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Abstract

This paper investigates whether the benefits of bank-borrower relationships differ depending on three factors identified in the theoretical literature: verifiability of information, bank size and complexity, and bank competition. We extend the current literature by analyzing how relationship lending affects loan contract terms and credit availability in an empirical model that simultaneously accounts for all three of these factors. Also, our unique data set of Japanese SMEs allows us to examine for the first time using micro firm data the value of information verifiability in the form of audited financial statements in setting loan contract terms. We find that firms benefit most from bank-borrower relationships when they do not have audited financial statements and when they borrow from small banks in less competitive markets, which is consistent with a number of different theoretical studies.

Keywords: Banks, Small Business, Bank-Borrower Relationships, Loan Interest Rate, Collateral, Credit Availability

JEL classification code: G21, G31, L11, L13, L22

1. Introduction

The importance of bank-borrower relationships has attracted much attention among academics, policymakers and practitioners all over the world. Numerous studies have investigated the benefits of bank-borrower relationships for small- and medium-sized enterprises (SMEs) in the US and in Europe.[1] Japan also offers a particularly rich environment to examine bank-borrower relationships given the historical emphasis by Japanese banks on their ties with their commercial customers. We exploit a rich and unique data set on Japanese SMEs that enables us to examine issues related to SME financing that have been difficult to analyze with data sets currently available in other countries.

As a comprehensive study on the relationship between banks and SMEs, one of the objectives of this paper is to analyze the benefit of relationship banking and to clarify the characteristics of bank-borrower relationships in the Japanese context. In so doing we build on a line of research that began with Petersen and Rajan 1994 and Berger and Udell 1995. Our focus is the effect of relationship strength on loan contract terms and/or credit availability.

Our analysis, however, is not just a replication of existing studies. We extend analyses conducted elsewhere by using a comprehensive empirical model that allows us to consider the simultaneous effect of information verifiability, bank market structure, and banking organization characteristics on SME lending. Our data also allow us to investigate much more thoroughly one aspect of bank-SME contracting that has not been thoroughly explored elsewhere, information verifiability. In particular, we are the first to analyze the association between audited financial statements and relationship lending in the context of a developed economy.

Our data is from the Survey of the Financial Environment, which was conducted on November 2002 by the SME Agency that is affiliated with the Ministry of Economy, Trade and Industry (METI) of the Japanese Government. The survey is similar in structure to the Survey of Small Business Finances (SSBF) in the US and asks SMEs in Japan about broad financing issues. As we note below, it differs in some important ways from the SSBF, which allows us to

[1] See, for example, surveys by Boot 2000, Ongena and Smith 2000, and Elyasiani and Goldberg 2004.

explore some key issues that are unresolved in the literature. We leverage this unique data set to empirically examine some recent key theoretical findings on bank-borrower relationships. These recent theoretical studies have hypothesized that the relevance of relationship lending depends on some key structural and institutional characteristics of a country's financial system architecture. In this paper we explore the impact on loan contract terms and credit availability of three of the most important of these characteristics: information verifiability, lender organizational structure and bank market structure.

Information verifiability plays a critical role in determining the feasibility of alternatives to relationship lending. The recent literature on SME lending emphasizes that commercial lenders can draw on alternative lending technologies in extending credit to SMEs (Berger and Udell 2002, 2005). *Relationship lending*, which is based on *soft information* obtained through close relationships, is only one of them. There are also other lending technologies, all of which are *transaction-based lending* technologies, that are based on *hard information* such as financial statements. For those SMEs that have "hard" information, therefore, close relationships might not play an important role even though many of these transactions lending technologies might be used to provide credit to opaque SMEs. Empirical examination of this issue has been extremely problematic because data sets used in prior studies do not have good proxies for hard information, particularly with respect to financial statements. Thus, these studies cannot distinguish between "financial statement borrowers" and "relationship borrowers."[2] Our data allows us to distinguish between these two lending technologies and to test the hypothesis that they offer alternative mechanisms for lending to SMEs.

Recent theoretical works suggests that bank organizational structure may matter because banks with different organizational structures may have different incentives to produce soft information (Stein 2002). Decentralized small banks may have a comparative advantage in producing soft information, while banks with multilayered hierarchies may have a comparative

[2] For example, the Federal Reserve's Survey of Small Business Finance (SSBF) only indicates whether a firm has "documentation or accounting records on which to answer survey questions." Thus, the SSBF does not have information on the defining characteristic that distinguishes relationship lending from financial statement lending – whether the firm has *audited* financial statements.

disadvantage in producing soft information. This suggests that credit terms may be more sensitive to the strength of the bank-borrower relationship for SMEs to which small banks lend because they are more likely to employ the relationship lending technology that is based on soft information.

Finally, bank competition may also influence how the strength of the bank-borrower relationship affects credit terms and credit availability. This is because competition influences incentives to invest in establishing close relationships. Competition also affects credit terms and availability since it determines the magnitude of monopoly rents. As different theoretical studies claim different linkages, how competition affects credit terms or credit availability is an empirical question. However, we can at least predict that the benefits of close relationships may differ by the degree of competition the lending bank faces.

In our analysis we construct variables for each of these three factors: information verifiability (i.e., soft vs. hard information), bank organization, and bank competition. By including all of these variables in our regression analysis and interacting these variables with our relationship variables, we are able to examine whether these factors independently affect *the association between relationship strength and credit terms/availability*. In addition, we investigate the separate issue *whether these three factors themselves affect credit terms/availability*. While analysis of the latter question is the subject of numerous prior studies (e.g., Petersen and Rajan 1994, 1995, Berger and Udell 1995, Harhoff and Korting 1998, Ongena and Smith 2001, Elsas 2005), our focus on the former question and our inclusion of all these variables in our analysis (including, in particular, information verifiability) constitutes the unique contribution of our paper.

Our results show that borrowers benefit from bank-borrower relationship – but not in all circumstances. A lower interest rate and a lower probability of a loan turndown (our measure of credit availability) are observed only between a firm without audited financial statements and a small bank operating in a less competitive environment. This result is consistent with the predictions of a number of theoretical studies as discussed above. We also find that the

frequency of pledging collateral increases with the strength of bank-borrower relationships and with firm age. Although this result is in sharp contrast with that in Berger and Udell 1995, it likely reflects differences in the institutional and structural environment between Japan and the U.S. In particular, in Japan, there is a lending practice called the "collateral principle," and it is very common for borrowers to routinely pledge real estate collateral as a banking relationship evolves to cover all existing and future credit extensions.

Although we are the first paper to consider the impact of all three of these factors simultaneously, there are several empirical studies on the benefit of bank-borrower relationships that focus on interactions among some of the three factors (i.e. information verifiability, bank organization, and bank competition) and the benefits of relationships. Information verifiability is considered in Jiangli, Unal, and Yom 2005. Complexity of bank organization is the main focus of Angelini et al. 1998 and Cole et al. 2004. As for bank competition, there are papers which focus on its effect on the benefit of bank-borrower relationships (Petersen and Rajan 1995, Scott and Dunkelberg 2004 Fischer 2005, and Valverde et al. 2005).[3] However, at least to our knowledge, there have been no studies which incorporate all the three factors into one empirical model with multiple interactions as we do in this paper.

There have been a few studies on bank-borrower relationships in Japan using the data from the SME agency's surveys. White Papers on SMEs (METI 2002, 2003) investigate whether a longer relationship is associated with a lower loan interest rate and lower likelihood of turndown. Further investigations of this association have addressed the endogeneity problem (Watanabe 2005). However, none of these papers take into account the potentially differing benefits of relationships that are associated with the three factors that are the focus of our study. In particular, no variables representing the lending banks' characteristics (other than bank type) are included in the regressions. Shikimi 2005 uses different data of Japanese SMEs and found that weaker relationships are associated with a higher cost of credit and more credit availability.

[3] Berger et al. 2005 also investigate whether the presence of hard information is relevant or not, and Scott 2004 directly tests the link between the relevance of soft information and the complexity of bank organizational structure. However, they do not investigate the benefit of bank-borrower relationship, i.e. the association between relationship strength and credit terms or availability.

However, her measure of relationship strength is the number of lending banks only, which is a weak point of her paper, and no control is made regarding lender's characteristics since the lending bank is not identified in the data.

