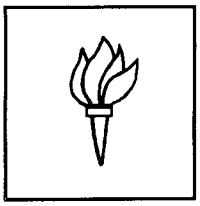

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Relationship Lending and Lines of Credit in Small Firm Finance

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RELATIONSHIP LENDING AND LINES OF CREDIT IN SMALL FIRM FINANCE

Abstract

This paper examines the role of relationship lending in small firm finance. We examine price and nonprice terms of bank lines of credit (L/C) extended to small firms. Our focus on bank L/Cs allows us to examine a type of loan contract in which the bank-borrower relationship is likely to be an important mechanism for solving asymmetric information problems associated with financing small enterprises. We find that borrowers with longer banking relationships pay lower interest rates and are less likely to pledge collateral. These results are consistent with theoretical arguments that relationship lending generates valuable information about borrower quality.

RELATIONSHIP LENDING AND LINES OF CREDIT IN SMALL FIRM FINANCE

I. Introduction

Large corporations typically obtain credit in the public debt markets, while small firms usually must depend on financial intermediaries, particularly commercial banks. Given that asymmetric information problems tend to be much more acute in small firms than in large firms, it is not surprising that the ways in which these respective groups obtain credit financing differ significantly. Bank financing often involves a long-term relationship that may help attenuate these information problems, whereas public debt financing generally does not have this feature.

Banks solve these asymmetric information problems by producing and analyzing information, and setting loan contract terms, such as the interest rate charged or the collateral required, to improve borrower incentives. The bank-borrower relationship may play a significant role in this information-gathering, loan contract term-setting process. Banks may acquire private information over the course of a relationship and use this information to refine the contract terms offered to the borrower. Our empirical analysis uses data on loan rates and collateral requirements on lines of credit issued to small businesses to test the joint hypothesis that banks gain information as the relationship progresses and use this information to adjust the contract terms.

This analysis is motivated by theories of financial intermediation that emphasize the information advantages of banks (e.g., Diamond 1984,1991, Ramakrishnan and Thakor 1984, Boyd and Prescott 1986). Recently, a theoretical literature on relationship lending has appeared which provides predictions about how loan interest rates evolve over the course of a bank-borrower relationship. The models of Boot and Thakor (1995)

and Petersen and Rajan (1993) predict that rates should decline as a relationship matures, while the models of Greenbaum et al. (1989), Sharpe (1990) and Wilson (1993) predict increases in rates over time. Boot and Thakor's model also predicts that collateral requirements on loans will be lower, the longer a borrower has had a banking relationship. The main purpose of this paper is to provide empirical tests of these theoretical predictions using an extensive data set on small firm finance.

Two strands of the literature have provided some empirical evidence on the value of bank-borrower relationships. In the first strand, studies of "bank uniqueness" addressed the question of whether banks produce valuable private information about borrowers (e.g., James 1987, Lummer and McConnell 1989, Hoshi et al. 1990a,b, James and Weir 1990, Wansley et al. 1992, Billet et al. 1993, Shockley and Thakor 1993, Kwan 1994). Among other things, these studies provided evidence that the existence of a bank-borrower relationship increases firm value. Some of these studies also indirectly provided evidence about the value of the strength of a bank-borrower relationship. They found that announcements of renewals of bank lines of credit (L/Cs) often generate greater abnormal market returns than newly issued L/Cs.

The second strand of the empirical relationship lending literature provided more direct tests of the strength of the bank-borrower relationship (Petersen and Rajan 1993,1994). These studies used a continuous measure of the strength of the bank-borrower relationship -- its duration -- as opposed to the simple new-versus-renewal L/C distinction. Perhaps surprisingly, these studies did not find that the rate charged on a loan depended on the strength of the relationship, although other evidence of relationship lending was found in the firm's trade credit arrangements.

Our analysis is similar to this second strand of the empirical literature in that we

focus on the length of the bank-borrower relationship as a measure of its strength. We also share with these studies a focus on small, mostly untraded firms for which the bank-borrower relationship is likely to be important. This differs from the bank uniqueness studies, which generally concentrated on large, publicly traded firms that may be less dependent on banking relationships. Our study and the Petersen and Rajan (1993,1994) studies also share a third advantage over the bank uniqueness studies. We are able to test directly the predictions of the recent theoretical models of relationship lending about the path of loan interest rates over the course of the relationship.

However, our approach differs from the Petersen and Rajan (1993,1994) studies in two important ways. First, we focus exclusively on lending under L/Cs. The L/C is an attractive vehicle for studying the bank-borrower relationship because the L/C itself represents a formalization of this relationship. By limiting our study to L/Cs, we exclude from our data set most loans which are "transaction-driven," rather than "relationship-driven," and may avoid diluting our relationship lending results.

Second, we analyze the empirical association between relationship lending and the collateral decision, providing the first test of Boot and Thakor's (1995) theoretical predictions about collateral, and the first analysis of the pattern of collateral requirements over time. We also test some propositions from the collateral literature about the associations among collateral, borrower risk, and loan risk.

Our data are drawn from the National Survey of Small Business Finances (NSSBF) which contains extensive information on both borrowers and loan contracts, as well as information on the relationship between the bank and the borrower. By way of preview, we find that borrowers with longer banking relationships pay lower interest rates and are less likely to pledge collateral. These relationship lending findings are both

statistically and economically significant despite relatively low R^2's and generally insignificant coefficients of the control variables.

Our relationship lending findings are consistent with the theoretical predictions of Boot and Thakor (1995) and Petersen and Rajan (1993) and support the more general theoretical literature on the role of banks as information producers. Our results are also consistent with much of the bank uniqueness literature. However, our findings conflict with the loan pricing results in the second strand of the empirical bank-borrower relationship literature, which draws its data from the same source. We attribute this difference to our exclusive use of L/C loans, which are more likely to reflect relationship effects than other loans. Additional evidence to support this attribution is presented below.

The paper is organized as follows. Section II discusses the extant literature on relationship lending. Section III describes the data set and motivates the variables used in the analysis. Section IV presents our econometric tests of the determination of the loan rate and whether collateral is pledged, both as functions of the strength of the bank-borrower relationship and other variables. Section V concludes.

