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How Are Loans by Their Main Bank Priced? Bank Effects, Information and Non-price Terms of Contract

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How Are Loans by Their Main Bank Priced?
Bank Effects, Information and Non-price Terms of Contract

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Abstract

We analyze how loans to Japanese small and medium entities by their main banks are priced using the matched data of firms and their main banks. The data on firms include informational characteristics of firms collected in the survey. Our findings are: 1. The borrower's transparency (to its main bank) does not affect the borrowing rate. 2. The firm's solvency reduces the borrowing rate. These are consistent with predictions of finance theories based on information economics. We also found that treating non-price terms of a loan contract as endogenous is crucial in consistently estimating the firm's borrowing rate.

Keywords: Main bank, borrowing rate, non-price terms, asymmetric information, instrumental variable
JEL classification: C31, G21

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1. Introduction

In this paper, we analyze how loans to small firms by their main bank are priced using the rich survey data on small and medium enterprises (SMEs) conducted by the Japanese Government. The main bank system in Japan has been analyzed as a major example of the relationship lending. The main bank system, however, is not a unique form of financing relationship between a lender and a borrower. It is widely observed in Europe, as exemplified by a German house bank system.

Under the relationship lending, a lender is said to take advantage of its closeness to a borrowing firm, to acquire unrecorded information, what we call soft information, on the firm through informal contacts, and therefore overcome asymmetric information with the firm that non-relationship lenders who rely on recorded information such as financial statements, what we call hard information, would inevitably face. According to this hypothesis, relationship lenders such as main banks are advanced monitors of opaque SMEs.

Our main interests in pricing of loans by main banks rest on six factors that may influence the price of loans; the main bank's financial conditions, the strength of the lender-borrower relationship, the borrowing firm's informational transparency, the borrowing firm's financial conditions, the firm's credit risk, and non-price contract terms of a loan such as collateralization and public credit guarantees.

As it is well known, a lender bank offers a multi-dimensional lending contract to a borrowing firm. The bank can not only raise a lending rate for a loan to a riskier borrowing firm, but also harden non-price terms; request collateralizing the loan or an application for public credit guarantee, and shorten the maturity. Thus, without properly modeling non-price lending contract terms in the estimation of the lending rate, estimated influences of other factors would be seriously biased.

The survey used in this study, the “Survey on Corporate Financial Environments,” (hereafter referred to as the SCFE) identifies a firm’s main bank. Thus, use of the SCFE data allows us to match the data on borrowers with the data on their lender. The SCFE asks respondent firms various questions concerning the firm’s relationship with its main bank, which are comparable to the Survey of Small Business Finances (SSBF) conducted by the Federal Reserve Board that survey American firms. The SCFE tracks firms every survey year and improves on the SSBF, which is conducted every five years and surveys different firms at each wave.

Using the two year panel data of the SCFE using 2002 and 2003 waves, we regress the surveyed firms’ short-term borrowing rate from its main bank on measures for the main bank’s financial conditions, the strength of the lender-borrower relationship, the borrowing firm’s informational transparency, the borrowing firm’s financial conditions, collateralization and public credit guarantees of loans by its main bank, after controlling for the firm’s demographic characteristics.

We use instrumental variables to overcome biases stemming from multidimensionality of the lending contract and to obtain consistent estimates of six groups of factors influencing the short-borrowing rate mentioned above. Instruments used for collateralization of loans are the share of tangible assets in the firm’s total assets and its interaction terms with dummy variables indicating the region that the firm is located in (region dummies) and with dummy variables indicating the industry the firm belongs to (industry dummies). Instruments used for public credit guarantees are the dummy variable indicating that the firm is qualified for public credit guarantees and its interaction terms with industry dummies as the qualification criteria varies by industry.

Our major findings are summarized in the following four points.

First, the borrower’s transparency (to its main bank) does not affect the borrowing rate.

This is consistent with the theoretical prediction that the relationship lender monitors its borrowers based not on recorded hard information but on unrecorded soft information.

Second, the higher the borrowing firm's capital to asset ratio, a measure for the borrower's financial strength, is, the lower the borrowing rate is. This is consistent with the "financial accelerator" theory proposed and empirically tested by Bernanke and Gertler (1995) and Bernanke, Gertler and Gilchrist (1999). According to their claim, a lender charges an "external finance premium" to a borrower, which increases in the ratio of net worth to total assets of the borrower, when the informational asymmetry between the lender and the borrower is present, as it is not easy for the lender to predict sustainability of the firm's business lines beyond what the current financial strength indicates. There does exist informational asymmetry between a firm and its main bank. The theory only claims that informational asymmetry is less serious between a firm and its main bank.

Thirdly, a bank with a greater amount of non-performing loans charges a higher interest rate. This suggests that lender banks take advantage of their stronger bargaining power in the negotiation over the contract terms with their borrowers and have their borrowers bear parts of costs associated with non-performing loans.

We also found that treating non-price terms of a loan contract as endogenous is crucial in consistently estimating the firm's borrowing rate. When collateralization and/or public credit guaranteeing of loans are not instrumented, coefficients of variables that are meant to measure the firm's transparency are negative, and that of collateralization of loans is *positive*, that is, the relationship lender would charge a higher rate for *secured* loans. These results are all counterintuitive results stemming from inabilitu to ldentifying the bank's pricing behavior.

The remainder of the paper is arranged as follows. In section 2, theories are discussed. In section 3, data and econometric issues are set out. In section 4, results are reported and interpreted. Section 5 concludes the paper.

2. What Influence the Pricing of the Relationship Lending?

In this section, we discuss six factors that may influence the price of loans; the main bank's financial conditions, the strength of the lender-borrower relationship, the borrowing firm's informational transparency, the borrowing firm's financial conditions, and non-price contract terms of a loan such as collateralization and public credit guarantees. The variables that are meant to measure these six factors will be used as independent variables in the regression analysis of the firms' borrowing rates from their main bank.

The main bank's financial conditions

If it is costly for a firm to switch its main bank, main banks may take advantage of the borrowing firms' financial dependence by forwarding the risks that they are exposed on their balance sheets. If a bank's asset allocation is not liquid enough, it might not be able to meet all the depositors' demands when deposits are withdrawn amass. If the bank fails to meet the Basel regulatory minimum standard, the prudential regulator intervenes and its businesses are adversely affected under the current Prompt Corrective Action framework (PCA); the regulator constraints the bank's businesses. Ultimately if the bank is undercapitalized, it has to close down its businesses. Banks may have their borrowers bear costs of disposing their non-performing loans.

Under the monopolistic main bank system, the bank may request its borrower compensation for such financial risks it is exposed by charging higher lending rates.[1] Van den

[1] Main bank relationships may not be perfectly monopolistic. Unlike in the United States where small firms usually borrow from a single bank, in Japan SMEs borrow from multiple banks including their main bank. Thus, main banks may face competitive pressures from non main bank lenders who may offer lower lending

Heuvel (2002) has formalized a negative influence of capital loss on the forward looking bank's lending supply function under the Basel regulatory framework. Diamond and Rajan (2000) also show that a financially weak bank, which is more vulnerable to runs by demand depositors than a financially strong bank, would charge higher lending rates. On the other hand, if the main bank system is not monopolistic and lending markets are competitive, the firm would be able to borrow from a financially stronger bank that offers a cheaper loan. In the equilibrium, the price of a loan is equalized across banks with varying financial strength.

Hubbard, Kuttner and Palia (2002) call such influences of the bank's financial conditions on the firm's borrowing rate "bank effects", and test on the importance of the effects using the contract based data on loans to large firms. They find that low-capital US banks charge higher rates than high-capital banks.