The rest of the paper is composed as follows. Section 2 reviews the theoretical framework that has been developed to explain the importance of bank-borrower relationships and the factors that may affect the extent to which it benefits borrowers. In section 3, data and methodology are presented. Section 4 reports the results and their interpretations. Section 5 concludes the paper.

2. Background Literature and Our Hypotheses

2-1. The Benefit of a Strong Banking Relationship

We endeavor in this paper to examine whether there is any benefit for an SME to establish a close relationship with a bank. On balance, theoretical and empirical findings elsewhere in the literature indicate that the stronger the relationship becomes, (i.e. the longer, the wider, and the more intimate the relationships between a bank and a borrower become), the more soft information is accumulated, and the greater the potential benefit of the relationship becomes in terms of credit availability and pricing.[4]

Since we cannot directly observe the amount of soft information which is accumulated, we can only capture the above linkage by investigating a connection between relationship variables and credit terms or a credit availability variable. To capture the strength of the relationship, several different variables are used in the literature: the relationship length; a measure of the breadth of services obtained by the SME from the bank; and the number of lending banks. The terms of credit have been proxied by the loan interest rate or the probability of pledging collateral, whereas credit availability has often been proxied by the amount of trade credit paid

[4] Note, however, that the benefit from a strong relationship may not necessarily entirely accrue to the borrower. Greenbaum et al. 1989, Sharpe 1990, Rajan 1992, and von Thadden 2004 demonstrate that if information obtained through close relationships is proprietary to an incumbent bank, and the bank is free from competitive pressure from less-informed competitors, it can enjoy informational rents.

late or a diffusion index of loan turndowns.[5] The baseline analysis here is typically a test of the hypothesis that stronger relationships lead to laxer credit terms and more credit availability. This association between the loan term (and credit availability) variables and the relationship variables has been tested in the context of a number of different countries.[6]

However, as we have noted above, recent theoretical studies have clarified that the benefit from relationship lending may differ depending on different factors related to the structure of the banking industry and the lending infrastructure. This implies that we must control for these factors in investigating the association between relationship variables and credit terms/availability. This is the focus and principal contribution of our paper. We now turn to a more detailed discussion of these three factors.

2-2. Bank-Borrower Relationships and Information Verifiability

The literature on SME lending emphasizes that the critical type of information in bank-borrower relationships is soft information (e.g., Stein 2002, Cole et al. 2004, Berger et al. 2005). Soft information is information that is not easily quantified, which is acquired by the loan officer through contact over time with the SME, the entrepreneur, and the local community. The information is therefore difficult to document and transfer to others. *Relationship lending* is a lending technology that is based on this kind of information that may be ideally suited for SMEs which do not have verifiable information. The accumulation of soft information for those SMEs may only be possible through the development of a bank-borrower relationship.

In contrast, it has been hypothesized that there are other lending technologies which do not depend on soft information and, thus, do not depend on close relationships. With respect to these *transaction based lending* technologies, lending decisions are based on hard information (e.g., Berger and Udell 2005).

Arguably the most economically significant of these technologies is financial statement

[5] See Petersen and Rajan 1994 and Angelini et al. 1998 for credit availability variables.
[6] Examples include: Angelini et al. 1998 - Italy, Harhoff and Korting 1998 - Germany, Petersen and Rajan 1994 – the U.S., and Valverde et al. 2005 - Spain.

lending which requires audited financial statements.[7] Consistent with this hypothesis, the importance of a banking relationship should be significantly less for those SMEs that have hard information. We investigate this hypothesis by examining the hypothesized difference between the two (arguably) most significant SME lending technologies: relationship lending and financial statement lending. Specifically, we investigate whether the dependence of credit terms and credit availability on the strength of the bank-borrower relationship differs for those SMEs that have hard information in the form of audited financial statements (financial statement borrowers) versus those SMEs that do not have audited financial statements (relationship borrowers). To the best of our knowledge we are the first study that has been able to investigate the value of audited financial statements in SME lending in the context of a developed economy.[8]

This leads us to our first hypothesis:

Hypothesis 1: Information verifiability and bank-borrower relationships

The benefits of close bank-borrower relationships are greater for those SMEs for whom hard information in the form of audited financial statements is not available.

[7] Audited financial statements, which are prepared by accountants, are quite different from either company-prepared statements or unaudited accountant-prepared statements on one key dimension. In preparing audited statements the accountant verifies the existence and veracity of all assets, liabilities and cash flows. Thus, without audited financial statements, lenders at best must rely on the financial numbers generated by the manager/entrepreneur.

[8] The lack of research on the role of audited financial statements in SME lending is likely driven by severe data limitations. As mentioned above, the best available data in the U.S. on SME lending is the SSBF which only contains information about whether a firm has "documentation or accounting records on which to answer survey questions." This is a threshold level that falls far short of the information verifiability associated with audited financial statements and is not useful in distinguishing between financial statement borrowers and relationship borrowers. We are aware of only one other study that has examined the role of audited financial statements in SME lending (Jiangli, Unal and Yom 2005). Using data from a specially designed World Bank survey this study examined credit availability in four developing economies during the Asian financial crisis and found that strong banking relationships (i.e., relationship lending proxied by the number of lenders) increased credit availability for two of the countries. They found some evidence that audited financial statements, if they are required by the lender, also increased credit availability – but only in one country. That this effect was limited to just one country may reflect the context of the analysis: developing economies with weak information infrastructures. It may also reflect the fact that the authors did not explore whether the effect varied according to the strength of the banking relationship and/or the fact that the measure of relationship strength was proxied by the number of financial institutions rather than length or breadth of the relationship.

2-3. Bank-Borrower Relationships and Bank Organizational Structure

Stein 2002 demonstrates that banks with different organizational structure have different incentives to produce soft information. In his model, to obtain funds internally to lend to a borrower, a loan officer has to prove to those in the banking organization that have authority to allocate funding that a borrower is creditworthy. He shows that if the relevant information is soft, a bank with a centralized and hierarchical organization will be at a disadvantage in accumulating, processing, and disseminating this information. In particular, for banks with a complex organizational structure, it is difficult for loan officers to verify the validity of soft information to an upper management. Alternatively, if the bank has a decentralized organizational structure, a loan officer herself will have the authority to allocate funds. Since her effort is easy to reward, more information is produced.

The following hypothesis follows from this theory:

Hypothesis 2: Bank organizational structure and bank-borrower relationships

The benefits of close bank-borrower relationships are greater for those SMEs that borrow from banks without complicated and hierarchical organizational structure lends.

2-4. Bank-Borrower Relationships and Bank Competition

Finally, bank competition may influence the benefits of bank-borrower relationships. Theory, however, offers competing predictions as to whether competition increases or decreases the incentive to strengthen relationships. On the one hand, in a competitive market lenders might not invest much in information accumulation, since the borrower may later switch lenders and the original lender may not be able to recoup the cost of investment (Greenbaum et al.1989, Sharpe 1990, Rajan 1992, von Thadden 2004, and Petersen and Rajan 1995). If this is the case,

relationship variables should have a smaller impact on credit terms or credit availability as bank competition intensifies.

On the other hand, relationships could serve as a device for product differentiation. In order to protect themselves from severe competition, banks in a more competitive market could become keener on establishing close relationships. As a result the benefit of close relationships on credit terms is larger in a more competitive loan market and greater concentration may be associated with less credit availability (Boot and Thakor 2000).

In summary, the net effect of bank competition on the association between relationships and credit terms or credit availability is thus a priori indeterminate from a theoretical point of view. The net effect of these countervailing effects is, therefore, an empirical question. The following hypothesis follows from these conflicting theories:

Hypothesis 3: Bank competition and Bank-Borrower Relationships

> The benefits of close bank-borrower relationships are different between SMEs that borrow from banks in a competitive loan markets and SMEs that borrow from banks in concentrated market lends.

In addition to the effect of banking market competition *on the benefits of bank-borrower relationships*, banking market competition may have a *direct* effect on credit terms and credit availability through the traditional structure-conduct-performance (SCP) hypothesis. This implies that market power is associated with a higher price of credit and a reduced level of access to credit. This is captured in the Hypothesis 3':

Hypothesis 3': Direct effect of bank competition (SCP hypothesis)

> *Credit terms or credit availability* differ depending on the degree of competition the lending bank faces.