II. The Relationship Lending Literature

The information-based literature on financial intermediation (e.g., Diamond 1984,1991, Ramakrishnan and Thakor 1984, Boyd and Prescott 1986) suggests that financial intermediaries exist because they enjoy economies of scale and/or comparative advantages in the production of information about borrowers. Banks in particular specialize in lending to a highly information-problematic class of borrowers. Because of this specialization, contracting in the bank loan market appears to differ substantially from contracting in other major debt markets (see Carey et al. 1993). One feature often ascribed to commercial bank lending is its emphasis on relationship lending.[1] Banks may

acquire information through the relationship by monitoring borrower performance over time under credit arrangements and/or through the provision of other services such as deposit accounts (see Allen, et al. 1991, Nakamura 1993), and use this information in designing future credit contracts.

Some studies have specifically modeled the association between the length of the bank-borrower relationship and loan pricing. In an extension of Diamond (1989), Petersen and Rajan (1993) developed a theoretical model with both adverse selection and moral hazard in which banks offer higher rates in the first period and lower rates in later periods after borrower types have been revealed. Boot and Thakor (1995) demonstrated that the length of the bank-borrower relationship may be important in determining loan prices even in a model without learning. They also found that collateral requirements are related to the length of the relationship. Borrowers pay a high rate and pledge collateral early in the relationship, and then pay a lower rate and do not pledge collateral later in the relationship after they have demonstrated some project success.

The Petersen and Rajan (1993) and Boot and Thakor (1995) models stand in contrast to other theories. Greenbaum et al. (1989), Sharpe (1990), and Wilson (1993) all demonstrated conditions under which lenders subsidize borrowers in early periods and are reimbursed for this subsidy in later periods. Thus, the issue of the association between loan pricing and the length of the bank-borrower relationship is ultimately an empirical one. In addition, as noted above, no one has previously tested the empirical association between collateral and the length of the bank-borrower relationship.

The bank L/C is a particularly important part of relationship lending because it represents a forward commitment to provide working capital financing under pre-specified terms.[2] It is not surprising, therefore, that much of the empirical literature on bank

uniqueness has focused on bank L/Cs. James (1987) found positive abnormal returns associated with announcements of firms who were granted bank L/Cs. Lummer and McConnell (1989) and Wansley et al. (1992) found evidence that James' results were driven by L/C renewals as opposed to newly initiated L/Cs. This result is consistent with the notion that information about the borrower is acquired over time through the bank-borrower relationship and is reflected in the continuation of credit arrangements, as opposed to initial credit assessments. Billett et al. (1993), however, found no difference in the announcement effects between new and renewal L/Cs.[3] One explanation for these disparate results may be that the new-renewal binomial categorization of L/Cs is at best a weak measure of the strength of the relationship. As in Petersen and Rajan (1993,1994), we avoid this measurement problem by using the continuous duration of the bank-borrower relationship as a measure of its strength. Also, unlike the uniqueness event studies which focus primarily on large publicly traded firms, we use data on small mostly untraded firms, which tend to be much more bank-dependent.

Petersen and Rajan (1993,1994) also used the NSSBF data source to analyze relationship lending and found somewhat conflicting results. Like our paper, they used the length of the bank-borrower relationship as a measure of its strength. They found no statistical association between the strength of the bank-borrower relationship and business loan pricing in their 1994 paper (they did not include the length of the bank-borrower relationship in the loan pricing equation in their 1993 paper). In contrast, however, they did find evidence of a lesser dependence on trade credit by firms with longer banking relationships, supporting the value of relationship lending.

Petersen and Rajan's failure to find evidence of relationship lending in bank loan pricing, which runs counter to our findings below, may be attributable to their inclusion

of all types of external loans in their data set rather than focusing on bank L/Cs.[4] That is, they included a number of different types of loans for which reputation and relationship effects may be substantially less important than those associated with the forward commitment embodied in an L/C. These non-L/C loans include mortgages, equipment loans, motor vehicle loans, and other spot loans, many of which may be one-time, or for non-recurring credit needs. In the parlance of Wall Street, these loans tend to be "transaction-driven" rather than "relationship-driven." Thus, the loan pricing effect of relationships may have been diluted by the inclusion of these loans in their samples. In contrast, we limit our analysis to just loans drawn under L/Cs.[5]

III. The Data Set

The NSSBF provides more extensive information on individual small businesses than any other publicly available source. The survey was conducted in 1988-89 by the Federal Reserve Board and the Small Business Administration (SBA). The data were obtained by telephone interviews with executives of about 3,400 businesses. Each interview consisted of about 200 questions covering firm description, governance, history, use of credit, relationships with financial institutions, and balance sheet and income information. The respondents represent a stratified random sample by size and geography of for-profit, nonagricultural, nonfinancial firms. Approximately 80% of the sample had less than 50 employees; 10% had 51-100 employees; and 10% had 101-500 employees. Nearly all of the firms were privately owned -- only about 0.5% were publicly traded. Asset size ranged up to $219 million. The geographical representation was also relatively uniform, with about 25% each from the Northeastern, North Central, Southern, and Western states.

Table 1 describes the variables used in this study, broken down into five main

categories: L/C contract characteristics, firm financial characteristics, firm governance characteristics, industry characteristics, and information/relationship characteristics. Looking first at the contract characteristics of commercial L/Cs, PREM is the premium over the prime rate at which loans drawn under the L/C are priced.[6] COLLAT indicates whether the L/C is secured, which is further decomposed by type of security -- ARINV for L/Cs secured by accounts receivable and/or inventory, and OTHERSEC for all other security, including equipment, real estate, and personal assets of the owners.

The distinction between ARINV and OTHERSEC is important to the analysis. Practitioners tend to view L/Cs secured by accounts receivable and inventory as the riskiest type of working capital financing, and so PREM may be expected to be higher for these loans to compensate the bank for this risk. Perhaps more important for analyzing relationship lending, ARINV financing or "asset-based lending" generally involves a form of intense monitoring not associated with other types of loans. This type of monitoring, which includes observation of sales invoicing and inventory management, may produce valuable information about overall firm performance as well as information about the value of the collateral (Swary and Udell, 1988). Such information may be particularly valuable for young firms early in their bank-borrower relationships when there is substantial uncertainty about their abilities to repay loans. If so, ARINV financing may involve the bank acquiring more information per year through the relationship than other loans, and using this information to design future loan contracts. The inclusion of different types of collateral distinguishes our paper from previous studies of business lending.[7,8]

GUAR indicates whether the L/C is guaranteed. Guarantees are generally provided by the firm's owners, giving the lender recourse against the owners for any

deficiency in payment by the borrowing firm. Guarantees are similar to the pledging of personal collateral, although they do not involve specific liens. COMPBAL indicates whether the L/C has a compensating balance requirement.