The strength of the lender-borrower relationship

Small and medium sized firms (SMEs) are opaque to financiers. Financial statements and other reports mandated by laws are often imprecise. In general, the stronger the relationship between a lender bank and a borrowing firm is, the less asymmetric information there exists. The close relationship allows the bank to obtain not only recorded information on the firm such as financial statements, what we call hard information, but also unrecorded information, what we call soft information, through a bank officer's frequent visits to the borrowing firm and rather

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rates for firms without relationships. Nevertheless, Japanese main bank relationships last typically very long (the average lending relationship for our sample firms discussed later is 36 years). The fact that firms seldom switch their main bank may imply that, in the main bank relationship, not only a lender engages in the relationship specific investment for monitoring but also a borrower bears relationship specific sunk costs that make a borrower less willing to withdraw from the relationship. How does bank competition and main bank relationships interplay is the least explored subject. According to Kano, Uchida, Udell and Watanabe (2005), shinkin banks in regions of less bank competition reduce lending rates to their borrower as the main bank relationship lasts longer, but such interplay between bank competition and lending terms is not observed for other types of banks.

informal conversations with its owner-manager, thereby makes monitoring of the borrowing firm more effective.

There is a large volume of empirical literature that attempts to investigate whether the strength of the relationship reduces the borrowing rate. The most often used measure for the strength of the lender-borrower relationship is the length of the financial relationship. Petersen and Rajan (1994, 2002) and Berger and Udell (1995) find that the longer the lending relationship is, the lower the lending rate to a small firm is. Their finding, however, is based on the SSBF data on small firms in the United States where the lender-borrower relationship develops mostly only through rounds of financial contracts, typically rolling over of loan contracts. The length of bank-firm business relationship in the US found using the SSBF data is relatively short in the US (11 years in Berger and Udell [1995] and 8 years in Cole [1998]).

Unlike contract based relationships in the US, the European/Japanese main bank system is institutional and stable. Main banks not only provide borrowing firms with loans and other financial services but also directly or indirectly control governance of borrowing firms through holding their shares or dispatching officers and managers. Therefore, main bank-firm relationships in Europe and Japan are far longer ones than the contract based relationships observed in the US. According to Elsas and Krahnen (1998), the length of the German house bank relationships is on average 20 to 30 years depending on firm size. As will be discussed in the next section, the length of the Japanese main bank relationships for SMEs recorded in the SCFE is on average about 35 years. It is only 14 percent of firms that have switched their main bank in their company history. This means that for vast majority of Japanese SMEs, a main bank stays with them from their birth to their death.

Under the main bank system, as evidenced by Elsas and Krahnen (1998), what matters is whether they have their main bank or not and not how long relationship they have with their main bank. Marginal increase in the length of the relationship with their main bank is of little importance to them under the long relationship.[2]

The borrowing firm's informational transparency

Under the main bank relationship, a main bank as a relationship lender takes advantage of its exclusive access to unrecorded (undocumented) *soft* information on its opaque borrower which non-relationship lenders are hard to obtain. The main bank collects soft information through informal contacts to the borrower firm. Such contacts occur often behind the closed door, in the firm's president's office. The firm's president provides the visiting main bank's loan officer information which no other lender can obtain. The main bank, then, assesses the borrower's credit worthiness based on gathered soft information. Thus, whether the borrowing firm is transparent and is well known to outsiders should be irrelevant to the main bank's financial decisions. It is because small firms are *opaque to outsiders* but *transparent to the main bank* that the main bank can win small firms over non-relationship lenders.

The borrowing firm's financial conditions

Bernanke and Gertler (1989, 1995), Bernanke, Gertler and Gilhrist (1998, 1999) discuss that the agency costs stemming from asymmetric information between a lender and a borrower results in the inverse relationship between the lending rate and the firm's net worth (collateral value). In general, an external lender charges the premium relative to an internal financier such as an owner and her family since there is the asymmetric information between a lender and a borrower. This premium, called the "external finance premium", is known to be inversely related to the borrowing firm's net worth under the optimal lending contract. The main bank relationship may substantially unveil opaqueness of a borrowing small firm but not entirely. No matter how close

[2] For an extensive literature survey on the relationship lending, see for instance Brick, Kane and Palia (2004).

the main bank is to its borrower firm, the facts remain that the lender and the borrower are separate entities and that there exists the lender – borrower asymmetric information.

The firm's credit risk

Unlike the extent of the firm's informational opaqueness, the firm's credit risk should be properly priced under the main bank relationship. Thus, the fundamental default probability of a firm should be positively related to the lending rate to that firm.

Non-price contract terms

A lending contract is multi dimensional. The price of a loan (lending rate) is not the sole term of a lending contract. A lender bank supplies a loan at the specified price of a loan (lending rate) conditional on various other written and unwritten "terms" of contract. Such non-price terms of contract include collateralization of a loan, coverage of a loan by a credit guarantee, and greater disclosure of the firm's financial conditions. The lender bank may cut the lending rate on the loan collateralized by physical assets or the loan secured by persons. Likewise, the bank may lower the lending rate on the loan guaranteed by a public program. The bank may cut the lending rate in exchange for greater disclosure of the firm's financial conditions.

The complication occurs because the determination of such non-price terms in turn is dependent on the lending rate. The bank may require that a loan be collateralized or covered by a credit guarantee or request greater disclosure in exchange for a lower lending rate. In essence, the pricing of a loan and various non-price "terms" are not determined sequentially but are determined simultaneously. Thus, when estimating the equation for the lending rate, variables that are meant to capture non-price terms should be treated as endogenous right hand side variables.

Little has been done to deal with endogenous non-price terms in the empirical model for the lending rate in the literature, though non-price terms may be a potential cause of very serious biases in estimating the lending rate.

Some studies do discuss the importance of non-price terms as a determining factor of the lending rate. Using the 1988 wave of the SSBF, Berger and Udell (1995) include dummy variables indicating a type of collateral if a loan is collateralized in the regression equation for interest rates on lines of credit supplied to small businesses. They estimate an independent equation for collateralization of a loan, which does not depend on the lending rate. Using the data on large firms whose sources are mostly SEC filings, Strahan (1999) conduct the similar empirical test to the Berger and Udell's. He includes the dummy variable indicating whether a loan is secured and the loan maturity, two of the important non-price terms, as regressors in the equation for the lending rate. He, too, run regressions of such non-price terms on exogenous firm characteristics, which are independent of the lending rate.

Cressy and Toivanen (2001) is the first attempt to deal with endogenous non-price terms in estimating the contractual lending rate using the simultaneous equation system (the instrumental variable regression). They, however, lack variables that capture informational characteristics of a borrowing firm. Hubbard, Kuttner and Palia (2002) instead let an endogenous fixed effect represent non-price terms. It is, however, hard to believe that such non-price terms are time-invariant. In addition, their use of contract based data, too, does not allow variables that capture informational characteristics of a borrowing firm.

Brick, Kane and Palia (2004) estimate the simultaneous system of equations for the lending rate and two of the important non-price terms, collateral and fees. Instruments used for non-price terms, however, are problematic. In the logit regression for collateralization of a loan, it is only a dummy variable that is set to unity if either the principal owner or the firm has ever defaulted that is statistically significant. This dummy variable captures not the firm's incentive to offer collateral to the lender bank but the bank's incentive to secure a loan to a borrowing firm with a bad credit history. Under the relationship lending, a monopolistic lender bank likely sets the lending rate and the borrowing firm accepts the offered rate. Thus, the equation for the lending rate characterizes the bank's behavior. Obviously, the variable that captures the bank's incentive to request collateral is not a valid exogenous instrument. It is a variable that captures the firm's incentive to voluntarily offer collateral that plays a role of a valid instrument.

3. The Data and Econometrics

3.1. Constructing the Matched Panel Data

The survey used in this study, the "Survey on Corporate Financial Environments," (SCFE) has been conducted annually by the Small and Medium Enterprise Agency (SMA) since 2001. The data of three waves (2001, 2002, and 2003) are currently available. The SCFE asks respondent firms various questions concerning the firm's relationship with its main bank such as the firm's disclosure and frequency of contacts to its main bank. The questions asked in the SCFE are comparable to those asked in the Survey of Small Business Finances (SSBF), whose surveyor is the Federal Reserve Board and the Small Business Administration (SBA). The SCFE tracks firms every survey year and improves on the SSBF, which is conducted every five years and surveys different firms at each wave. We match each surveyed firm with its main bank through the question from the 2002 wave of the SCFE that asks respondent firms their main bank.