Although Hypothesis 3 and Hypothesis 3' are distinct from each other, they have not been explicitly differentiated in existing studies. Hypothesis 3 focuses on the indirect effect of banking market competition where market power affects the strength of banking relationships which in turn affects credit terms and credit availability. Hypothesis 3' focuses on the direct effect of banking market competition where competition directly affects credit terms and credit availability via the SCP. [9] As will be shown below, our empirical analysis independently tests these hypotheses.

3. SMEs in Japan, the Data and Our Methodology

3-1. SMEs in Japan

To date the research emphasis on bank-borrower relationships in Japan has centered on large corporations. In particular, a large literature has developed that has analyzed the Japanese main bank system, where the focus has been on analyzing the benefits of banking relationships between large banks and large corporations.[10]

However, little research has been conducted on Japanese banking relationships between banks and SMEs, despite the fact that the SME sector in Japan is quite large. The Ministry of Economy, Trade, and Industry (METI) (2004, Table 1-(2) and Table 3-(2)) reports that among 4,703,039 enterprises in non-primary industries in Japan in 2001, there are 4,689,609 SMEs (more than 99%). Furthermore, SMEs employ 29,963,365 (70.2%) employees out of a total of 42,655,963 employees.[11]

It is expected that in Japan as elsewhere, the benefits of strong bank-borrower relationships

[9] Under asymmetric information among competitors, the standard result of the SCP hypothesis may fail to hold. Even under competitive pressure, banks with an informational advantage can enjoy positive profits (Dell'Ariccia et al. 1999 and Dell'Ariccia 2001). As for credit availability, Broecker 1990 finds that banks with inferior information to borrowers become less inclined to lend in order to avoid the "winner's curse." See Shaffer 2004 as well.

[10] See, for example, Aoki and Patrick 1994.

[11] These data are from the Ministry of Internal Affairs and Communications' (MIC) *Establishment and Enterprise Census of Japan* (2001). SMEs are defined here as enterprises with 300 or fewer regular employees (100 or fewer in wholesaling and services, 50 or fewer in retail and food) or a capital stock of 300 million yen or less (100 million yen or less in wholesale, 50 million yen or less in retail, food and services). The genesis of this definition of SMEs is the Small and Medium Enterprise Basic Law.

would be greater for opaque SMEs than for large businesses. In fact, the Japanese Financial Service Council recently issued a report "Toward Functional Enhancement of Relationship Banking" in March 2003, that stresses the importance of banking relationships for SME financing.[12] In spite of this increased interest in relationship banking in Japan, there is little empirical evidence on the importance of relationships between banks and SMEs in Japan, which is the focus of the present paper.

3.2 Data

Our data source for SMEs in Japan is the Survey of the Financial Environment (SFE) that was conducted on November 2002 by the Small and Medium Enterprise Agency, which is affiliated with the Ministry of Trade, Economy, and Industry (METI), the Japanese government. The SFE survey is similar to the Survey of Small Business Finance (SSBF) in the US, and asks about financing issues of SMEs in Japan as of October 31, 2002. The survey contains numerous questions about SMEs' financing including information about the SME's main bank relationship.[13]

We first selected SMEs whose main bank is either a bank that is domestically licensed under the Japanese Banking Act or a Shinkin bank, since these banks are main commercial banks in Japan.[14] We then dropped SMEs whose financial statements are not available in the two most recent fiscal years (FY) from the survey date, i.e. FY 2000 and FY 2001. Furthermore, SMEs whose information necessary for our analysis is missing were also dropped.[15] As a result, 1960 SMEs remain in the sample.

In order to examine different effects from bank characteristics, we then linked this survey

[12] The Finance Service Council is an advisory council of experts for the Financial Service Agency, the primary bank regulatory body in Japan.
[13] A main bank of an SME is identified by the perception of the SME itself, which is asked in the survey.
[14] SMEs whose main bank is either a governmental financial institution, Norinchukin Bank, a credit cooperative, an agricultural cooperatives, a fishery cooperative, or a labor bank are dropped, since they are not commercial banks. Such SMEs account for less than five percent of surveyed firms.
[15] Firms are dropped from the sample if they did not to report either the short-term borrowing rate from their main bank, the length of the borrowing relationship with their main bank, firm age, or the state of the firm's entrepreneur's residential housing.

data to bank balance sheet data. For banks under the Banking Act, the data are available from Nikkei NEEDS Company (Bank) Data File issued by Nihon Keizai Shimbun, Inc. For Shinkin banks, Financial Statements of Shinkin Banks from Kin-yu Tosho Consultant Corporation is used. These data are as of March 31, 2002, the end of the fiscal year 2001.[16,17]

3.3 Variables

Dependent variables

As dependent variables, we use two credit term variables and a proxy for credit availability. Our two credit term variables are a loan interest rate and a dummy variable indicating whether the SME pledges collateral to the main bank. The loan interest rate, SHORT_RATE, is the highest annual short-term borrowing rate with terms less than one year from the main bank as of October 31, 2002. The collateral dummy, COLLATERAL, takes a value of one if the SME pledges collateral (property) to the main bank. The presence of relationship benefit should be reflected in a lower interest rate and/or lower probability of pledging collateral.

We should note here that it appears that it is nearly mandatory in Japan for borrowers to pledge collateral. In fact, COLLATERAL is equal to one for 80 percent of the sample. This is consistent with the so-called "collateral principle" that Japanese banks have allegedly followed. It is also customary in Japan that a main bank is listed at the top of the list of fixed collateral lien holders. Judging from these facts, a low likelihood of pledging collateral may not necessarily reflect a strong banking relationship in Japan, and the collateral regressions may not produce results that are similar to those in other countries.

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[16] We also dropped firms whose main bank is either Mizuho Bank or Mizuho Corporate Bank. These two banks were established on April 1, 2002 as a result of a three way merger among Industrial Bank of Japan, Daiichi Kangyo Bank, and Fuji Bank. Thus, for those firms that reported one of the two Mizuho banks as their main bank as of October 31, 2002, we cannot know which of the three banks was their main bank. Note that the Japanese banks' financial closing date that is the most recent from the survey date is March 31, 2002, the end of FY 2001.

[17] Firms that reported Resona Trust Bank as their main bank are also dropped since it is a bank that had succeeded the Daiwa Bank's trust account. A trust account is for trust service, which cannot be compared with commercial banking service as is represented by a banking account. For other trust banks, measures for their financial health are defined based on their ledger accounts related to banking activities.

Our third dependent variable is a measure of credit availability, a dummy variable BORREFU that takes a value of one if an SME chooses the response "a refusal or reduction in amount" to the question, "what has been the most common response by your main bank to your loan applications in the past one year?"

Relationship variables

Our key explanatory variables are two relationship variables. The first variable LENGTH represents the length of relationship between the SME and the bank. The SFE survey asks how many years the firm has had a business relationship with its current main bank since the company first borrowed funds for business purposes.[18] Second, we use a variable SCOPE, which represents the scope of relationships. This variable needs some explanation. In order to simplify our regressions in terms of the number of variables and cross terms, we summarize the information contained in the following five dummy variables which represent different aspects of relationship scope.

(i) CHKAC: a checking account dummy which takes a value of one if the SME has a checking account at the main bank.

(ii) SETTLEMENT: a bill settlement dummy which takes a value of one if the SME has a relationship for "settlement of bills payable" with the main bank.[19]

(iii) CAPPURCHASE: a dummy variable to represent the existence of bank stock ownership relationship to the bank, which takes the value of one if the SME has recently purchased stock in its main bank.[20]

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[18] Taking a natural logarithm of LENGTH did not change the results very much.

[19] In Japan, "Tegata" (bills or notes) are commonly used as a commercial method of payment. This dummy equals one if the SME uses its deposit account (usually checking) as the account to settle bills. When a buyer (A) purchases something, he writes out a bill (which looks like a check) to a seller (B), promising that the holder is paid a specified amount of money by a settlement bank (C) at a specified date. When B itself, B's agent (usually its bank (D)), or someone else (an endorsee) requests the disbursement at the specified date, C makes the payment by withdrawing money from A's checking account at C. A settlement date is often months ahead so that a bill serves as credit, constituting a part of accounts receivables (payables). A bill is negotiable and any bank may discount it.