The financial characteristics of the firm consist of key financial ratios, including the leverage ratio (LEV), the current ratio (CURRRAT), the quick ratio (QUICKRAT), accounts receivable turnover (ARTURN), inventory turnover (INVTURN), accounts payable turnover (APTURN), and total assets (TA). The purpose of the financial variables is to control for the observable risk of the borrower in our regressions determining the loan rate and whether collateral is pledged. It is expected that all else equal, riskier borrowers would pay higher loan rates and pledge collateral more frequently, and prior empirical analysis is consistent with these expectations (e.g., Berger and Udell 1990,1992). Most of the financial ratios are among the ratios conventionally used in credit risk analysis, and so should correspond reasonably well to the data used by banks in making their loan rate and collateral decisions.

The governance characteristics include the legal form of the firm -- CORP for (non-Subchapter S) corporation, SUBS for Subchapter S corporation, PART for partnership, and PROP for sole proprietorship. OWNMG indicates whether the firm was owner-managed, and CONC50 signifies whether 50% or more was owned by a single family. The governance characteristics are included because different ownership structures may be related to the amount of private information that borrower have, the risks that borrowers take, and the ability of the borrower to shift risk to the bank and other fixed claim holders. All of these factors should figure in the determination of loan rates and collateral requirements.

Industry characteristics are reflected in dummy variables for whether the firm is

in the construction (CONSTR), services (SERVICES) or retail (RETAIL) industries. The bulk of the remaining respondents (OTHERIND) were in the manufacturing sector. Again, these variables are included because they may help proxy for risk in our equations determining the loan rate and the probability of collateral being pledged.

The information/relationship characteristics consist of AGE and RELATE. AGE refers to the number of years that current ownership has been in place. If the firm is currently owned by its founders, then AGE represents the actual age of the firm. RELATE is the number of years that the firm has purchased its L/Cs from its current lender, and represents our measure of the strength of the bank-borrower relationship.[9] RELATE captures the ability of the bank to learn more about the nature of the borrowing firm through its lending relationship. There is an important distinction between AGE and RELATE. AGE reflects information that becomes revealed to the market as a whole, i.e., its public reputation, while RELATE reflects private information revealed through the intermediation process only to the lender through the bank-borrower relationship. Thus, the difference between AGE and RELATE essentially corresponds to the distinction between reputation and monitoring in Diamond (1991).

The use of both AGE and RELATE also may help distinguish the role of bank loans versus public debt offerings. It would be expected that AGE would have an effect in public markets, but RELATE would not, since the investors who buy public issues do not gain access to exclusive information from monitoring in the same way that banks do. Thus, our main relationship tests of whether RELATE has effects on PREM and on the probability of COLLAT may also be viewed as tests of the specialness or uniqueness of banks. As noted earlier, RELATE is also likely a superior measure of the strength of the relationship than the distinction between new and renewal L/Cs used in Lummer and

McConnell (1989), Wansley et al. (1992), and Billet et al. (1993). Although we are primarily interested in the effects of RELATE, it is important to include AGE in the analysis as a control variable to avoid bias, since AGE and RELATE are so highly correlated (ρ = .476).

In the empirical tables below, we report the results of regressions in which we specify the natural logs of AGE and RELATE -- LNAGE and LNRELATE, respectively. This allows for the possibility of diminishing marginal effects of additional years in business or in a relationship on the value of information gained. That is, we expect that the marginal effect of the 5th year of AGE or RELATE to be more important in revealing information about the firm than the 25th year, by which time virtually all of the information that will be revealed has been revealed. As discussed below, we also run robustness checks with AGE and RELATE measured in levels, rather than logs, and with second-order terms in both the logs and levels.

The means of the variables for the entire sample of 863 firms who reported L/Cs are shown in the first column of Table 2. These means reveal several interesting characteristics of small firms using credit lines. The vast majority are owner-managed (89%) with a single family owning more than half of the stock (80%). Most are also organized as non-subchapter S corporations (55%). Consistent with other data sources, the majority of the L/Cs are secured (53%), usually with accounts receivable and inventory (36%). Only 7% of all L/Cs in the sample have compensating balance requirements, suggesting that this pricing element no longer plays a prominent role for small firms. The data also indicate that the small firms with L/Cs have been in business under current management about 14 years on average (AGE), and have a constant banking relationship for the last 11 of those years (RELATE).

We also split the sample roughly in half between firms with assets above and below $500,000. As shown in columns two and three of Table 2, the data suggest that firms with assets greater than $500,000 may be quite different from smaller firms in that they are much more likely to be corporations, much more likely to pledge collateral, generally have lower liquidity ratios and lower profit margins, and tend to pay a lower PREM. The data also show that firms with assets above $500,000 are about 5 years older on average than firms with assets below $500,000, and have bank-borrower relationships that are about 2 1/2 years longer on average. We emphasize that $500,000 in assets is quite small, and that our subsamples above and below this threshold should both be considered to be small firms.

IV. Econometric Specification and Test Results

In our empirical analysis, we test the joint hypothesis that i) banks gather valuable information about a borrower over the course of a bank-borrower relationship; ii) that they use this information to refine the loan contract terms; and iii) that this is reflected in the loan rate and collateral requirements. This may be viewed as a rather stringent test of whether bank-borrower relationships generate value, since we will not be able to detect if banks gather information but do not use it to change contract terms significantly over time or if they change contract terms other than the loan rate or collateral.[10]

Note that the refinement of contract terms to borrowers with longer relationships (i.e., higher values of RELATE) can come about in at least two distinct ways. First, for a given borrower, the loan rate or collateral requirements may be changed as the length of the relationship increases. Second, there may be a survivorship effect in which borrowers with longer relationships pay different rates or have different collateral require-

ments on average than borrowers with shorter relationships. This is similar to the selection-over-time mechanism in Diamond (1991). For example, banks might gain information during their relationships with borrowers in a high-risk pool that helps them distinguish creditworthy customers from uncreditworthy ones. If they offer prohibitively expensive terms or simply refuse to re-lend to the uncreditworthy borrowers after gaining some experience with them, the average observed loan interest rate may decline with RELATE, assuming that this high-risk pool was paying a relatively high rate on its loans. In practice, it is probable that both of these effects are in operation. If loan rates or collateral requirements decline with the length of the relationship, it is likely due in part to some continuing borrowers receiving more favorable loan terms, and in part to some borrowers with relatively unfavorable terms having their relationships terminated. Both of these phenomena are valid representations of the theory that banks acquiring information through relationship lending and using this information to refine loan contract terms. In fact, non-price credit rationing or the setting of an infinite price for credit renewal might be viewed as the ultimate loan contract refinement.