We construct a two year panel data of the SCFE using 2002 and 2003 waves. We match the surveyed firm with its main bank through the questionnaire that asks respondent firms their main bank in the 2002 wave. The SCFE asks respondent firms to report answers to questionnaires as of October 31 of the survey year. That is, firms are supposed to report answers as of October 31, 2002 for the 2002 wave of the SCFE and answers as of October 31, 2003 for the 2003 wave of the SCFE. The financial data of surveyed firms are compiled by the Tokyo Shoko Research Corporation (TSR), whereas data on their main banks of surveyed firms are their financial statements and relevant data such as the BIS capital to asset ratio and the region that they are headquartered in, which are publicly available in various forms.

In matching the SCFE survey data with data on main banks, the selected date on which the data on main banks are recorded is March 31 of the survey year, which is the most recent closing date of the fiscal year for Japanese financial institutions.[3] Thus, the data from the 2002 and 2003 waves of the SCFE are matched with the data of banks at the end of the fiscal year 2001 and the data at the end of the fiscal year 2002, respectively. Likewise, the data on the surveyed firm from each wave of the SCFE are matched with the TSR financial data on the firm at the most recent closing date of the survey year.[4]

The qualitative data on surveyed firms such as demographic characteristics of the firm's representative and shareholder decomposition are collected by TSR in 2001.

3.2. Sample Selection

The numbers of firms surveyed in 2002 and 2003 waves of the SCFE are 7726 and 8846 respectively. Following the US definition of the small firm set by the SMA, firms that employ

[3] Main banks of surveyed firms are not necessarily banks licensed under the Banking Act. Other depository institutions include shinkin banks, credit cooperatives, government financial institutions, the Norinchukin Bank, and agricultural and fishery cooperatives.
[4] Unlike financial institutions, closing dates are scattered all across a calendar year.

more than 500 persons are dropped. Firms whose financial statements can be traced back to FY 2000 are selected so that lagged financial variables of firms are available. After dropping firms whose borrowing rate from the main bank either in the 2002 wave of the SCFE or in the 2003 wave of the SCFE is missing and firms with missing information on the length of their relationship with their main bank, 1301 firms remain. Furthermore, firms whose main bank remains the same for at least three years at the survey time of the 2003 wave of the SCFE (October 31, 2003) are selected so that the data on the firms' main banks can be traced back to FY 2000. This sample selection ensures that lagged variables of main banks of surveyed firms for FY 2001 are available.[5] Only 2.2 percent of firms (29 firms) in the sample have less than or equal to three years of the main bank relationship. The number of remaining firms in the sample is 1272.

From 1272 firms that remain in the sample, firms with answers to various questionnaires concerning the firm's relationship with its main bank being missing, firms with answers to questionnaires concerning collateralization and public guarantees being missing, and firms with demographic information on their representative being missing are dropped. A small number of firms that had reported to their main bank neither in 2002 nor in 2003 are also dropped. As a result, 846 small and medium enterprises remain in the constructed two-year panel data.

3.3. The Empirical Model

We model the simultaneous system of equations for the lending rate and two of important non-price terms, collateralization and credit guaranteeing as the following three-equation system.

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[5] Recall that the SCFE data on surveyed firms that are matched with bank and financial data for FY 2001 are the data from the 2002 wave of the SCFE.

$$r_{ijt} = \alpha_r + \beta_r BANK_{it} + \gamma_r RELAT_{ijt} + \delta_r INFO_{jt} + \varphi_r RISK_{jt} + \kappa_r FIRM_{it} + \pi_r C_{ijt} + \tau_r G_{ijt} + u_{ijt}$$

$$\begin{cases} \Pr(C_{ijt}=1)_{ijt} = F^c\left(\alpha_c + \beta_c BANK_{it} + \gamma_c RELAT_{ijt} + \delta_c INFO_{jt} + \varphi_c RISK_{jt} + \kappa_c FIRM_{it} + \tau_c G_{ijt} + \omega_c r_{ijt} + \rho_c IV^c{}_{jt} + \varepsilon^c{}_{ijt}\right) \\ \Pr(G_{ijt}=1)_{ijt} = F^g\left(\alpha_g + \beta_g BANK_{it} + \gamma_g RELAT_{ijt} + \delta_g INFO_{jt} + \varphi_g RISK_{jt} + \kappa_g FIRM_{it} + \pi_g C_{ijt} + \omega_g r_{ijt} + \rho_g IV^g{}_{jt} + \varepsilon^g{}_{ijt}\right) \end{cases}$$

The first equation models the main bank's decision to set the lending rate *r*. The second and the third equations model the main bank's decisions to request the borrowing firm collateralizing a loan physically or personally and to request the firm obtaining credit guarantees from government funded Credit Guarantee Corporations (CGCs), respectively. Subscripts *i*, *j*, and *t* represent a firm, its main bank, and year.

BANK, RELAT, INFO, and RISK are vectors of independent variables. BANK is (a vector of) variables that are meant to measure the main bank's financial conditions. RELAT is a variable that is meant to measures the strength of the lender-borrower relationship. INFO is a vector of variables that are meant to measure the firm's informational transparency. RISK is a variable that is meant to measure the credit risk of the firm. FIRM is a vector of firm specific variables that include the firm's solvency and demographic variables. IV^c and IV^g are sets of instrumental variables for collateralization and for credit guarantees from CGCs.

The more detailed explanations on endogenous exogenous variables follow in order. Definitions of these variables are also summarized in Table 1.

3.4. Endogenous and Exogenous Variables

<u>The interest rate</u>

Each wave of the SCFE asks respondents the highest short borrowing rate from their main bank. Use of the short rate with maturity less than one year as a dependent variable allows us to control for maturity of the lending contract, one of the most important non-price terms. Figure 1 presents the distribution of short rates surveyed in 2002 and 2003 waves of the SCFE. The short-term prime rate remains 1.375 percent both in October 2002 and October 2003, which is indicated by a red line.[6]

Collateralization and credit guarantees

The indicator variable C is set to unity if the firm's loans from their main bank are (partially) collateralized by physical assets or by personal securities. Another indicator variable G is set to unity if the firm's loans from their main bank are (partially) guaranteed by Credit Guarantee Corporations (CGCs). Survey questionnaires regarding collateralization and credit guarantees are not identical between two waves of the SCFE used.

In the 2002 wave of the SCFE, respondent firms are directly investigated whether they are offering a physical collateral or not, whether they are offering a personal security to their main bank, and whether they are using CGCs for loans from their main bank.

In the 2003 wave of the SCFE only, respondent firms are asked the total amount of short-term and long-term loans from their main bank.[7] Then, they are asked the amount of loans from the main bank that is physically collateralized and the amount that is guaranteed by CGCs. In a separate questionnaire, they are asked whether they are offering a personal security to their

[6] The data on short rates are the only universally available figures for the borrowing rate. On the other hand, the data on longer rates, which are likely the rates on funds for financing the firm's investment, may not be comparable across firms since maturities vary. Since a main bank often roles over short loans, the firm's objective to borrow short does not necessarily is just to finance short-term working capital but is often to finance longer term projects. Furthermore, the fact that fixed collateral is usually set up for the firm's entire amount of loans from a main bank suggests that a main bank likely mix longer loans and short loans in the single basket in managing the borrower's loans.