[20] This variable also reflects a practice during the period of the banking crisis. Newspaper reports indicated that troubled banks attempted to issue new stock to increase their capital base. However,

(iv) INFORMATIVE: an information services dummy which takes a value of one if the SME has obtained any of three information services from the main bank.[21]

(v) TIMEDEPO: a time deposit dummy which takes a value of one if the SME has time deposits at the main bank.

The variable SCOPE was constructed by conducting a principal component analysis on these variables.[22]

Interaction dummies

As explained in the previous section, we want to capture the difference in the association between relationship variables and the dependent variables, which is caused by three factors: information verifiability, the size and complexity of the lending bank's organizational structure, and competition in the banking market. We proxy these factors by three dummy variables respectively, and extend the basic regression by introducing cross terms of these three dummy variables with the relationship variables. The resulting regression has *four-way interaction terms* that enable us to investigate how relationship importance varies with these factors. This is a key distinguishing feature of our paper.

Information verifiability is proxied by dummy variables representing the availability of audited financial documents. The SFE survey asks if SMEs have financial statements to refer to when they answer the survey, and what kind of documents they are, if any. A dummy variable, AUDIT, takes the value of one if the SME's financial statements are either audited by certified public accountants or verified by licensed tax accountants. So as to separate the counter sample, we use a dummy variable NO_AUDIT, which equals one minus AUDIT. Hypothesis 1 implies that the relationship variables should have significant effect for samples with NO_AUDIT = 1, whereas no (or much less) effect for those with AUDIT = 1.

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because they encountered difficulty in selling these issues, they pushed these stocks on their borrowers who may have had little bargaining power.

[21] The three services are: (i) participation in exchange meetings of customers/suppliers hosted by the main bank, (ii) consultation/advice such as financial analysis, and (iii) introduction of customers.

[22] We also tried a scope variable which simply added up the five dummies. The results were qualitatively the same.

For organizational size and complexity we proxy bank size, ownership structure, and bank complexity by bank type dummies. Among the banks in the sample, city banks, long-term credit banks, and trust banks are very big and have a highly complicated organizational structure. Most of them are subsidiaries of a bank holding company. We call them *large banks*. *Shinkin banks* are smaller credit associations with a membership organization. They are nonprofit organizations. *Regional banks* are between large banks and Shinkin banks in terms of size and organizational structure. They are corporations, and operate in a smaller geographic area than large banks and a wider area than Shinkin banks. We thus use three dummies: LARGE (= city, long-term credit, and trust banks), REGIONAL, and SHINKIN. Hypothesis 2 implies that the effects of the relationship variables should be the greatest for firms associated with SHINKIN = 1, the next greatest for those with REGIONAL = 1, and the least for those with LARGE = 1. Note that LARGE + REGIONAL + SHINKIN = 1 for the entire sample.

Finally, bank competition is proxied by a low competition dummy (LCD) and an intense competition dummy (ICD). The former takes a value of one if a Herfindahl index is more than its median, while the latter takes a value of one if it is less than its median.[23] The Herfindahl index is constructed by bank type.[24] Hypothesis 3 implies that the effects of the relationship variables might differ for those SMEs with LCD = 1 versus those with ICD = 1.

We note that we can test Hypothesis 3' independently from Hypothesis 3. The former hypothesis focuses on the difference in *the level (or frequency) of the dependent variable* when LCD=1 and when ICD=1, and is independent of the strength of the relationship. Thus, the test of Hypothesis 3' is whether the estimated coefficient for the two independent explanatory variables, LCD and ICD, significantly differ. In contrast, the latter hypothesis is tested with respect to the difference in *the association between relationship variables and a dependent variable* when the degree of competition differs. Thus, the test of Hypothesis 3 is whether the estimated coefficient for a four-way interaction variable, (a relationship variable) * (a documentation dummy) * (a bank type dummy) * (*LCD*), significantly differs from the

[23] Thus, LCD+ICD=1 for all the samples.
[24] See Data Appendix for the construction of the Herfindahl index by bank type.

coefficient for the corresponding four-way interaction variable, (the relationship variable) * (the documentation dummy) * (the bank type dummy) * (*ICD*).

Other control variables

Finally, as control variables, we include variables to represent: firm/entrepreneur characteristics, Industry dummies, regional dummies, SMEs' performance, financial statement numbers of the SME, bank characteristics, and bank performance.[25] These variables control for firm risk, industry risk, regional risk, and the difference in loan characteristics by bank. Details of these variables are found in the Data Appendix.

Descriptive statistics

Table 1 represents summary statistics of the sample. The average of loan interest rate is 2.06 percent, and eighty percent of sample firms pledge collateral to their main bank. On average, sample firms have a 32 year borrowing relationship with their main bank. Decomposing the variable SCOPE into its five component dummies explained above (not shown), sample firms make three types of transactions on average with their main bank in addition to borrowing.

Sample firms are medium-sized in the sense that they have 3.4 billion yen of assets and employ 103 persons on average. The average firm age is forty-seven years old. Only three percent of the firms are listed, whereas forty-three percent of firms are owner-managed (half of a firm's shares are owned by the entrepreneur and individuals with the same family name as the entrepreneur's),

Table 2 shows the sample distribution by bank size and type of financial statements. One quarter of sample firms' main banks are large banks, whereas sixty-three percent of firms' main banks are regional banks. The remaining eleven percent of firms' main banks are Shinkin banks. Fifty-nine percent of sample firms have their financial statements either audited by certified public accountants or verified by licensed tax accountants.

[25] Entrepreneur characteristics are defined by those of the firm's representative, which is usually a CEO.

4. Results and Interpretations

Interest rate regression

We first report the results for the OLS loan interest rate regression presented in Table 3. The novelty of our analysis lies in the results for our four-way interaction terms, which represent differing associations among two relationship variables and the interest rate depending on (1) the availability of verified information, (2) the lending bank' type, and (3) competition in the banking market. Due to the three corresponding dummies, there are ten possible combinations of three-way interactions, which are to be multiplied by LENGTH and SCOPE. We took the combination AUDIT = LARGE = 1 as the default case.

Looking first at the coefficient on LENGTH we find that a one year increase in relationship length increases the loan interest rate by 0.0024 percentage point for a firm with audited financial statements that borrows from a large bank. The coefficient for the other nine interaction terms represent the *additional* increase or decrease in the interest rate for the firm with relevant characteristics.

The result is striking. The interest rates for all but one case are statistically independent of the length of relationships. The rate is significantly smaller only for those firms which do not have audited financial statements, and for which the lending bank is a Shinkin bank under low competition. If the length of a relationship increases by one year, such a firm is charged an interest rate that is smaller by 0.0373percentage point. The negative association between loan rates and relationship strength is consistent with the hypothesized prediction on relationship strength and with other studies that have found a positive association with relationship length and better credit terms (e.g., Berger and Udell, 1995; Cole, 1998; Elsas and Krahnen, 1998; Harhoff and Körting 1998). The benefit of close bank-borrower relationships is observed only for firms without verified financial statements (Hypothesis 1), that borrow from smaller banks with less complicated organizational structure (Hypothesis 2), and firms whose lending bank faces low competition (Hypothesis 3).

As for the scope of relationships, the results are similar in the sense that significant effects are observed for firms that do not have audited financial statements and borrow from a Shinkin bank under a less competitive environment. However, for SCOPE the effect is in the opposite direction. This result could reflect the fact that LENGTH and SCOPE represent different aspects of relationship closeness. The information obtained through longer relationships and that through wider scope of relationships might be different. Possibly only information from SCOPE could be used by the bank to capture the borrower.

We turn next to the three-way interaction terms in the regression, which are not multiplied by the relationship variables. These terms represent the direct effect of three interaction variables that operate independent of relationship closeness. The coefficient of the nine three-way interaction terms represents an additional increase or decrease of the interest rate for the SMEs, controlling for relevant characteristics, over the interest rate for SMEs with verified financial statements that borrow from large banks (which is represented by the intercept). Of particular interest is the difference in results between variables multiplied by low competition (LCD) and those by intense competition (ICD), since Hypothesis 3' can be tested by investigating this difference.