Loan Rate Tests

We perform empirical tests first on loan rates and then on collateral. Our loan rate tests analyze the determinants of PREM, the loan rate premium over the bank's prime rate. PREM is regressed on the loan contract, financial, governance, industry, and information/relationship characteristics of the firm. These tests offer the opportunity to examine the role of relationship lending in commercial loan contracting by measuring the effect of RELATE on the interest rate of an L/C.

The NSSBF data set includes data on the interest rate paid on the firm's most recent loan, which is often drawn under an L/C. The survey also gives information on

whether the loan was indexed to the prime and, if so, the premium over prime (PREM), and whether it was floating or fixed rate. For purposes of this analysis, the cleanest data for loan-by-loan comparison comes from using only floating rate L/C loans which were indexed to the bank's prime rate.[11]

The PREM results for the entire sample are shown in Table 3. The first column of the table excludes the potentially endogenous loan contract variables for collateral, guarantees, and compensating balances, and should be viewed as the reduced form for PREM. The coefficients of the included variables may be interpreted as the effects of these variables on the rate, inclusive of any predicted rate-reducing effect of collateral, guarantees, and compensating balances that they may imply. For example, the coefficient of LEV represents the association between leverage and the rate on the loan after taking into account the expected values of collateral, guarantees and compensating balances that a marginal increase in leverage implies. Thus, the coefficients of the firm characteristics in column one can also be interpreted as reflecting the association between these characteristics and the risk of the loan, as reflected in its price.

Column two of table 3 includes all of the variables in the first column plus the collateral, guarantee, and compensating balance contract variables. The interpretation of the borrower and relationship characteristics now reflect their effects on the premium excluding their effects through the contract terms.[12] Thus, the coefficients of the firm characteristics in column two can also be interpreted as reflecting the association between these characteristics and the risk of the borrower, as reflected in the loan price. The regressions in columns one and two may also be viewed as robustness checks on each other -- we expect that if relationship effects are strong, they should be present in both equations. The regression in column three includes only the loan contract terms on the

right-hand side, and will be discussed further below.

The most interesting results in column one of Table 3 are the importance of the information/relationship variables, LNAGE and LNRELATE. Both coefficients are negative, although the LNAGE coefficient is not statistically significant at standard confidence levels. When this regression was rerun using levels in place of logs to measure the effects of AGE and RELATE (not shown), both coefficients were negative and statistically significant. The negative coefficients suggest that the older the firm is in terms of current ownership and the longer the banking relationship, the lower the rate on the loan (inclusive of any collateral and guarantee effects associated with these variables). The RELATE results contrast sharply with those of Petersen and Rajan (1993,1994), who found a positive, but insignificant effect of RELATE on PREM instead of our negative significant effect.

We also investigate whether the magnitudes of the measured AGE or RELATE effects on PREM are **economically** significant. The LNAGE coefficient of about -.14 suggests that all else held equal, a small firm with an additional 10 years of business experience, 11 years versus 1 year, pays an expected 33 basis points less on its L/C loans (i.e., -.14•(ln11 - ln1)). Similarly, the LNRELATE coefficient of about -.20 suggests that a firms with an 11-year banking relationship can expect to pay an L/C loan premium 48 basis points less than a firm that is the same in every way except that it has only a 1-year relationship. Note that these figures are additive, rather than mutually exclusive, so that an 11-year-old firm with an 11-year bank-borrower relationship can expect to pay about 81 basis points less than a 1-year-old firm with a 1-year relationship.

In order to determine whether these changes in PREM are economically important, we evaluate them in terms of our sample distribution of the PREM

variable.[13] The sample density of PREM (not shown) is concentrated almost entirely on values of PREM which are divisible by 25 basis points (i.e., 1.00%, 1.25%, 1.50%, etc.). This suggests that banks group their borrowers into pricing pools on the basis of risk, relationship, and other factors at 25 basis point intervals. Therefore the 33 basis point estimated AGE effect moves a firm more than a full pricing pool, and the 48 basis point estimated RELATE effect moves a firm about 2 full pricing pools. Moreover, 59.6% of the PREM observations are concentrated in the closed interval between 100 and 150 basis points, suggesting that our relationship effect -- which lowers PREM by about the breadth of this interval when RELATE increases by 10 years -- can by itself move a firm's rate below that paid by most other small firms with L/Cs.

As robustness checks, we also examined the magnitudes of the estimated effects using 3 other specifications -- second-order in the logs of AGE and RELATE, linear in their levels, and second-order in the levels. The second-order equation in logs adds the terms 1/2 $LNAGE^2$, 1/2 $LNRELATE^2$, and LNAGE•LNRELATE, and similarly for the second-order equation in levels. The second-order equations allow the data more freedom to choose the shapes of the curves giving the marginal effects of AGE and RELATE at different numbers of years. Increasing AGE from 1 to 11 years, holding RELATE at its sample mean value gives expected declines in PREM of 66, 19, and 39 basis points for the three alternative specifications, respectively, as opposed to the 33 basis points for the model shown in the text. Similarly, increasing RELATE from 1 to 11 years, holding AGE at its mean value, lowers PREM by predicted values of 60, 21, and 29 basis points, respectively (as opposed to 48 basis points for the log model). These suggest that our conclusion that the measured AGE and RELATE effects are economically meaningful is robust, although the least preferred linear specification (which

forces all years to have the same marginal effect), yields notably smaller results.