[7] There may be individual loan contracts between a firm and the lender bank that are neither even partially collateralized nor publicly guaranteed. At the time of default, though, what matters to the lender most is not recovery of each individual loan but recovery of collection of all the loans that the bank has supplied. Thus, whether some of loans from the main bank to the firm are collateralized or publicly guaranteed influences the *highest* short lending rate, which is the rate charged on one of multiple contracts between the bank and the firm that are not necessarily neither collateralized nor publicly guaranteed.

main bank or not. Regarding the data from the 2003 wave of SCFE, C is set to be unity if either the amount of collateralized loans from the main bank is greater than zero or the firm is offering personal securities to the main bank.

The main bank's financial conditions (BANK)

Independent variables included in BANK are the book capital to asset ratio (BCAR), the dummy variable that is set to unity if the bank's regulatory status is "international" (BBISCLASS), the ratio of non-performing loans to total asset (BNPL), the ratio of loan loss provisions to total asset (BLOSS), the ratio of liquid assets to total asset (BLIQUID), and a logarithm of total asset (LNBTASSET).

The book-based capital to asset ratio is used because the BIS regulatory capital to asset ratio on which the prudential regulator (Financial Services Agency) bases its actions is easy for a bank to manipulate pointed out by Ito and Sasaki (1999).[8] "International" banks that are allowed to operate international businesses need to meet the higher minimum standard (8 percent) than "domestic" banks (4 percent). BLIQUID is a measure for the bank assets' liquidity used by Kashyap and Stein (1999). The liquid assets included are cash, deposits, call loans, and securities.[9]

The strength of the lender-borrower relationship (RELAT)

We include the length of the main bank relationship (LENGTH) as a measure for the strength of the lender-borrower relationship. We expect that LENGTH does not influence the lending rate under the main bank system.

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[8] Half of capital to meet the regulatory need should be core Tier 1 capital that is roughly equivalent to book capital.

[9] Hubbard, Kuttner and Palia (2002) include the bank's ROA as another "bank effect" variable. We excluded the ROA since it is very strongly correlated with the short rate.

The borrowing firm's informational transparency (INFO)

Independent variables included in INFO are the frequency of the firm's reporting to its main bank (DOC), the dummy variable that is set to unity if the firm reports to its main bank on the bank's request rather than by the firm's voluntary will (DOC_BANK), the interaction term between DOC and DOC_BANK (DOCBANK), firm age (FAGE), the number of board members (BOARD), and the dummy variable that is set to unity if the firm is owner-managed (OWNER).[10]

DOC_BANK is constructed from the questionnaire only surveyed in the 2002 SCFE that let respondent firms select from three choices, "not reporting to the main bank", "reporting on the bank's request", and "reporting by its own will". DOC captures the frequency (the number of times of reporting in one year) of the frm's reporting by its own will and is exogenous to the bank's setting of the lending rate, whereas DOC_BANK and DOCBANK are endogenous variables that the bank can influence. Owner-managed firms or firms with the small number of board members are less likely to leave reliable hard information. FAGE is included since young start ups are little known to external financiers. We expect that these variables measuring informational transparency do not influence the lending rate under the main bank system.

The firm's credit risk (RISK)

We include the credit score of 0 to 100 issued by TSR (SCORE) (A firm with a score of 100 is the safest.). The score is based on various quantitative indices from the firm's financial statements and a wide range of additional qualitative information. We expect that the lending rate is a decreasing function of SCORE.

[10] Since there are very few listed firms in the sample (1.5 percent), the dummy variable that is set to unity if the firm is listed in stock exchanges is not included.

Firm specific variables (FIRM)

Variables included in FIRM are the firm's book capital to asset ratio (CAPITAL) and various firm specific control variables. Control variables are the logarithm of total assets (LNTASSET), the logarithm of short borrowing (LNSHORT), age of the firm's representative (AGE), a dummy variable that is set to unity if the firm's representative owns residential housing (HOUSE), a dummy variable that is set to unity if the educational attainment of the firm's representative is college or more advanced (EDUC), industry dummies and region dummies.[11] LNSHORT is included as a proxy for quantity of the firm's short loans from the main bank that is not directly observed.

3.5. Instrumental Variables for Collateralization and Public Credit Guarantees

Instrumental variables for the indicator variable for collateralization, C, are shares of immovables and movables within total asset (ESTATE and NONESTATE), interaction terms between the share of immovable assets and region and industry dummies, and interaction terms between the share of movable assets and industry dummies. Interaction terms with region dummies are meant to capture variations in land prices across regions. Interaction terms with industry dummies are meant to capture variations in importance of tangible or intangible assets across industries.

Instrumental variables for the indicator variable for public credit guaranteeing, G, are a dummy variable that is set to unity if the firm is qualified for applying credit guarantees to CGCs

[11] 8 region dummies for Hokkaido, Tohoku, Kitakanto, Chubu, Kansai, Chugoku, Shikoku, and Kyushu are included, whereas the dummy variable for Greater Tokyo is excluded as the variable for a base group. 9 industry dummy variables for construction, information and communication, transportation, wholesale, retail, real estate, services, and other industries are included, whereas a dummy variable for the manufacturing industry is excluded as the variable for a base group.

(GELIGIBLE), and interaction terms between this dummy variable and industry dummies. Firms that are qualified to apply for public credit guarantees from CGCs are “small and medium enterpreises (SMEs)” defined by the SMA. The trick in constructing this effective instrumental variable is that firms selected in the sample are “small” firms defined by the simpler US standard, which do not necessarily coincide with “SMEs” by the more elaborate Japanese standard. Interaction terms with industry dummies are included since definitions of “SMEs” differ across industries (see Table 2 for definitions of “SMEs”).

3.6. The Instrumental Variable Regression

Our interest is in estimates of coefficients in the equation for the lending rate that characterize the main bank’s behavior to set the rate. We take into account equations for collateralization and public credit guaranteeing for their endogenous influences on the equation for the lending rate. We are not interested in the way the main bank requests the borrowing firm collateral or credit guarantees by CGCs. That is, to meet our end, the way collateralization or credit guaranteeing are modeled are of less importance.

We run the standard instrumental variable regression (two-stage least square, 2SLS) for the lending rate using all the exogenous variables included in the equation for the lending rate and instrumental variables for collateralization and credit guaranteeing mentioned just above as a set of instrumental variables. It is well known that consistency of estimates on coefficients in the linear regression equation with endogenous dummy independent variables holds as long as selected instrumental variables are exogenous and correlated with endogenous dummy variables.

At the first stage of the 2SLS regression, linear regressions for endogenous dummy variables are run on instrumental variables. Thus predicted probabilities for collateralization and public credit guaranteeing, which are then used as independent variables for the second stage linear regression for the lending rate, may be less than zero or greater than one. Such "invalid" predicted values for probabilities do not bias estimates of coefficients in the equation for the lending rate.

4. Results

4.1. Preliminary Results

Summary statistics

Table 3 shows summary statistics of variables used in this study. The median and the mean of the number of employees are 39 and 61 respectively.[12] The average short rate is 2.16 percent. 95 percent of firms in the sample are offering collateral, whereas 58 percent of firms are obtaining public guarantees from CGCs for loans from their main bank. Main banks of two thirds of firms are regional or regional 2 banks. 23 percent of firms have nationally operating large banks (city banks or trust banks) as their main bank and 11 percent of firms have shinkin banks as their main bank. The average length of main bank relationships is 36 years. 44 percent of firms are owner-managed. 92 percent of firms are eligible for public credit guarantees.

The first stage

Tables 4-1 and 4-2 present the results of the fist stage OLS regressions for collateralization and public credit guaranteeing, respectively. DOC is excluded as an independent variable as it

[12] Japanese firms surveyed in the SCFE are relatively larger than American firms surveyed in the SSBF. The median and the mean of firms surveyed in the 1998 wave of the SSVF are 3 and 23 respectively.

is exogenous only when it is used with an endogenous interaction term, DOCBANK.

When interaction terms between instrumental variables and regional and industry dummies are not included, the estimated coefficient of ESTATE in the equation for collateralization is positive and statistically significant (column 1). Likewise when these interaction terms are excluded, the sign of the estimated coefficient of GELIGIBLE in the equation for public credit guaranteeing is positive, though statistically insignificant. These results are strong enough to validate our choice of instrumental variables.