The results show that the firm that has audited statements and borrows from a large bank pays an interest rate of 7.92% (the coefficient for the intercept) after adjusting for firm- and bank-specific factors. The interest rate significantly increases if the firm borrows from a Shinkin bank. A Shinkin under intense competition is associated with an additional 1.28 percentage point of interest, and with an additional 2.11 percentage points under less competition. This difference is consistent with Hypothesis 3' in a sense that traditional SCP hypothesis is supported. The fact that a significant addition in the interest rate is not observed to a comparable extent in other seven three-way interaction variables implies that the loan market for Shinkin banks is segmented from other markets for those SMEs that do not have audited financial statements.[26]

[26] At a 10% level of significance, the interest rate is increased when the firm has verifiable information

Finally, we briefly discuss the results on the control variables. Firm size and the number of employees have a significantly negative effect on the loan interest rate, which is consistent with the prediction that a larger firm is safer. The capital asset ratio also reduces the interest rate, while an owner managed firm (OWNER) pays a higher interest rate. A more educated entrepreneur's firm (EDUCATION) pays a lower interest rate. The larger the bank's size is in terms of total assets (BTASSET) and the larger the bank's loan to asset ratio (BTLOANR), the smaller the interest rate becomes. This is consistent with the presence of economy of scale. It is interesting to observe that a less liquidity-constrained bank (BLIQUIDITY) offers a lower interest rate, whereas a profitable bank (BROA_N) offers a higher interest rate, which would make the bank more profitable. The loan interest rate increases with bank's capital asset ratio (BCAPR), but the relationship is concave (see BCAPR2). It is also interesting to observe that the BIS capital asset ratio has no effect on the dependent variable.

Collateral regression

Table 4 reports the results of a Probit estimation with COLLATERAL as the dependent variable. Contrary to the results reported in existing studies, both LENGTH and SCOPE contribute to an increase in the frequency of pledging collateral for those firms that have audited documents and borrow from a large bank (the coefficient for LENGTH and SCOPE). No additional increase in the frequency of pledging collateral is observed for firms other than those that do not have audited documents and borrow from a Shinkin bank under little competitive pressure. Such firms have a higher probability of pledging collateral by 0.12 percentage point. Three-way interaction terms have no direct effect on the probability of pledging collateral except in the case of firms with audited financial statements that borrow from regional banks in intense competition markets.

As for control variables, the firm's profit measures indicate that a safer firm (CAPRATIO) is less likely to pledge collateral. Also, a closely held firm (OWNER) and a less educated

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and borrows from either a regional bank or a Shinkin bank under intense competition. This result is hard to interpret.

entrepreneur (EDUCATION) are more frequently required to pledge collateral. Entrepreneurs with their own house pledge collateral more frequently. This could indicate that the house can serve as collateral. Frequency of pledging collateral is related to some of the bank-specific factors. For example, profitable bank (BROA_N), and a subsidiary bank (HELD).

The fact that the frequency of pledging collateral increases with relationship closeness and firm age is clearly in contrast with the results in Berger and Udell 1995, which report the opposite effects. Given the extensive control variables in both studies, it seems likely that this difference comes from other factors. As we have confirmed above, it looks as though collateral is nearly mandatory for most SMEs in Japan. The difference could thus be attributed to the unique "collateral principle" regarding real estate (i.e., fixed collateral) that is associated with Japanese lending practices.

Availability regression

Finally, we turn to the Probit regression of credit availability with BORREFU (which = 1 if the firm has experienced a refusal or reduction in the amount requested in a loan application) as the dependent variable. The results are summarized in Table 5. The results for four-way interaction terms indicate that close relationships on balance reduce the frequency of loan turndown although most of the coefficients are not significant. However, the results are not very easy to interpret from a theoretical point of view. Consistent with the results for the interest rate regression, a firm that does not have audited financial statements and that borrows from a Shinkin bank under low competition has a statistically smaller likelihood of loan turndown as its scope of transactions with the main bank expands. This is consistent with Hypotheses 1 through 3. However, we also observe a decrease in the probability of loan turndown for an additional year of relationships between a firm with verifiable information and a regional bank under fierce competition, and for wider scope of relationships between a firm with verifiable information and a Shinkin bank under low competition. As in the case of the collateral regression, three-way interaction terms have no impact on loan turndown.

Similar to the COLLATERAL regression, better profit ratios of the firm contribute to reduce the frequency of loan turndown. A bigger firm (in the number of employees) has smaller probability of loan turndown, while owner-held firms are more likely to face refusal. Although most bank-specific factors have little effect on the frequency of loan turndown, two variables significantly increase the frequency. An increase in one percentage point of the bank's BIS ratio increases 1.24 percentage point of loan turndown. An interesting result is that a bank which experienced a merger with a bank of similar or larger size tends to refuse loan application, which indicates that such banks were forced to shrink loans.

5. Conclusion

This paper investigates whether the benefits of SME bank-borrower relationships differ with respect to key factors identified in the theoretical literature. Specifically, we extend the current literature by analyzing for the first time how relationship lending affects loan contract terms and credit availability in an empirical model that simultaneously accounts for information verifiability, bank size and complexity, and the level of bank competition in the banking market.

One of the biggest obstacles to conducting this type of analysis in the past has been a lack of good data on information verifiability. Our unique data set of Japanese SMEs allows us to address this deficiency. This is important because recent contributions to the literature have emphasized that relationship lending is not the only lending technology that banks can use to extend credit to SMEs. When SMEs can provide their lenders with verifiable information in the form of audited financial statements, banks can deploy the financial statement lending technology as an alternative to relationship lending. For these "financial statement borrowers" it has been hypothesized that the benefit of a close banking relationship will be less because soft information will not be as important in mitigating the problems driven by opacity (e.g., Berger and Udell 2005). Data limitations have severely limited the ability of prior research to examine the role of audited financial statements. Specifically, nearly all studies that have examined

relationship lending have been hindered by their inability to distinguish between relationship borrowers and financial statement borrowers. Our data allow us to make this distinction and to examine hypotheses that apply exclusively to relationship lending.

We conduct three forms of tests: interest rate tests, collateral tests and credit availability tests. Overall our interest rate tests and our credit availability tests show that firms benefit the most from bank-borrower relationships when they do not have audited financial statements and when they borrow from small banks in less competitive markets. These results suggest that relationship strength matters most when firms are less transparent (i.e., do not have audited financial statements). This is consistent with the hypothesis that relationship lending and financial statement lending are distinct lending technologies. Our collateral results are less clear although we hypothesize that they may be a result of idiosyncratic bank practices in Japan related to taking fixed collateral.

Our analysis suggests the possibility of extensions in several directions. First, we have not taken into account the endogeneity of credit term determination. The loan interest rate and collateral are likely determined simultaneously. A further investigation which can control for endogeneity bias might be fruitful. Second, the availability regression may have a sample selection bias. The dependent variable represents whether a firm had experienced any loan turndown in the past one year. However, it is likely that included among the firms that were not turned down are firms that did not apply for a loan at. An analysis using a sample selection model could increase reliability of the results.