The coefficients of most of the control variables in column one are not statistically significant. The exceptions are CORP and SUBS, which are negative and statistically significant, suggesting that loans to either type of corporation tend to be safer than other loans. Most of the variables do have the predicted signs, and the magnitudes of the 8 financial variables taken together suggest that if all of these variables moved one standard deviation in the direction of greater risk, PREM would increase by 19 basis points. This movement in the predicted direction provides some verification of the model, despite the statistical insignificance. The insignificance of most of the control variables could be a consequence of low statistical test power, given the large number of parameters of the model relative to the limited number of observations. Another potential reason for the insignificance could be multicollinearity. Many of the 16 control variables, particularly the 8 financial variables, are intended to proxy for borrower risk. Each variable could individually be insignificant, but the variables as a whole might be significant. However, tests of the joint significance of both the 8 financial variables together and the 16 total control variables together could not reject the null hypothesis that they jointly have zero effect. Perhaps the most likely reason that most of the control variables are insignificant and that the R^2 of the equation is relatively low is that the pricing of loans to small businesses is idiosyncratic and often depends on the reputation and credit of the business owners as much as or more than the reputation and characteristics of the firm. This is discussed further below. Whatever the reason for the low R^2 and general insignificance of the control variable coefficients, it does not detract from our central result that the relationship variable is both statistically and economically significant over a number of different specifications.

The second column in Table 3 includes the contract variables as well as all the firm and relationship variables from column one. The AGE and RELATE effects are virtually unchanged from the prior equation. The coefficients and t-statistics on LNAGE and LNRELATE are almost the same as earlier, so that only LNRELATE is statistically significant. Once again, however, both coefficients were negative and statistically significant when this regression was rerun using levels in place of logs. The RELATE results in columns one and two of Table 3 -- plus the various checks of statistical significance, economic significance, and robustness -- strongly suggest a role for private information acquired through relationship lending where information becomes available only to the specific lender through monitoring over time. The AGE results are somewhat weaker, given that the coefficients are not always statistically significant, but they generally still support a role for reputation, or publicly available information, which becomes available over time to the lending community as a whole.[14]

The RELATE results in columns one and two are consistent with the theoretical models of Boot and Thakor (1995) and Petersen and Rajan (1993). They may also shed some light on the ambiguous results found in the uniqueness event studies which have examined the difference in announcement effects between new L/Cs and renewal L/Cs. These studies relied on what may be a relatively weak binomial proxy for the strength of the bank-borrower relationship -- whether the L/C was new or a renewal. Our methodology permits a more revealing continuous measure of the relationship, its length. Using this measure (RELATE), we find that the strength of the relationship is an important determinant of loan pricing.

We next deal with an unresolved issue in the collateral literature -- the associations among collateral, borrower risk, and loan risk. Most theoretical models of

collateral demonstrate that collateral will be associated with safer borrowers and loans (Bester 1985, Besanko and Thakor 1987a,b, Chan and Kanatas 1987), while others predict that riskier borrowers will more often pledge collateral (Swary and Udell 1988, Boot et al. 1991, Black and de Meza 1992). Most of the empirical collateral literature supports the view that collateral is associated with riskier borrowers and loans (Orgler 1970, Hester 1979, Scott and Smith 1986, Berger and Udell 1990,1992, Booth 1992,1993). These empirical studies have been hampered by a dearth of data sources on the risk characteristics of individual borrowers and the lack of detailed information on the type of collateral pledged -- problems that we can resolve with our detailed borrower information and two types of collateral.

The regression in column three of table 3, which includes only the loan contract terms on the right-hand side, tests the association between collateral and loan risk. The collateral tests presented later provide some evidence that secured L/Cs are associated with observably riskier borrowers. But this does not necessarily mean that secured loans are relatively risky because recourse against collateral reduces the risk of these loans, possibly to levels below those of unsecured loans. The results in column three of Table 3 show positive coefficients on both types of collateral, indicating higher loan rates for secured loans, although none of the slope coefficients in this equation are statistically significant either individually or jointly, and the explanatory power of the regressors is very low. These results suggest that secured loans may be riskier than unsecured loans as found in prior studies, but the association is not very strong and there is not sufficient test power to reject the null hypothesis of no statistical association.

Tables 4 and 5 show the same regressions as in Table 3, except that they are for firms with assets above and below $500,000 respectively. For firms with assets above

$500,000 in Table 4, the findings are somewhat stronger than the findings for all firms in Table 3. The LNAGE and LNRELATE coefficients and t-statistics are larger, and the R^2 are all higher. In addition, in column 3 of Table 4, the coefficient of ARINV is .35 and is marginally statistically significant. This suggests that for firms above $500,000, being secured by accounts receivable and inventory may be an important indicator of higher loan risk, for which the bank charges an additional risk premium of about 35 basis points.[15] However, the R^2 for this equation is still very low and a test of joint significance of all the coefficients could not reject the null hypothesis of all zeros.

In contrast to these stronger results for firms above $500,000, the regressions for firms below $500,000 in assets in Table 5 show much greater weakness. Only one of the independent variables is statistically significant, and the R^2's are about half of those for firms above $500,000. This suggests that the pricing of bank loans to very small firms is relatively idiosyncratic. This may be the case because the reputation and financial accounts of the business and of its owners are often not economically separable for small family-owned and -operated businesses. Unfortunately, we lack the personal data on the owners that might be used by the bank, such as their credit history and how long they may have had personal relationships with the bank. This problem likely affects many of the over-$500,000 firms in our sample as well, and may help explain why, even in Tables 3 and 4, the R^2's are fairly low and most of the control variables are statistically insignificant.[16] Another reason why the AGE and RELATE effects may be more difficult to estimate for the below-$500,000 firms is that these variables have smaller standard deviations and are more highly correlated with each other for these firms than for the over-$500,000 firms.

Overall, the results of the loan rate tests suggest that the bank-borrower rela-

tionship plays an important role in the pricing of loans to small businesses, with the possible exception of the very smallest borrowers. Our results are generally consistent with the theoretical models of Boot and Thakor (1995) and Petersen and Rajan (1993), both of which generate a negative association between loan rates and the length of the bank-borrower relationship.