When interaction terms are included, the estimated coefficients of the interaction term between ESTATE and the dummy variable for the information industry and the interaction term between ESTATE and the dummy variable for the services industry in the equation for collateralization are positive and statistically significant. Likewise, when these interaction terms are included, the interaction term between GELIGIBLE and the dummy variable for the construction industry and the interaction term between GELIGIBLE and the dummy variable for the transportation industry in the equation for public credit guaranteeing are positive and statistically significant. The R-squared for the equation for collateralization becomes smaller and that for the equation for public credit guaranteeing becomes greater when interaction terms are included than when they are not.

4.2. Results

Our empirical findings break dowin into the following three points. First, the results are consistent with the predictions from finance theories based on the information economics. Second, accounting for endogenous non-price terms is crucial in estimating the main bank's pricing of loans. Third, the financial strength of a main bank does not lower but *raises* the lending rate.

Table 5 presents the regression results for the equation for the main bank's lending rate. The fist column is the 2SLS regression results using instrumental variables. The following discussion on empirical results is based on the first column. The second and the third columns present the results that do not fully take into account endogeneity due to non-price terms. The second column presents the 2SLS regression results when G (public credit guaranteeing) is treated as an exogenous variable, whereas the third column presents the simply OLS regression results.

The main bank's financial conditions (BANK)

The coefficient of BNPL is positive and statistically significant. This suggests that financially unhealthy banks with a greater amount of non-performing loans charge higher interest rates. This finding is consistent with our theoretical prediction and is also consistent with the US evidence by Hubbard, Kuttner and Palia (2002).

The strength of the lender-borrower relationship (RELAT)

As the theory predicts, the estimated coefficient of LENGTH is not statistically significant.

The borrowing firm's informational transparency (INFO)

As the theory predicts, all but one of coefficients of variables that are meant to capture transparency to lenders is estimated to be statistically insignificant. The remaining coefficient of DOC, which indicates whether a firm voluntarily discloses documents to the main bank or not, is significant only at the 10 percent level. Such results cast a sharp contrast to Berger and Udell (1995) who find that more transparent firms, such as incorporated firms and non-owner managed firms, enjoy lower borrowing rates than opaque firms, such as unincorporated firms and owner managed firms.

There are possibly two explanations for our results' departure from Berger and Udell's. One explanation is that American banks' relationships with small firms are relatively short and are not as established as Japanese banks' relationships with small firms under the main bank system. Another explanation is that Berger and Udell's estimates may be biased due to endogeneity of non-price terms. We will come back to this problem soon.

The firm's credit risk (RISK)

Risks of firms are properly priced as the coefficient of SCORE is estimated to be negative and statistically significant.

Firm specific variables (FIRM)

Coefficients of CAPITAL and LNTASSET are estimated to be negative and statistically significant. These findings jointly support the theory that higher collateral value of a firm reduces the cost of borrowing when there exists lender-borrower asymmetric information.

Non-price terms

On one hand, the estimated coefficient of C (collateralization) is not statistically significant. On the other hand, the estimated coefficient of G (public credit guaranteeing) is positive and significant.[13] This is probably because banks assess that firms which willingly obtain public

[13] A firm which voluntarily offers collateral to its main bank should signal to the bank that it is a safer firm. If so, the bank should reduce the lending rate to this safer firm. If this theory holds true in the real world, the coefficient of collateral should be positive. Another way to interpret the variable C is that it captures the firm's collateral value. This is a valid argument since C is instrumented by the share of immovables in the firm's assets. In the latter interpretation of C, its coefficient is again theoretically positive. The fact that the coefficient of the firm's capital to asset ratio is positive and the coefficient of C is statistically insignificant may suggest that both C and the firm's capital to asset ratio capture the firm's collateral value. To test on this hypothesis, we dropped the capital to asset ratio as an independent variable so as to examine the coefficient of

credit guarantees are firms which engage in risky businesses. This finding likely reflects the fact that the firm's risks are not perfectly captured by variables that are supposed to pick up the borrowing firm's risks such as SCORE and that G picks up the firm's remaining risks.

Importance of the simultaneity bias due to non-price terms

Ignoring endogeneity due to non-price terms would seriously bias our estimate of the main bank's pricing behavior. The estimated equation for the lending rate when non-price terms are treated as exogenous variables is implausible in many regards. The coefficients of LENGTH and those of BOARD are negative and statistically significant on both the second and the third columns. The positive and significant estimate of the coefficient of DOC in the OLS results likely captures the main bank's behavior to request risky firms more frequent reporting. Likewise, the positive and significant estimate of coefficients of C (collateralization) on both the second and the third columns suggests that banks request risky firms to collateralize loans.

4.3. Robustness Checks

In this subsection, we will aim to answer three major doubts that can be cast on our empirical specification.

The major criticism on our empirical specification is on lack of quantity of short-term loans from the firm's main bank as an independent variable when the firm's borrowing rate from its main bank is the dependent variable. We used rather the logarithm of the firm's total short-term borrowing whose lenders include both the firm's main bank and other lenders. This is of course against the basic analysis of the supply curve (of loans) in the textbook economics.

C turns positive and significant. The coefficient of C, however, remained insignificant.

Another potential criticism is on the way the length of the main bank relationship enters in the right hand side of the equation for the lending rate. The effect of the length of the relationship may be nonlinear. The marginal increase in the length of the relationship is much more important at the beginning of the relationship than at the later stage when the relationship becomes stable and institutionalized.

The last possible doubt is on our use of instrumental variables. The results of the first stage regressions in Tables 4-1 and 4-2 suggest that as instrumental variables three variables (ESTATE, NONESTATE, and GELIGIBLE) alone are more valid for the equation for collateralization than those with various interaction terms.

To overview, our benchmark 2SLS results from Table 5 are robust except that the coefficient of the length of the main bank relationship is sometimes estimated to be negative. The results of these robustness checks are presented in Table 6 with the benchmark results from Table 4 reappearing for the purpose of comparison (Model 1).

Use of the estimated short borrowing as a independent variable

We attempt to estimate the amount of short-term loans that the firm borrows from its main bank, which itself is available in neither wave of the SCFE, using the information surveyed only in the 2003 wave of the SCFE and the firm's financial data. As we mentioned in the previous section, though, the amount of total loans the firm borrows from its main bank is surveyed in the 2003 wave of the SCFE. Multiplying the abovementioned amount of total loans from the firm's main bank with the share of the firm's short-term loans within the firm's total loans, both of which we obtain from the firm's balance sheet in FY 2003, results in our estimate of the amount of short-term loans the firm borrows from its main bank.

Our empirical findings from the previous subsection remain robust when LNSHORT_MAIN (the logarithm of the estimated short-term loans from the firm's main bank) replaces LNSHORT (Model 2 of Table 6). The only exception is that now LENGTH is negatively related to the lending rate. The coefficient of LNSHORT_MAIN itself is not statistically significant, which is consistent with the finding by Hubbard, Kuttner and Palia (2002) that facility size of a contract is of little relevance to the lending rate.

The nonlinear relationship between the length of the relationship and the lending rate

The suspected nonlinearity in the relationship between the length of the relationship and the lending rate is not well grounded. The benchmark results are almost unchanged when LENGTH is taken a lag (LNLENGTH). Again, the only exception is that LENGTH is negatively related to the lending rate. The estimated coefficient of LNLENGTH itself is not statistically significant (Model 3 of Table 6).

A set of instrumental variables excluding interaction terms

The results remain qualitatively the same when interaction terms with ESTATE and NONESTATE are excluded from a set of instrumental variables and only interaction terms with GELIGIBLE are included (Model 4 of Table 6).

4.4 Policy Implications

Three major policy implications can be drawn from our empirical findings.