Data Appendix

[Control variables]
Firm-specific controls
(Financial statement numbers and ratios)
SIZE: total asset
CURRENT: current ratio = liquid (current) assets / liquid (current) liabilities
CAPRATIO: capital asset ratio (= 1- leverage)
PPMARGIN: pretax profit margin
(Firm characteristics)
FAGE: firm age
FAGE2: = square of FAGE

EMPLOYEE: the number of employees
LISTED: (dummy) the SME is listed
OWNER: (dummy) owner or family members have more than half shares
(Entrepreneur characteristics)
GENDER: (dummy) the entrepreneur is male
HOUSING: (dummy) the entrepreneur has his/her own house
EDUCATION: education level of the entrepreneur
graduated a college/university/graduate school = 1
graduated a high school = 2
graduated a junior high school = 3
AGE: entrepreneur's age

Industry dummies
CONSTRUCT: construction
TRANS: transport
WHOLE: wholesale
RETAIL: retail
REALE real estate
SERVI: service
OTHER: other industries

Regional dummies
HOKKAIDO: Hokkaido prefecture
TOHOKU: Tohoku region
KITAKANTO: North Kanto area
CHUBU: Chubu area
KANSAI: Kansai area
CHUGOKU: Chugoku area
SHIKOKU: Shikoku area
KYUSHU: Kyushu area

Bank-specific controls
BTASSET: bank's total asset
BTLOAN: total loans
BTLOANR: loan to asset ratio
BLIQUIDITY: liquid asset index = baliquid_0/btasset_0
BCAPR: bank's capital asset ratio = bank's book capital/asset ratio
BCAPR2: square of BCAPR
BBIS: BIS capital asset ratio
BBIS2: square of BBIS
BROA_N = (Net business profit (Gyoumu Jun-eki in Japanese)) / BTASSET
ACQUIRE: (dummy) the bank involved a merger as an acquirer: This dummy equals 1 when the firm reports that its main bank experienced a merger with a smaller bank in the past five years
ACQUIRED: (dummy) the bank involved a merger as an acquired: This dummy equals 1 when the firm reports that its main bank experienced a merger with a larger bank or a bank with a similar size in the past five years
HELD: (dummy) the bank is a subsidiary of a bank holding company
BNPL_RATE: bad loan ratio = (loans to legally bankrupt companies + past due loans + renegotiated loans) / total assets
BLOSS: ratio of loan loss provision to total asset

[Herfindahl index]

Herfindahl index by bank type

Kano and Tsutsui 2003 reported that the market for Shinkin banks and that for regional banks are segmented. Therefore we calculate Herfindahl indices with only respective type of banks (regional and second regional banks) taken into consideration.

For Shinkin banks, Kano and Tsutsui 2003 reported that loan markets for Shinkin banks are geographically segmented by prefecture and they are competing within the

same type of banks. We therefore calculate Herfindahl indices for Shinkin banks by prefecture.

For regional banks, Kano and Tsutsui 2003 reported that the loan markets for these types of banks are only weakly segmented geographically by prefecture. We therefore assume that these banks are competing not in a prefecture but in a wider geographical area, which usually includes several prefectures. We calculate Herfindahl indices by geographical area in Japan and by loan size. The area definition is based on the demarcation of the ten finance bureaus of the Ministry of Finance.

Finally, for city banks, since they operate nationwide, we assume they are facing a uniform extent of competition and do not construct any index.

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Table 1: Descriptive statistics

		N	Mean	Std. Dev.	Min	Max
Dependent variables	SHORT_RATE (%)	1960	2.06	1.06	0	9.999
	COLLATERAL	1898	0.80	0.40	0	1
	BORREFU	1960	0.08	0.27	0	1
Relationship variables	LENGTH (year)	1960	32.20	15.77	1	99
	SCOPE	1960	0.00	1.27	-4.449957	1.625235
Firm-specific controls	SIZE (thondsand yen)	1960	3,423,718	6,995,780	2,337	88,000,000
	CURRENT	1960	1.72	6.77	0.078	290.959
	CAPRATIO	1960	0.26	0.29	-4.761	0.969
	PPMARGIN	1960	0.01	0.09	-1.513	1.452
	FAGE (year)	1960	47.33	26.00	3	378
	EMPLOYEE (person)	1960	103	448	2	17417
	LISTED	1960	0.03	0.18	0	1
	OWNER	1960	0.43	0.50	0	1
	GENDER	1960	0.98	0.13	0	1
	HOUSING	1960	0.89	0.31	0	1
	EDUCATION	1960	0.62	0.49	0	1
	AGE (year)	1960	59.08	9.42	29	95
Industry dummies	CONSTRUCT	1960	0.22	0.42	0	1
	TRANS	1960	0.03	0.16	0	1
	WHOLE	1960	0.15	0.36	0	1
	RETAI	1960	0.06	0.25	0	1
	REALE	1960	0.03	0.16	0	1
	SERVI	1960	0.08	0.27	0	1
	OTHER	1960	0.06	0.24	0	1
Regional dummies	HOKKAIDO	1960	0.08	0.27	0	1
	TOHOKU	1960	0.13	0.33	0	1
	KITAKANTO	1960	0.03	0.18	0	1
	CHUBU	1960	0.23	0.42	0	1
	KANSAI	1960	0.14	0.35	0	1
	CHUGOKU	1960	0.08	0.27	0	1
	SHIKOKU	1960	0.05	0.22	0	1
	KYUSHU	1960	0.08	0.27	0	1
Bank-specific controls	BTASSET (million yen)	1960	20,100,000	32,300,000	42,824	102,000,000
	BTLOANR	1960	0.6350	0.0738	0.38324	0.83561
	BLIQUIDITY	1960	0.3004	0.0681	0.13984	0.61641
	BCAPR	1960	0.0394	0.0124	0.01582	0.10470
	BBIS	1960	0.1002	0.0192	0.04600	0.20610
	BROA_N	1960	0.006	0.002	-0.00480	0.01525
	ACQUIRE	1960	0.067	0.251	0	1
	ACQUIRED	1960	0.134	0.340	0	1
	HELD	1960	0.301	0.459	0	1
	BNPL_RATE	1960	0.0547	0.0206	0.01221	0.15055
	BLOSS	1960	-0.0223	0.0369	-0.4434	-0.0009

Table 2: Sample distribution by three way interaction

	AUDIT=1	NO_AUDIT=1	Total	
LARGE=1	298	199	497	(25.4%)
REGIONAL=ICD=1	395	291	686	(35.0%)
REGIONAL=LCD=1	335	221	556	(28.4%)
SHINKIN=ICD=1	63	48	111	(5.7%)
SHINKIN=LCD=1	62	48	110	(5.6%)
	1153 (58.8%)	807 (41.2%)	1960	(100.0%)

Note: LARGE, REGIONAL, and SHINKIN are dummy variables which take a value of one when the main bank is a large, regional, and Shinkin bank, respectively. ICD and LCD are bank competition dummies which take a value of one when the main bank is located in a low and high Herfindahl prefecture, respectively. AUDIT and NO_AUDIT are documentation dummies which take a value of one when the firm has an audited financial statement and not, repectively.