As noted above, we conjecture that our loan pricing empirical results differ from those of Petersen and Rajan (1993,1994), who use the same NSSBF data source, primarily because of our focus on lines of credit. We include only L/C loans and exclude "transaction-driven" loans, such as mortgages, equipment loans, motor vehicle loans, and other spot loans. To investigate this issue more thoroughly, we calculated "loyalty ratios," which indicate how often borrowers reuse the same bank for the same type of loan. If what we call transaction-driven loans are actually relationship-driven, then we would expect that firms with more than one of these loans would almost always have them at the same bank. In contrast, if these loans are generic bank products without strong bank-borrower ties, then firms with multiple loans might often have them at multiple institutions. In the full NSSBF sample (including borrowers with and without L/Cs), we found that of borrowers with two or more mortgages, only 45.7% had these loans consolidated at a single bank. Similarly, equipment loans, motor vehicle loans, and other spot loans had loyalty ratios of 50.8%, 52.3%, and 41.9%, respectively. Thus, only about half or less of the time did borrowers with more than one loan of a given type have all of the same type at the same bank, suggesting a lack of "loyalty" that would be expected if these were relationship-driven loans. Moreover, when we group these four types of loans together, only 26.0% of borrowers with two or more of any of these types of loans had them concentrated at a single institution. By contrast, borrowers with L/Cs

demonstrated a high degree of loyalty, supporting our interpretation of the L/C contract as a formalization of a lending relationship. Of all borrowers with L/Cs, 88.8% had them with only one bank, so that these borrowers almost always have their multiple loans under L/Cs consolidated at a single institution. These figures provide support for the conjecture that our finding of a significant effect of relationship lending on loan prices differs from that of Petersen and Rajan (1993,1994) primarily because of their inclusion of "transaction-driven" loans that dilute the relationship effect.

A recent working paper by Blackwell and Winters (1994) also focused on lines of credit, but their loan pricing results are unclear. They used a sample of L/Cs drawn from 2 bank holding companies. When they included LNAGE and LNRELATE in their PREM regressions, the coefficients of both variables were negative (as expected), but the coefficient of LNRELATE was not statistically significant. The LNRELATE coefficient became significant when LNAGE was either dropped or replaced by ln(AGE - RELATE), but it is unclear what these regressions imply. The dropping of LNAGE obviously creates a bias because LNAGE and LNRELATE are highly correlated. The inclusion of ln(AGE - RELATE) along with LNRELATE without also including LNAGE may create a similar bias because it does not allow AGE to have an effect independent of RELATE, despite that fact that its independent effect was shown in other regressions. Moreover, the marginal effect of RELATE on PREM depends on a combination of two coefficients in this equation, but the significance of this combination was not investigated. Thus, no other study to our knowledge has established a link between the length of the relationship and the loan rate.

Collateral Tests

In order to determine whether collateral requirements are greater or lesser for

borrowers with longer banking relationships, we use logit models to examine the probability of an L/C being secured. Recall that Boot and Thakor's (1995) model predicts that collateral will less often be pledged for borrowers with longer relationships. This prediction is also consistent with conventional wisdom among bankers.

Unlike the loan interest rate data analyzed above, data on collateral are available for **all** firms with L/Cs, not just those whose last loan was a floating-rate, prime-based draw under an L/C. Therefore, our sample size is more than twice as large for the collateral regressions than the PREM regressions above, 863 observations instead of 371. The explanatory variables again include the firm's financial, governance, and industry characteristics, as well as the information/relationship variables. The other contract variables, GUAR and COMPBAL, are excluded from the right hand side of these regressions because of the possibility that the collateral, guarantee, and compensating balance decisions are co-determined.[17]

Logit regressions for the probability of any type of collateral being pledged (i.e., Prob(COLLAT)) are shown in Table 6. Column one shows the results using the entire data sample.[18] The coefficients of the information/relationship variables, LNAGE and LNRELATE, are both significant and negative in this regression. Both were also negative and significant when AGE and RELATE were included as levels in place of logs.[19] As above for the loan rates, the magnitudes of these coefficients suggest that they are economically significant in determining whether collateral is pledged. The LNAGE coefficient of about -.19 suggests that all else held equal, a small firm with 11 years experience versus 1 year would have a probability of pledging collateral of about 12 percentage points lower (evaluated at the mean probability of 53%, i.e., ln(.53/(1-.53)) - .19•(ln11 - ln1) = ln(.41/(1-.41)). Similarly, the LNRELATE coefficient of

about -.26 suggests that an additional 10 years of bank-borrower relationship could lower the probability of collateral being pledged by about 16 percentage points from the mean of 53% to 37%. Thus, firms with greater experience and stronger bank-borrower relationships appear to pledge collateral much less often than other firms, consistent with Boot and Thakor (1995) and conventional wisdom.

As above for the PREM regressions, the coefficients of the control variables are generally statistically insignificant, although most of the coefficients have the predicted signs. The simulation of an increase in risk by moving all the financial variables one standard deviation in the direction of greater risk increases the predicted probability of collateral being pledged as expected, providing some verification of the specification.

Columns two and three of Table 6 show logit regressions for Prob(COLLAT) using the subsamples of firms above and below $500,000 in assets, respectively. The coefficients of the information/relationship variables are again negative and of economically meaningful magnitudes. However, the AGE coefficient in the above-$500,000 regression and both the AGE and RELATE coefficients in the below-$500,000 regression are not statistically significant. This may at least partly reflect a loss of statistical test power in the smaller subsamples. As well, the explanatory power of the below-$500,000 regression is considerably lower, presumably reflecting a finding that the terms of bank lending to very small firms are quite idiosyncratic to the owner-manager and are not well explained by our firm-level economic variables. Similar results obtained for the specification in the levels of AGE and RELATE (not shown).

In Table 7 the same logit regressions were run except that the dependent variable is the probability that the loan is secured by accounts receivable and/or inventory (ARINV). The decision to pledge this type of collateral which requires intensive

monitoring by the bank may have different motivations than pledging other collateral.[20] The results for the information/relationship variables in Table 7 all have the same negative signs as were observed in Table 6, and the coefficients are generally of economically significant magnitudes, although LNAGE loses its statistical significance in the full sample. In the specification with levels of AGE and RELATE (not shown), the results are similar, except that AGE is statistically significant for the full sample and for the assets-over-$500,000 subsample.

Thus, the collateral findings generally imply that the older a firm is and the longer its banking relationship, the less often it will pledge collateral (although the AGE effect is not always statistically significant). These results are consistent with Boot and Thakor (1995), who demonstrate that requiring collateral early in a relationship may be useful in solving a moral hazard problem. The findings are also consistent with conventional wisdom in banking. As above for the PREM regression results, the collateral findings suggest that information about the firm is revealed over time. Young firms with new banking relationships may be willing to incur the costs associated with collateral because they know that pledging collateral attenuates the problems associated with asymmetric information. Over time, the firms are able to demonstrate some project success to the lender, who then reduces the collateral requirements. The Prob(COLLAT) findings are also consistent with the PREM findings in that in both cases, borrowers with longer relationships receive easier terms from their banks, lower rates and collateral is less often required.