First, our finding that banks with a greater amount of non-performing loans charge higher rates on borrowing firms suggests that helping banks to write off non-performing loans with public capital would ease small firms' financial conditions through reducing borrowing rates.

Second, the credit channel of monetary policy transmission likely exists in Japan. Our finding that the lending rate is inversely related to the firm's solvency implies that the expansionary monetary policy, which would increase a real value of the firm's marketable assets through a reduced discount rate or decrease a real value of the firm's debts through a rising rate of inflation, would be amplified and propagated since the increasing net worth of the borrowing firm further cuts back on the borrowing interest rate.

Third, encouraging small firms to disclose more reliable financial statements would not improve small firms' borrowing conditions from their incumbent main banks with which firms have very long and stable relationships. Such policy, however, would encourage small firms to rely less on their main banks and rather to borrow more from lenders whom firms had not previously borrowed from or to access direct credit markets. The SMA's recent policy regarding the SME finances is twofold, 1; setting up more rigorous accounting standards, and 2; encouraging SMEs to utilize less traditional financial instruments such as asset backed securities and financial scoring loans. Our empirical finding ensures coherency of such policy framework.

5. Conclusion

In this paper, we analyzed how loans to small firms by their main bank are priced using the rich survey data on small and medium enterprises (SMEs) conducted by the Japanese Government.

The survey used in this study, the Survey on Corporate Financial Environments dentifies a firm's main bank. Thus, use of the SCFE data allows us to match the data on borrowers with the data on their lenders.

Using the two year panel data of the "Survey on Corporate Financial Environments" (SCFE), we regressed the surveyed firms' short-term borrowing rate from its main bank on six major factors that likely influence the rate, measures for the main bank's financial conditions, the strength of the lender-borrower relationship, the borrowing firm's informational transparency, the borrowing firm's financial conditions, collateralization and public credit guarantees of loans by its main bank.

Use of instrumental variables allowed us to overcome biases due to endogenous non-price terms (collateralization and public credit guaranteeing) and to obtain consistent estimates of the coefficients in the equation for the lending rate.

First, we found that 1. The borrower's transparency to its main bank is not a determinant of the lending rate. 2. The higher the borrowing firm's solvency is, the lower the lendiing rate is. These are consistent with predictions of theoretical predictions based on asymmetric information. We further evidenced that financially distressed main banks charge higher lending rates, supporting our view that a monopolistic main bank financing dominates and that the lending market is not competitive. Finally and the foremost importantly, we showed that treating non-price terms of a loan contract as endogenous is crucial in consistently estimating the firm's borrowing rate.

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Table 1. Description of Endogenous and Exogenous Variables

Variables	Description
Non-price terms	
C	A dummy variable that is set to unity if the firm's loans from their main bank are (partially) collateralized by physical assets or by personal securities
G	A dummy variable that is set to unity if the firm's loans from their main bank are (partially) guaranteed by Credit Guarantee Corporations
BANK	
BCAR	The book capital to asset ratio
BBISCLASS	A dummy variable that is set to unity if the bank's regulatory status is "international"
BNPL	The ratio of non-performing loans to total asset
BLOSS	The ratio of loan loss provisions to total asset
BLIQUID	The ratio of liquid assets to total asset
LNBTASSET	A logarithm of total asset
RELAT	
LENGTH	The length of the main bank relationship
INFO	
DOC	The frequency of the firm's reporting to its main bank (annual)
DOC_BANK	The dummy variable that is set to unity if the firm reports to its main bank on the bank's request rather than by the firm's voluntary will
DOCBANK	The interaction term between DOC and DOC_BANK
FAGE	Firm age
BOARD	The number of board members
OWNER	The dummy variable that is set to unity if the firm is owner-managed
RISK	
SCORE	The credit score of 0 to 100 (a firm with a score of 100 is the safest)
FIRM	
CAPITAL	The firm's book capital to asset ratio
LNTASSET	the logarithm of total assets
LNSHORT	the logarithm of short borrowing
AGE	age of the firm's representative
HOUSE	A dummy variable that is set to unity if the firm's representative owns residential housing
EDUC	A dummy variable that is set to unity if the educational attainment of the firm's representative is college or more advanced
Instrumental variables	
ESTATE	The share of immovables out of total asset
NONESTATE	The share of movables assets out of total asset
GELIGIBLE	A dummy variable that is set to unity if the firm is qualified for applying credit guarantees to Credit Guarantee Corporations

Table 2. Definitions of SMEs
The Eligibility of Applying to Credit Guarantees from Credit Guarantee Corporations

Industry	Equity is no more than	The number of employees is no more than
Manufacturing, construction and transportation	300 million yen	300
Wholesale	100 million yen	100
Retail	50 million yen	50
Service	500 million yen	100
Mining	300 million yen	300
Manufacturers of rubber products	300 million yen	900
Lodging	50 million yen	200
Software and information processing service	300 million yen	300

Table 3. Descriptive Statistics

Variable names	Mean	Std. Dev.	Min	Max
Short rate	2.04	0.878	0.00	8.90
Non-price terms				
C	0.914			
G	0.498			
BANK				
BCAPR	0.0370	0.0130	0.0011	0.0998
BBISCLASS	0.0391			
BNPL	0.0514	0.0200	0.0109	0.1505
BLOSS	-0.0170	0.0069	-0.0463	-0.0033
BLIQUID	0.31	0.069	0.140	0.622
BTASSET (million)	276504	403177	630	1409860
Large	0.301			
Regional	0.515			
Regional 2	0.093			
Shinkin	0.086			
Norinchukin	0.005			
RELAT				
LENGTH	35.6	14.6	2	91
INFO				
DOC	4.3	4.2	1	12
DOC_BANK	0.382			
FAGE	51.4	26.1	7	379
BOARD	4.8	2.6	1	18
OWNER	0.382			
RISK				
SCORE	57.2	6.5	25	80
FIRM				
CAPITAL	0.251	0.228	-1.900	0.925
TASSET (million)	39.25	70.09	0.02	749.34
SHORT (million)	9.63	27.394	0.00	467.77
SALES (million)	39.60	61.98	0.03	569.90
AGE	60.1	9.3	31	91
HOUSE	0.94			
EDUC	0.651			
Instrumental variables				
ESTATE	0.241	0.1715	0	0.912
NONESTATE	0.071	0.121	0	0.7886
GELIGIBLE	0.801			

Table 4. 1. The Results of the First Stage for Collateralization

	Without interaction terms	With interaction terms
BANK		
BCAPR	0.339	0.641
	(0.559)	(0.557)
BBISCLASS	-0.0232	-0.030
	(0.019)	(0.019)
BNPL	-0.633	-0.470
	(0.522)	(0.533)
BLOSS	-0.817	-0.712
	(1.116)	(1.136)
BLIQUID	0.068	0.084
	(0.133)	(0.133)
LNBTASSET	0.0168	0.0226**
	(0.0103)	(0.0103)
REGIONAL	0.036	0.033
	(0.035)	(0.035)
REGIONAL2	0.027	0.028
	(0.048)	(0.050)
SHINKIN	0.077	0.080
	(0.056)	(0.057)
NOCHU	-0.134	-0.148
	(0.149)	(0.146)
observations	1692	1692

Note

1. *, ** and *** show that a coefficient is statistically significant at 10 %, 5% and 1% respectively.
2. Standard errors are in parentheses