Table 3: Interest rate regression

Dependent variable	SHORT_RATE				Coef.		Std. Err.	t	P>|t|
4-way interection	LENGTH				0.0024		0.0038	0.62	0.535
	LENGTH	*AUDIT	*REGIONAL	*ICD	-0.0075		0.0048	-1.56	0.120
	LENGTH	*AUDIT	*REGIONAL	*LCD	-0.0073		0.0049	-1.49	0.136
	LENGTH	*AUDIT	*SHINKIN	*ICD	-0.0136		0.0093	-1.47	0.143
	LENGTH	*AUDIT	*SHINKIN	*LCD	0.0048		0.0110	0.44	0.663
	LENGTH	*NO AUDIT	*LARGE		-0.0006		0.0056	-0.10	0.918
	LENGTH	*NO AUDIT	*REGIONAL	*ICD	-0.0048		0.0052	-0.92	0.355
	LENGTH	*NO AUDIT	*REGIONAL	*LCD	-0.0054		0.0055	-0.99	0.325
	LENGTH	*NO AUDIT	*SHINKIN	*ICD	-0.0136		0.0105	-1.30	0.195
	LENGTH	*NO AUDIT	*SHINKIN	*LCD	-0.0373	***	0.0107	-3.49	0.000
	SCOPE				0.0377		0.0488	0.77	0.439
	SCOPE	*AUDIT	*REGIONAL	*ICD	-0.0804		0.0608	-1.32	0.186
	SCOPE	*AUDIT	*REGIONAL	*LCD	-0.0275		0.0678	-0.41	0.685
	SCOPE	*AUDIT	*SHINKIN	*ICD	-0.0296		0.0971	-0.30	0.761
	SCOPE	*AUDIT	*SHINKIN	*LCD	-0.2095		0.1336	-1.57	0.117
	SCOPE	*NO AUDIT	*LARGE		0.0121		0.0745	0.16	0.871
	SCOPE	*NO AUDIT	*REGIONAL	*ICD	-0.0273		0.0635	-0.43	0.667
	SCOPE	*NO AUDIT	*REGIONAL	*LCD	0.0113		0.0705	0.16	0.873
	SCOPE	*NO AUDIT	*SHINKIN	*ICD	0.0863		0.1218	0.71	0.479
	SCOPE	*NO AUDIT	*SHINKIN	*LCD	0.2673	**	0.1212	2.21	0.028
3-way interaction	Intercept				7.9208	***	1.3373	5.92	0.000
	AUDIT	*REGIONAL	*ICD		0.6761	***	0.2547	2.65	0.008
	AUDIT	*REGIONAL	*LCD		0.6119	**	0.2649	2.31	0.021
	AUDIT	*SHINKIN	*ICD		1.0432	***	0.3958	2.64	0.008
	AUDIT	*SHINKIN	*LCD		0.6057		0.4306	1.41	0.160
	NO AUDIT	*LARGE			0.0088		0.2065	0.04	0.966
	NO AUDIT	*REGIONAL	*ICD		0.6466	**	0.2687	2.41	0.016
	NO AUDIT	*REGIONAL	*LCD		0.5942	**	0.2757	2.16	0.031
	NO AUDIT	*SHINKIN	*ICD		1.2751	***	0.4433	2.88	0.004
	NO AUDIT	*SHINKIN	*LCD		2.1128	***	0.4287	4.93	0.000
Firm-specific	log(SIZE)				-0.1170	***	0.0172	-6.79	0.000
	CURRENT				0.0010		0.0032	0.32	0.746
	CAPRATIO				-0.8308	***	-0.0763	10.88	0.000
	PPMARGIN				-0.4176	*	0.2504	-1.67	0.096
	FAGE				0.0015		0.0020	0.75	0.451
	FAGE2				0.0000		0.0000	-0.28	0.782
	EMPLOYEE				-0.0001	**	0.0001	-2.30	0.022
	LISTED				-0.0588		0.1325	-0.44	0.657
	OWNER				0.1261	***	0.0457	2.76	0.006
	GENDER				-0.0429		0.1664	-0.26	0.797
	HOUSING				0.0861		0.0687	1.25	0.210
	EDUCATION				-0.1826	***	0.0483	-3.78	0.000
	AGE				-0.0002		0.0024	-0.10	0.922
Industry dummies	CONSTRUCT				0.1357	**	0.0599	2.26	0.024
	TRANS				0.1861		0.1352	1.38	0.169
	WHOLE				0.0113		0.0654	0.17	0.863
	RETAI				0.2036	**	0.0927	2.20	0.028
	REALE				0.4279	***	0.1387	3.08	0.002
	SERVI				0.1005		0.0865	1.16	0.246
	OTHER				0.0044		0.0954	0.05	0.964
Regional dummies	HOKKAIDO				-0.2212	*	0.1307	-1.69	0.091
	TOHOKU				-0.1022		0.1004	-1.02	0.309
	KITAKANTO				-0.0191		0.1387	-0.14	0.891
	CHUBU				-0.1815	**	0.0827	-2.19	0.028
	KANSAI				-0.1022		0.0784	-1.30	0.193
	CHUGOKU				-0.1013		0.1174	-0.86	0.388
	SHIKOKU				-0.2476	*	0.1329	-1.86	0.062
	KYUSYU				-0.2067	**	0.1047	-1.97	0.048
Bank-specific	log(BTASSET)				-0.1682	***	0.0436	-3.85	0.000
	BTLOANR				-3.6715	***	1.1108	-3.31	0.001
	BLIQUIDITY				-5.1524	***	1.1453	-4.50	0.000
	BCAPR				31.6050	***	10.7910	2.93	0.003
	BCAPR2				-374.9422	***	120.0467	-3.12	0.002
	BBIS				0.6076		3.5925	0.17	0.866
	BBIS2				22.9043		15.1340	1.51	0.130
	BROA_N				24.7396	**	11.9937	2.06	0.039
	ACQUIRE				0.0548		0.1014	0.54	0.589
	ACQUIRED				0.1868	**	0.0875	2.13	0.033
	HELD				0.0675		0.1174	0.57	0.566
	BNPL_RATE				1.9832		1.5928	1.25	0.213
	BLOSS				-2.2614	***	0.7074	-3.20	0.001
Number of observations		1960							

Note: ***, **, or * means that the coefficient is statistically significant at 1%, 5%, or 10% level.

Table 4: Collateral regression

Dependent variable	COLLATERAL				dF/dx		Std. Err.	z	P>|z|
4-way interection	LENGTH				0.0027	*	0.0016	1.68	0.092
	LENGTH	*AUDIT	*REGIONAL	*ICD	-0.0015		0.0021	-0.73	0.467
	LENGTH	*AUDIT	*REGIONAL	*LCD	-0.0008		0.0021	-0.39	0.695
	LENGTH	*AUDIT	*SHINKIN	*ICD	-0.0006		0.0052	-0.12	0.907
	LENGTH	*AUDIT	*SHINKIN	*LCD	0.0010		0.0071	0.15	0.883
	LENGTH	*NO AUDIT	*LARGE		-0.0014		0.0023	-0.59	0.556
	LENGTH	*NO AUDIT	*REGIONAL	*ICD	0.0003		0.0022	0.12	0.907
	LENGTH	*NO AUDIT	*REGIONAL	*LCD	-0.0012		0.0023	-0.54	0.589
	LENGTH	*NO AUDIT	*SHINKIN	*ICD	-0.0019		0.0043	-0.43	0.666
	LENGTH	*NO AUDIT	*SHINKIN	*LCD	-0.0056		0.0067	-0.84	0.403
	SCOPE				0.0385	**	0.0183	2.10	0.035
	SCOPE	*AUDIT	*REGIONAL	*ICD	-0.0192		0.0238	-0.81	0.419
	SCOPE	*AUDIT	*REGIONAL	*LCD	0.0127		0.0262	0.49	0.627
	SCOPE	*AUDIT	*SHINKIN	*ICD	0.0616		0.0418	1.47	0.141
	SCOPE	*AUDIT	*SHINKIN	*LCD	0.0555		0.0747	0.74	0.458
	SCOPE	*NO AUDIT	*LARGE		0.0062		0.0295	0.21	0.833
	SCOPE	*NO AUDIT	*REGIONAL	*ICD	-0.0189		0.0245	-0.77	0.439
	SCOPE	*NO AUDIT	*REGIONAL	*LCD	-0.0273		0.0265	-1.03	0.304
	SCOPE	*NO AUDIT	*SHINKIN	*ICD	0.0027		0.0474	0.06	0.955
	SCOPE	*NO AUDIT	*SHINKIN	*LCD	0.1229	**	0.0606	2.02	0.043
3-way interaction	AUDIT	*REGIONAL	*ICD		0.1386	*	0.0632	1.68	0.093
	AUDIT	*REGIONAL	*LCD		0.0704		0.0847	0.73	0.464
	AUDIT	*SHINKIN	*ICD		0.1426		0.0454	1.36	0.175
	AUDIT	*SHINKIN	*LCD		0.1461		0.0500	1.16	0.245
	NO AUDIT	*LARGE			0.0730		0.0594	1.03	0.301
	NO AUDIT	*REGIONAL	*ICD		0.0444		0.0930	0.44	0.659
	NO AUDIT	*REGIONAL	*LCD		0.0550		0.0889	0.55	0.581
	NO AUDIT	*SHINKIN	*ICD		0.1162		0.0747	0.93	0.355
	NO AUDIT	*SHINKIN	*LCD		0.1576		0.0273	1.36	0.174
Firm-specific	log(SIZE)				0.0106		0.0069	1.54	0.123
	CURRENT				-0.0078		0.0048	-1.62	0.106
	CAPRATIO				-0.1156	***	0.0314	-3.68	0.000
	PPMARGIN				-0.1730		0.1226	-1.41	0.159
	FAGE				0.0046	***	0.0009	5.14	0.000
	FAGE2				0.0000	***	0.0000	-2.82	0.005
	EMPLOYEE				0.0000		0.0000	-0.77	0.442
	LISTED				-0.0615		0.0631	-1.07	0.286
	OWNER				0.0742	***	0.0186	3.89	0.000
	GENDER				0.0303		0.0801	0.40	0.690
	HOUSING				0.0692	**	0.0330	2.29	0.022
	EDUCATION				-0.0766	***	0.0188	-3.90	0.000
	AGE				-0.0015		0.0010	-1.45	0.147
Industry dummies	CONSTRUCT				-0.0667	**	0.0289	-2.46	0.014
	TRANS				0.0426		0.0488	0.78	0.433
	WHOLE				-0.1391	***	0.0356	-4.41	0.000
	RETAI				-0.0283		0.0444	-0.67	0.505
	REALE				0.1040	**	0.0337	2.06	0.039
	SERVI				-0.0738	**	0.0413	-1.97	0.049
	OTHER				-0.1014	**	0.0479	-2.39	0.017
Regional dummies	HOKKAIDO				-0.0682		0.0651	-1.15	0.251
	TOHOKU				-0.0197		0.0448	-0.45	0.652
	KITAKANTO				-0.1386	**	0.0788	-2.05	0.041
	CHUBU				0.0119		0.0338	0.35	0.729
	KANSAI				0.0096		0.0312	0.30	0.762
	CHUGOKU				0.0353		0.0431	0.76	0.447
	SHIKOKU				0.0496		0.0444	0.99	0.322
	KYUSYU				-0.0091		0.0454	-0.20	0.839
Bank-specific	log(BTASSET)				-0.0194		0.0191	-1.01	0.310
	BTLOANR				0.4288		0.4698	0.91	0.361
	BLIQUIDITY				0.1295		0.4898	0.26	0.792
	BCAPR				7.3779		4.6693	1.58	0.115
	BCAPR2				-89.9982	*	52.2559	-1.72	0.086
	BBIS				-0.8772		1.4920	-0.59	0.557
	BBIS2				11.7720	*	6.3588	1.85	0.065
	BROA N				10.4996	**	4.9114	2.14	0.032
	ACQUIRE				-0.0691	*	0.0500	-1.52	0.129
	ACQUIRED				-0.0254		0.0392	-0.67	0.501
	HELD				0.0898	*	0.0422	1.94	0.052
	BNPL RATE				0.4675		0.6838	0.68	0.494
	BLOSS				-0.1062		0.2811	-0.38	0.705
Number of observations		1898							