The data shown in Tables 6 and 7 may also be used to investigate the association between collateral and borrower risk. Borrower risk should be distinguished from loan risk, which was investigated above with the loan rate data. Borrower risk does not

include the risk-reducing effects of the pledged collateral itself. In Table 6, the leverage coefficient (LEV) is positive and statistically significant in all three regressions, suggesting that more leverage is associated with a higher probability of pledging collateral. Similarly, in Table 7, the LEV coefficient is positive in all three regressions and statistically significant in all but the below-$500,000 subsample. This evidence of a positive association between borrower risk and the likelihood of collateral being pledged is consistent with earlier studies (Hester 1979, Berger and Udell 1990,1992).[21]

V. Conclusion

Our analysis highlights the role of relationship lending in commercial bank loan contracting. The evidence indicates that small firms with longer banking relationships borrow at lower rates and are less likely to pledge collateral than other small firms. These effects appear to be both economically and statistically significant. The results are consistent with the financial intermediation literature which emphasizes that banks produce private information about borrower quality (e.g., Diamond 1984,1991, Ramakrishnan and Thakor 1984, Boyd and Prescott 1986). Our empirical results also suggest that banks accumulate increasing amounts of this private information over the duration of the bank-borrower relationship, and use this information to refine their loan contract terms. In addition, our findings are consistent with recent theoretical models of bank-borrower relationships (Boot and Thakor 1995, Petersen and Rajan 1993), although our results run counter to the predictions of other theoretical models (Greenbaum et al. 1989, Sharpe 1990, Wilson 1993). This does **not** suggest that one set of theories is true and the other is false -- rather that on net, the Boot and Thakor and Petersen and Rajan models appear to have stronger effects on loan contract terms than the other models.

Our analysis attempts to extend two strands of the empirical literature that bear

on relationship lending questions. Studies of bank uniqueness found that the existence of a bank-borrower relationship increases firm value, and that the strength of the relationship -- as measured by the distinction between the announcements of L/C renewals versus newly issued L/Cs -- often generates market value as well. The uniqueness literature results are consistent with the notion that banks acquire valuable private information over the course of their relationships with mostly large, publicly traded firms.

Our study differs from these uniqueness studies in three important ways. First, we focus on small, mostly untraded firms, rather than large, publicly traded firms. Small firms are generally more dependent on banks, and are more likely to have the type of asymmetric information problems that a bank-borrower relationship may resolve. Second, we use a continuous measure of the strength of the bank-borrower relationship, the length of time that the bank has purchased L/Cs from its current bank. We believe that this measure dominates the simple binomial proxy of whether the L/C was a renewal versus a new issue as a measure of the relationship's strength. Third, we are able to test directly the predictions of the recent theoretical literature about the path of loan interest rates over the course of the relationship.

Similar to our analysis, the second strand of the empirical literature on relationship lending focused on small firms, used the continuous length of the bank-borrower relationship as a measure of its strength, and tested the path of loan interest rates over the course of the relationship (Petersen and Rajan 1993,1994). However, an important difference from our study is that this second strand of studies did not confine themselves to L/C loans. We focus on just bank lines of credit, excluding from our data set loans which are primarily "transaction-driven," rather than "relationship-driven." Our

exclusion of transaction-driven loans -- such as mortgages, equipment loans, motor vehicle loans, and other spot loans which small firms often obtain from multiple banks -- may avoid diluting our relationship lending results, and may explain why our results concerning the pricing of bank loans differ from this second strand of empirical literature.

Our study also differs from both strands of the empirical literature in that it analyzes the association between the pledging of collateral and the bank-borrower relationship. The relationship lending model of Boot and Thakor (1995), as well as conventional wisdom in banking, emphasize the role of collateral in the evolution of the bank-borrower relationship. Our empirical result that collateral is less often pledged in a mature relationship is consistent with the predictions of Boot and Thakor and conventional wisdom. Our findings may also help clarify some of the issues in the collateral literature by controlling for more types of collateral and more firm characteristics than were previously available. The collateral findings are also consistent with the loan rate findings -- in both cases, borrowers with longer relationships receive easier loan terms from their banks (lower rates, fewer collateral requirements).

Finally, our finding that bank-borrower relationships have value may have some policy implications about the future of the banking industry. First, relationship lending may help limit the so-called "decline of banking," in which securitization and non-bank competition are reducing the share of loans held by banks. Our results suggest that the impact of these trends on small business lending may be limited because of the value of relationships associated with bank lending. Second, our results suggest that bank failures may create a loss of value in excess of the book value of the bank -- the additional loss of the relationships. Research on both the Great Depression (Bernanke 1983) and a

recent bank failure (Slovin et al. 1993) verify these losses. Lastly, bank failures may create "credit crunches" or reductions in the supply of credit for small borrowers, who may face higher loan rates and more collateral requirements if a bank with which they had an established relationship fails.

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[1]Some theoretical papers have formally examined the choice between bank debt and public debt (e.g., Diamond 1991, Rajan 1992).

[2]Most L/Cs contain material adverse change (MAC) clauses which permit the bank to abrogate the commitment if the borrower's financial condition has changed substantially. However, these clauses can only be contingent on verifiable characteristics of the borrower. In addition, because of reputation effects and lender liability laws, banks may be reluctant to invoke these clauses except under extreme conditions (see Avery and Berger 1991).

[3]Billett, et al. (1993) also found higher abnormal returns for higher-rated lenders. Other papers have found that the loan announcement-related abnormal returns may be associated with firm characteristics. Slovin et al. (1992) found a negative association with firm size and Best and Zhang (1993) found a positive association with declining or uncertain earnings forecasts.

[4]Petersen and Rajan excluded loans from the owner or the owner's family. By focusing on just bank L/Cs, we also exclude these loans from our data set.

[5]Petersen and Rajan (1993,1994) also examined the association between loan rates and the age of the firm and found that older firms had lower borrowing costs, as we find below. Petersen and Rajan (1993) found that this association was stronger in less concentrated markets.

[6]One element of the price vector about which we do not have data is the L/C fee. Presumably, PREM is less than it otherwise would be because the bank receives some compensation from fee income. This could create a bias if the fees vary systematically with the characteristics of the individual borrowers used as exogenous variables. However, we do not expect this omission to create substantial bias, since most of any systematic variation in fees would likely be related to the policies of the bank, rather than the characteristics of the individual borrowers.

