PREFC as the bank characteristic variable. Dots correspond to the point estimates and the vertical lines represent 90% confidence intervals. Panel (a) and (b) respectively shows the results when we divide NBRATIO by the sample median and 10 deciles.

Figure 4 Determinants of the type of debt forbearance: Coefficients on NBRATIO_X_Y when interacted with HHI_IND_{HI, LOW}



Notes: This figure presents the estimated coefficient on NBRATIO_X_Y, β_{1k}, in equation (3) in the text where we employ HHI_IND as the bank characteristic variable. Dots correspond to the point estimates and the vertical lines represent 90% confidence intervals. Panel (a) and (b) respectively shows the results when we divide NBRATIO by the sample median and 10 deciles.

Table 5 Descriptive statistics including firms that did not receive debt forbearance

	DF_TYPE=1 or 2				DF_TYPE=0			
	N	mean	sd	p50	N	mean	sd	p50
Debt forbearance variables								
FINANCE	657	0.820	0.384	1	216	0	0	0
FORGIVE	657	0.180	0.384	0	216	0	0	0
DF_TYPE	657	1	0	1	216	0	0	0
Determinant variables								
NBRATIO	657	0.616	0.406	0.591	216	0.477	0.304	0.466
NBRATIO_50_100	657	0.487	0.500	0	216	0.347	0.477	0
NBRATIO_50_75	657	0.250	0.433	0	216	0.204	0.404	0
NBRATIO_75_90	657	0.139	0.346	0	216	0.093	0.291	0
NBRATIO_90_100	657	0.099	0.299	0	216	0.051	0.220	0
NBRATIO_50_60	657	0.099	0.299	0	216	0.079	0.270	0
NBRATIO_60_70	657	0.105	0.307	0	216	0.097	0.297	0
NBRATIO_70_80	657	0.100	0.301	0	216	0.042	0.200	0
NBRATIO_80_90	657	0.084	0.277	0	216	0.079	0.270	0
NBRATIO_90_100	657	0.099	0.299	0	216	0.051	0.220	0
ROA	657	-0.044	0.159	0.000	216	-0.019	0.101	0.002
lnNUMEMP	657	3.208	1.072	3.135	216	3.123	1.164	3.091
lnNUMBANK	657	1.205	0.606	1.386	216	1.133	0.625	1.099
SALESGROWTH	657	1.017	1.600	0.914	216	1.280	2.557	0.924
AGE	657	40.985	16.213	41.000	216	42.463	17.762	42.000

Notes: This table presents summary statistics of the dependent and independent variables used in the multinomial logit estimation in Table 6. All variables are defined in Table 2. The block of columns labeled "DF_TYPE=1 or 2" reports summary statistics for firms that received debt forbearance. The block of columns labeled "DF_TYPE=0" reports summary statistics for firms that did not receive debt forbearance.

Table 6 Determinants of the approval and type of debt forbearance (Multinomial logit estimation): No forbearance, financing, and forgiveness

Dependent variable: DF_TYPE	DF_TYPE=0 (No debt forbearance) (1)		DF_TYPE=1 (FINANCE=1) (2)		DF_TYPE=2 (FORGIVE=1) (3)	
	dy/dx	(S.E.)	dy/dx	(S.E.)	dy/dx	(S.E.)
NBRATIO_50_75	-0.074	(0.032) **	0.000	(0.041)	0.074	(0.033) **
NBRATIO_75_90	-0.100	(0.038) ***	0.020	(0.052)	0.080	(0.045) *
NBRATIO_90_100	-0.123	(0.043) ***	-0.030	(0.069)	0.153	(0.065) **
ROA	0.250	(0.161)	-0.387	(0.172) **	0.137	(0.119)
lnNUMEMP	-0.023	(0.015)	0.018	(0.017)	0.005	(0.012)
lnNUMBANK	-0.025	(0.025)	0.016	(0.029)	0.009	(0.021)
SALESGROWTH	0.030	(0.010) ***	0.050	(0.022) **	-0.080	(0.028) ***
AGE	0.001	(0.001)	-0.002	(0.001) *	0.001	(0.001)
Industry dummies	No		No		No	
Esimation Method:	Multinomial logit					
Sample selection:	Firms that had demand for debt forbearance (DF_TYPE=0 , 1 or 2)					
Obs.					873	
Wald chi2					48.610	
Prob>chi2					0.000	
Pseudo R-squared					0.031	

Notes: This table presents the results of the multinomial logit estimation for the determinants of the approval and type of debt forbearance. The columns labeled "dy/dx" show the estimated marginal effect of each variable. All variables are defined in Table 2. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table 7 The effect of debt forbearance on credit availability and firm performance (PSM-DID treatment effect estimations): No forbearance, financing, and forgiveness

			Finance vs. Forgive vs. No debt forbearance				
	Treated	Control	ATET	(S.E.)	z-value	95%CI-	95%CI+
D_FINCOND	Finance	No forbearance	0.077	(0.048)	1.620	-0.016	0.171
	Forgive	No forbearance	0.028	(0.062)	0.460	-0.093	0.149
	Forgive	Finance	-0.049	(0.051)	-0.960	-0.150	0.051
D_BANK_ATTITUDE	Finance	No forbearance	-0.065	(0.046)	-1.420	-0.154	0.025
	Forgive	No forbearance	0.039	(0.060)	0.650	-0.079	0.156
	Forgive	Finance	0.104 **	(0.048)	2.160	0.009	0.198
D_SCORE	Finance	No forbearance	-1.728 ***	(0.379)	-4.560	-2.471	-0.985
	Forgive	No forbearance	-1.007	(0.682)	-1.480	-2.343	0.330
	Forgive	Finance	0.722	(0.676)	1.070	-0.603	2.047
D_lnNUMEMP	Finance	No forbearance	-0.035	(0.056)	-0.630	-0.144	0.074
	Forgive	No forbearance	-0.024	(0.067)	-0.360	-0.155	0.107
	Forgive	Finance	0.011	(0.049)	0.230	-0.086	0.108
D_TANGIBLERATIO	Finance	No forbearance	0.009	(0.010)	0.870	-0.011	0.029
	Forgive	No forbearance	0.004	(0.015)	0.270	-0.025	0.033
	Forgive	Finance	-0.005	(0.014)	-0.350	-0.033	0.023
D_ROA	Finance	No forbearance	0.009	(0.011)	0.870	-0.012	0.031
	Forgive	No forbearance	0.006	(0.011)	0.560	-0.016	0.029
	Forgive	Finance	-0.003	(0.009)	-0.320	-0.022	0.016
D_SALESGROWTH	Finance	No forbearance	-0.042	(0.056)	-0.750	-0.151	0.067
	Forgive	No forbearance	-0.053	(0.064)	-0.820	-0.178	0.073
	Forgive	Finance	-0.011	(0.060)	-0.180	-0.128	0.106

Notes: This table presents the estimation results for the PSM-DID treatment effects on credit availability and ex-post firm performance. All variables are defined in Table 2. ***, **, * denote significance at 1%, 5%, and 10% level, respectively.