Note: ***, **, or * means that the coefficient is statistically significant at 1%, 5%, or 10% level.

Table 5: Availability regression

Dependent variable	BORREFU				dF/dx		Std. Err.	z	P>|z|
4-way interection	LENGTH				0.0002		0.0006	0.34	0.737
	LENGTH	*AUDIT	*REGIONAL	*ICD	-0.0022	**	0.0009	-2.53	0.011
	LENGTH	*AUDIT	*REGIONAL	*LCD	-0.0013		0.0008	-1.52	0.128
	LENGTH	*AUDIT	*SHINKIN	*ICD	0.0001		0.0013	0.08	0.934
	LENGTH	*AUDIT	*SHINKIN	*LCD	-0.0028	*	0.0017	-1.67	0.094
	LENGTH	*NO AUDIT	*LARGE		0.0003		0.0008	0.45	0.653
	LENGTH	*NO AUDIT	*REGIONAL	*ICD	-0.0009		0.0009	-1.06	0.287
	LENGTH	*NO AUDIT	*REGIONAL	*LCD	-0.0013		0.0009	-1.36	0.173
	LENGTH	*NO AUDIT	*SHINKIN	*ICD	-0.0023		0.0017	-1.37	0.171
	LENGTH	*NO AUDIT	*SHINKIN	*LCD	-0.0021		0.0024	-0.87	0.387
	SCOPE				0.0135		0.0087	1.55	0.122
	SCOPE	*AUDIT	*REGIONAL	*ICD	-0.0155		0.0107	-1.45	0.146
	SCOPE	*AUDIT	*REGIONAL	*LCD	-0.0085		0.0115	-0.74	0.457
	SCOPE	*AUDIT	*SHINKIN	*ICD	-0.0270	*	0.0150	-1.82	0.069
	SCOPE	*AUDIT	*SHINKIN	*LCD	-0.0056		0.0205	-0.27	0.785
	SCOPE	*NO AUDIT	*LARGE		-0.0099		0.0116	-0.85	0.394
	SCOPE	*NO AUDIT	*REGIONAL	*ICD	-0.0045		0.0114	-0.39	0.693
	SCOPE	*NO AUDIT	*REGIONAL	*LCD	-0.0189		0.0121	-1.57	0.117
	SCOPE	*NO AUDIT	*SHINKIN	*ICD	-0.0165		0.0162	-1.02	0.309
	SCOPE	*NO AUDIT	*SHINKIN	*LCD	-0.0399	**	0.0189	-2.15	0.032
3-way interaction	AUDIT	*REGIONAL	*ICD		0.0139		0.0520	0.30	0.767
	AUDIT	*REGIONAL	*LCD		0.0238		0.0620	0.45	0.649
	AUDIT	*SHINKIN	*ICD		-0.0200		0.0268	-0.49	0.626
	AUDIT	*SHINKIN	*LCD		0.1007		0.1927	0.82	0.410
	NO AUDIT	*LARGE			0.0126		0.0371	0.38	0.704
	NO AUDIT	*REGIONAL	*ICD		-0.0061		0.0385	-0.15	0.881
	NO AUDIT	*REGIONAL	*LCD		0.0389		0.0794	0.64	0.524
	NO AUDIT	*SHINKIN	*ICD		0.0360		0.1152	0.41	0.680
	NO AUDIT	*SHINKIN	*LCD		-0.0008		0.0770	-0.01	0.992
Firm-specific	log(SIZE)				0.0004		0.0032	0.12	0.908
	CURRENT				-0.0204	***	0.0053	-3.25	0.001
	CAPRATIO				-0.0594	***	0.0132	-5.83	0.000
	PPMARGIN				-0.1005	***	0.0367	-2.89	0.004
	FAGE				0.0005		0.0005	0.97	0.330
	FAGE2				0.0000		0.0000	-0.87	0.386
	EMPLOYEE				-0.0001	**	0.0000	-2.43	0.015
	LISTED				0.0449		0.0496	1.23	0.218
	OWNER				0.0268	***	0.0085	3.46	0.001
	GENDER				-0.0274		0.0338	-1.03	0.304
	HOUSING				-0.0119		0.0134	-0.99	0.322
	EDUCATION				-0.0099		0.0082	-1.26	0.206
	AGE				0.0007	*	0.0004	1.85	0.064
Industry dummies	CONSTRUCT				0.0069		0.0107	0.68	0.499
	TRANS				0.0263		0.0321	1.03	0.302
	WHOLE				0.0013		0.0104	0.13	0.898
	RETAI				-0.0004		0.0147	-0.03	0.979
	REALE				0.0288		0.0332	1.11	0.269
	SERVI				-0.0180		0.0097	-1.41	0.159
	OTHER				-0.0114		0.0127	-0.76	0.448
Regional dummies	HOKKAIDO				-0.0199		0.0114	-1.27	0.203
	TOHOKU				0.0251		0.0236	1.29	0.197
	KITAKANTO				0.0164		0.0316	0.61	0.542
	CHUBU				-0.0103		0.0116	-0.83	0.408
	KANSAI				0.0046		0.0124	0.38	0.700
	CHUGOKU				-0.0189		0.0111	-1.26	0.208
	SHIKOKU				-0.0135		0.0137	-0.79	0.427
	KYUSYU				-0.0042		0.0158	-0.25	0.802
Bank-specific	log(BTASSET)				-0.0028		0.0071	-0.40	0.690
	BTLOANR				0.1381		0.1816	0.76	0.446
	BLIQUIDITY				0.0568		0.1824	0.31	0.755
	BCAPR				-1.7877		1.6450	-1.10	0.272
	BCAPR2				14.7556		18.0017	0.83	0.409
	BBIS				1.2411	**	0.5656	2.25	0.024
	BBIS2				-3.3922		2.3993	-1.43	0.152
	BROA N				0.8060		1.8405	0.44	0.661
	ACQUIRE				0.0146		0.0211	0.80	0.426
	ACQUIRED				0.0369	**	0.0220	2.16	0.031
	HELD				-0.0211		0.0175	-1.10	0.273
	BNPL RATE				0.2277		0.2435	0.94	0.347
	BLOSS				-0.0960		0.1011	-0.96	0.339
Number of observations		1960							

Note: ***, **, or * means that the coefficient is statistically significant at 1%, 5%, or 10% level.