	Without interaction terms	With interaction terms
RELAT		
LENGTH	0.0017***	0.0016***
	(0.0005)	(0.0005)
INFO		
BOARD	-0.0005	0.0015
	(0.0032)	(0.0032)
OWNER	0.031***	0.032***
	(0.011)	(0.012)
FAGE	0.0005**	0.0004*
	(0.0002)	(0.0002)
RISK		
SCORE	-0.00301**	-0.00287**
	(0.00119)	(0.00114)
FIRM		
CAPITAL	-0.0690**	-0.0566*
	(0.0292)	(0.0333)
LNTASSET	-0.0107	0.0045
	(0.0161)	(0.0162)
HOUSE	0.0436	0.0532
	(0.0342)	(0.0348)
AGE	-0.0013**	-0.0011*
	(0.0006)	(0.0006)
EDUC	-0.003	0.007
	(0.0165)	(0.03)
LNSALES	-0.0051	-0.0149
(the logarithm of sales)	(0.0228)	(0.0154)
Instrumental variables		
ESTATE	0.261***	0.322***
	(0.036)	(0.104)
NONESTSTE	-0.529***	-0.062
	(0.0823)	(0.1513)
GELIGIBLE	0.0055**	0.054
	(0.023)	(0.040)
observations	1692	1692

Note
1. *, ** and *** show that a coefficient is statistically significant at 10 %, 5% and 1% respectively.
2. Standard errors are in parentheses

	Without interaction terms	With interaction terms
Interaction terms with ESTATE		
Information		-2.813*
		(1.577)
Real estate		-0.212**
		(0.087)
Restaurant		38.916***
		(0.263)
Service		0.444***
		(0.144)
Other industry		0.429***
		(0.161)
Hokkaido		-0.304**
		(0.122)
Tohoku		-0.263**
		(0.131)
Kitakanto		-0.356***
		(0.139)
Chubu		-0.375***
		(0.106)
Interaction terms with NONESTATE		
Service		-0.655***
		(0.208)
Other industry		-0.770***
		(0.207)
Interaction terms with GELIGIBLE		
Retail		0.110***
		(0.041)
Other industry		0.203**
		(0.081)
observations	1692	1692
R-squared	0.239	0.292

Note

1. *, ** and *** show that a coefficient is statistically significant at 10 %, 5% and 1% respectively.
2. Standard errors are in parentheses
3. Only coefficient estimates of interaction terms that are statistically significant at least at the 10 percent significance level are presented.
4. In addition, industry dummies and regional dummies are included as control variables.

Table 4. 2. The Results of the First Stage for Public Credit Guaranteeing

	Without interaction terms	With interaction terms
BANK		
BCAPR	-2.049*	-1.864
	(1.097)	(1.120)
BBISCLASS	0.039	0.026
	(0.034)	(0.034)
BNPL	-1.281	-1.198
	(0.870)	(0.896)
BLOSS	-0.094	-2.327
	(0.238)	(2.144)
BLIQUID	-0.094	-0.105
	(0.238)	(0.241)
LNBTASSET	0.0136	-0.0218
	(0.0212)	(0.0215)
REGIONAL	0.139**	0.104
	(0.065)	(0.066)
REGIONAL2	0.103	-0.063
	(0.088)	(0.088)
SHINKIN	0.267**	0.205*
	(0.114)	(0.117)
NOCHU	-0.312***	-0.295***
	(0.078)	(0.081)
observations	1692	1692

Note
1. *, ** and *** show that a coefficient is statistically significant at 10 %, 5% and 1% respectively.
2. Standard errors are in parentheses

	Without interaction terms	With interaction terms
RELAT		
LENGTH	-0.0019**	-0.0019**
	(0.0009)	(0.0009)
INFO		
BOARD	-0.0155***	-0.0152***
	(0.0045)	(0.0047)
OWNER	0.0711***	0.0574**
	(0.0236)	(0.0242)
FAGE	0.0007	0.0005
	(0.0005)	(0.0005)
RISK		
SCORE	-0.0166***	-0.0167***
	(0.0021)	(0.0021)
FIRM		
CAPITAL	-0.366***	-0.363***
	(0.065)	(0.068)
LNTASSET	-0.0411*	0.0223
	(0.0217)	(0.0228)
HOUSE	0.0262	0.042
	(0.050)	(0.050)
AGE	-0.0019	-0.0017
	(0.0012)	(0.0012)
EDUC	-0.096	-0.101*
	(0.059)	(0.061)
LNSALES	-0.008	-0.019
(the logarithm of sales)	(0.023)	(0.023)
Instrumental variables		
ESTATE	0.113*	-0.160
	(0.066)	(0.172)
NONESTSTE	-0.285***	0.003
	(0.093)	(0.198)
GELIGIBLE	0.125***	0.168***
	(0.031)	(0.045)
observations	1692	1692

Note
1. *, ** and *** show that a coefficient is statistically significant at 10 %, 5% and 1% respectively.
2. Standard errors are in parentheses

	Without interaction terms	With interaction terms
Interaction terms with ESTATE		
Information		-1.453***
		(0.334)
Wholesale		0.837***
		(0.196)
Restaurant		-3.243***
		(0.504)
Other industry		-0.424*
		(0.243)
Interaction terms with NONESTATE		
Construction		-0.769**
		(0.318)
Real estate		-3.793***
		(1.017)
Service		-0.662***
		(0.250)
Interaction terms with GELIGIBLE		
Service		-0.190**
		(0.088)
observations	1692	1692
R-squared	0.252	0.338

Note

1. *, ** and *** show that a coefficient is statistically significant at 10 %, 5% and 1% respectively.
2. Standard errors are in parentheses
3. Only coefficient estimates of interaction terms that are statistically significant at least at the 10 percent significance level are presented.
4. In addition, industry dummies and regional dummies are included as control variables.

Table 5. 2SLS Regression Results for the Lending Rate

	C, G endogenous	C endogenous	OLS
BANK			
BCAPR	1.972	1.708	2.521
	(2.135)	(1.985)	(1.797)
BBISCLASS	-0.072	-0.050	-0.045
	(0.053)	(0.048)	(0.046)
BNPL	4.010***	3.177**	2.833**
	(1.596)	(1.459)	(1.424)
BLOSS	2.909	0.626	-0.829
	(4.205)	(4.233)	(3.559)
BLIQUID	-0.056	-0.204	-0.135
	(0.430)	(0.435)	(0.382)
LNBTASSET	-0.023	-0.035	-0.031
	(0.037)	(0.034)	(0.032)
REGIONAL	-0.053	0.016	0.0140
	(0.113)	(0.103)	(0.100)
REGIONAL2	0.014	0.063	0.054
	(0.161)	(0.151)	(0.1489)
SHINKIN	0.167	0.305	0.294
	(0.195)	(0.175)	(0.169)
NOCHU	0.023	-0.117	-0.072
	(0.147)	(0.162)	(0.142)
observations	1692	1692	1692

Note

1. *, ** and *** show that a coefficient is statistically significant at 10 %, 5% and 1% respectively.
2. Standard errors are in parentheses
3. In addition, industry dummies and regional dummies are included as control variables.

	C, G endogenous	C endogenous	OLS
RELAT			
LENGTH	-0.001	-0.003*	-0.002
	(0.002)	(0.002)	(0.00146)
INFO			
DOC	0.038*	0.027*	0.025***
	(0.020)	(0.016)	(0.0046)
DOCBANK	-0.044	0.016	0.019**
	(0.059)	(0.052)	(0.009)
DOC_BANK	0.422	0.229	0.040
	(0.253)	(0.224)	(0.047)
BOARD	-0.003	-0.019**	-0.019***
	(0.0101)	(0.008)	(0.0067)
OWNER	-0.049	-0.0095	0.024
	(0.048)	(0.039)	(0.034)
FAGE	0.001	0.001	0.002*
	(0.001)	(0.001)	(0.001)
RISK			
SCORE	-0.015***	-0.0230***	-0.026***
	(0.005)	(0.003)	(0.003)
FIRM			
CAPITAL	-0.227*	-0.404***	-0.523***
	(0.121)	(0.097)	(0.081)
LNTASSET	-0.133***	-0.140***	-0.079
	(0.0510)	(0.050)	(0.020)
LNSHORT	0.073*	0.053	-0.008
	(0.038)	(0.036)	(0.009)
HOUSE	0.110*	0.116**	0.095*
	(0.066)	(0.057)	(0.057)
AGE	0.002	0.001	0.000
	(0.002)	(0.002)	(0.002)
EDUC	-0.078*	-0.107***	-0.102***
	(0.046)	(0.041)	(0.037)
Non-price terms			
C	0.0974	0.373**	0.238***
	(0.214)	(0.1872)	(0.054)
G	0.907***	0.293***	0.339***
	(0.214)	(0.043)	(0.0348)
observations	1692	1692	1692

Note: Pleases see the note on the previous page.

Table 6. 2SLS Regression Results for the Lending Rate

	Model 1	Model 2	Model 3	Model 4
BANK				
BCAPR	1.972	4.676	1.945	1.846
	(2.135)	(2.900)	(2.133)	(2.448)
BBISCLASS	-0.072	-0.096	-0.072	-0.087
	(0.053)	(0.067)	(0.053)	(0.062)
BNPL	4.010***	5.211**	3.989**	4.419**
	(1.596)	(2.494)	(1.591)	(1.868)
BLOSS	2.909	1.811	2.873	4.319
	(4.205)	(6.485)	(4.194)	(4.986)
BLIQUID	-0.056	-0.058	-0.063	-0.062
	(0.430)	(0.579)	(0.428)	(0.466)
LNBTASSET	-0.023	-0.029	-0.024	-0.069
	(0.037)	(0.048)	(0.037)	(0.0417)
REGIONAL	-0.053	-0.123	-0.054	-0.030
	(0.113)	(0.147)	(0.112)	(0.127)
REGIONAL2	0.014	-0.076	0.012	0.021
	(0.161)	(0.197)	(0.160)	(0.172)
SHINKIN	0.167	0.0878	0.166	0.211
	(0.195)	(0.273)	(0.194)	(0.223)
NOCHU	0.023	0.019	0.021	-0.039
	(0.147)	(0.241)	(0.145)	(0.192)
observations	1692	846	1692	1692

Note

1. *, ** and *** show that a coefficient is statistically significant at 10 %, 5% and 1% respectively.
2. Standard errors are in parentheses
3. In addition, industry dummies and regional dummies are included as control variables.
4. Model 4 is different from Model 1 in that interaction terms with ESTATE and those with NONESTATE are excluded from a set of instrumental variables.

	Model 1	Model 2	Model 3	Model 4
RELAT				
LENGTH	-0.001	-0.003		-0.000
	(0.002)	(0.002)		(0.002)
LNLENGTH			-0.026	
			(0.045)	
INFO				
DOC	0.038*	0.017	0.038	0.059*
	(0.020)	(0.023)	(0.020)	(0.034)
DOCBANK	-0.044	0.033	-0.044	-0.101
	(0.059)	(0.064)	(0.058)	(0.111)
DOC_BANK	0.422	0.286	0.425	-0.809
	(0.253)	(0.311)	(0.243)	(0.499)
BOARD	-0.003	-0.015	-0.004	-0.001
	(0.0101)	(0.013)	(0.010)	(0.016)
OWNER	-0.049	-0.016	0.050	-0.060
	(0.048)	(0.060)	(0.047)	(0.068)
FAGE	0.001	0.003	0.001	0.001
	(0.001)	(0.002)	(0.001)	(0.001)
RISK				
SCORE	-0.015***	-0.024***	-0.015***	-0.015**
	(0.005)	(0.007)	(0.005)	(0.007)
observations	1692	846	1692	1692

Note

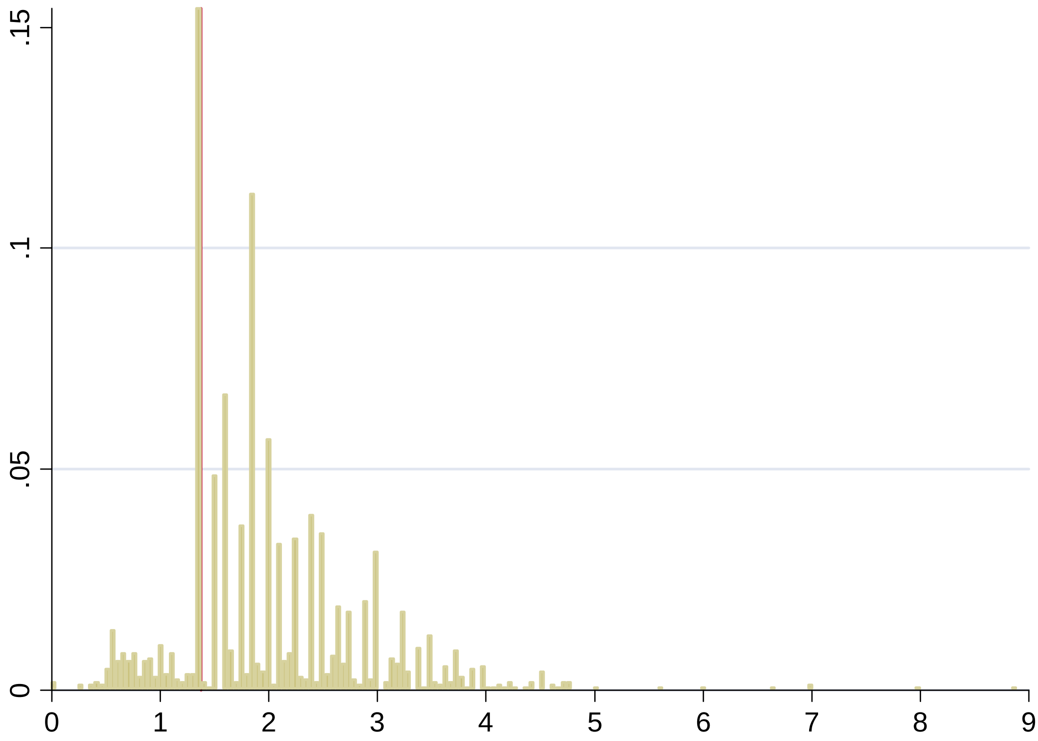
1. *, ** and *** show that a coefficient is statistically significant at 10 %, 5% and 1% respectively.
2. Standard errors are in parentheses
3. In addition, industry dummies and regional dummies are included as control variables.
4. Model 4 is different from Model 1 in that interaction terms with ESTATE and those with NONESTATE are excluded from a set of instrumental variables.

	Model 1	Model 2	Model 3	Model 4
FIRM				
CAPITAL	-0.227*	-0.371**	-0.226*	-0.191
	(0.121)	(0.155)	(0.122)	(0.183)
LNTASSET	-0.133***	-0.0824*	-0.135***	-0.116
	(0.0510)	(0.048)	(0.0510)	(0.086)
LNSHORT	0.073*		0.075**	0.061
	(0.038)		(0.038)	(0.065)
LNSHORT_MAIN		0.035		
		(0.046)		
HOUSE	0.110*	0.093	0.0111*	0.101
	(0.066)	(0.084)	(0.066)	(0.076)
AGE	0.002	0.001	0.002	0.001
	(0.002)	(0.004)	(0.002)	(0.002)
EDUC	-0.078*	-0.123**	-0.080*	-0.103*
	(0.046)	(0.061)	(0.046)	(0.057)
Non-price terms				
C	0.0974	0.279	0.100	-0.217
	(0.214)	(0.284)	(0.210)	(0.310)
G	0.907***	0.586**	0.893***	0.976**
	(0.214)	(0.292)	(0.213)	(0.406)
observations	1692	846	1692	1692

Note

1. *, ** and *** show that a coefficient is statistically significant at 10 %, 5% and 1% respectively.
2. Standard errors are in parentheses
3. In addition, industry dummies and regional dummies are included as control variables.
4. Model 4 is different from Model 1 in that interaction terms with ESTATE and those with NONESTATE are excluded from a set of instrumental variables.

Table 1. The Distribution of the Short Rate (2002, 2003)



Note
1. The horizontal axis represents the short rate.
2. The red vertical line indicates the short-term prime rate at 1.375 percent.