[7]A further distinction can be made between "inside" collateral (assets of the borrowing firm) and "outside" collateral (assets outside the firm belonging to either the owner of the firm or another interested party, such as a major customer of the firm). Inside collateral reorders the claims of creditors, whereas outside collateral provides additional assets for the secured creditors to claim. The theoretical models in the literature generally focus on outside collateral with the exception of Swary and Udell (1988). Unfortunately, data limitations prevent a clean distinction between inside and outside collateral, since the NSSBF survey focused on the type of asset pledged, rather than its ownership. Nonetheless, we may conclude that ARINV is almost surely all inside collateral, although OTHERSEC likely includes many cases of both inside and outside collateral.

[8]Interestingly, the SBA recently announced a new loan program which for the first time will provide a government guarantee for L/Cs secured by ARINV. This is a significant departure for the SBA, which previously had substantially limited the scope of its guarantees to amortizing term loans. Some lenders have expressed concern about the

new program because of the intense monitoring associated with ARINV and because of the perceived riskiness of this type of secured lending (Selz 1994).

[9]An upper limit of 30 years was imposed on AGE and RELATE. This imposes the restriction that no additional relevant information is revealed after 30 years. For the few publicly traded firms, AGE was also set equal to 30.

[10]Empirical support for this hypothesis is also consistent with Boot and Thakor's (1995) model of loan contracting which does not involve information production.

[11]Fixed-rate L/Cs were excluded because it was not possible to construct a PREM variable that would be accurate and comparable to the PREM for floating-rate L/Cs. First, the loan rate itself appears to have substantially different properties for fixed-rate and floating-rate loans. For example, prior research showed that fixed loan rates were stickier than floating rates (Berger and Udell 1990,1992). Second, it is difficult to find a comparable market rate to subtract from the loan rate to measure PREM. A logical choice might be the rate on a Treasury security with approximately the same duration. However, this still may create problems of accuracy and noncomparability with the fixed-rate PREM because i) only the month of the loan takedown is known and Treasury rates often varied considerably within the months covered by our data set; ii) the duration of the loan is not known because the payments schedule is not reported and because the callability of commercial loans makes the prepayment option difficult to evaluate; and iii) the prime rate, which is subtracted from our floating loan rates, is known to be sticky relative to Treasury rates.

[12]A bias could occur in estimating this equation because the collateral, guarantee, and compensating balance variables are endogenous to the firm and relationship characteristics. We assume a recursive model structure here in which the firm and relationship characteristics explain the contract terms up to random errors that are not significantly

correlated with the PREM error term. Our findings given just below that i) the coefficients of the contract terms in column two are not significantly different from zero, and that ii) their inclusion has no material effect on the coefficients of the other variables, suggests that no substantial bias is present.

[13]We thank the anonymous referee for this very helpful suggestion.

[14]It is also possible that the RELATE results represent public information to some degree. If alternative lenders observe the length of the relationship and are able to infer that a longer customer is a better one, they may make more competitive offers to borrowers with larger values of RELATE. The lower PREM associated with longer relationships could in part reflect the higher degree of competition among lenders for these borrowers. This would be similar to the competitive process described in Greenbaum et al. (1989) (although they reached the opposite conclusion regarding the association between PREM and RELATE). However, we do not expect this public-revelation-of-private-information effect to be particularly strong in our sample of small firms, since there is little in the way of public pronouncements and outside monitoring for firms of this size.

[15]Some caution should be exercised in interpreting this result because ARINV financing typically requires that banks closely monitor the collateral. Thus, the higher PREM for ARINV loans may be partly explained by the costs of this monitoring to the extent that these costs are not paid for by fees.

[16]For a more complete discussion of the integration of personal and business activities associated with small business, see Ang (1992).

[17]We examine this co-determination problem by also running separate collateral regressions on two subsets of the data -- L/Cs with personal liability (corporations with a guarantee, sole proprietorships, partnerships) versus those without personal liability (corporations without a guarantee). These additional logit regressions (not shown)

suggest that our results reported below generally hold for both of these groups and are robust.

[18]In principle, the Prob(COLLAT) logit regression could be estimated jointly with the PREM OLS regression in a Seemingly Unrelated Regression model. However, under the assumed recursive model structure, the error terms of these equations are not correlated, and so there would be no gain from joint estimation. The fact that we found virtually no change in the PREM results when the COLLAT variables were added to those regressions suggests that this assumption is justified. Moreover, even if the error terms were substantially correlated, there would likely be little gain from joint estimation because the exogenous variables in both equations are the same. In a linear model, there is no gain from joint estimation with a common X matrix, and experiments with nonlinear forms suggest little or no improvement when nonlinearities, such as the logit form, are used.

[19]The negative effect of AGE is consistent with the results of Scott and Smith (1986). They did not, however, have data on our RELATE variable.

[20]An alternative specification would be to use a trichotomous logit with the choices being ARINV, OTHERSEC, and no collateral. Regressions run under this alternative were not materially different from those reported.

[21]Note, however, that the coefficients of the financial ratios other than LEV in Tables 6 and 7 are generally statistically insignificant or fail to have signs that consistently associate collateral with either greater or lesser borrower risk.

Table 1
Variable Description

Variable Name	Description
	CONTRACT CHARACTERISTICS
PREM	Premium over the prime rate
COLLAT	Equals one if loan is secured
ARINV	Equals one if loan is secured by accounts receivable and/or inventory
OTHERSEC	Equals one if loan is secured by other than accounts receivable and/or inventory
GUAR	Equals one if loan is guaranteed
COMPBAL	Equals one if loan requires compensating balances
	FINANCIAL CHARACTERISTICS
LEV	Leverage: total debt/assets
PROFMARG	Pretax profit margin (% of sales)
CURRRAT	Current ratio ((current assets)/(current liabilities))
QUICKRAT	Quick ratio ((current assets - inventory)/(current liabilities))
ARTURN	Accounts receivable turnover in days ((accounts receivable)/(sales/day))
INVTURN	Inventory turnover in days (inventory/(cost of goods sold)/day)
APTURN	Accounts payable turn in days ((accounts payable)/(cost of goods sold)/day)[1]
TA	Total firm assets (in thousands of dollars)
	GOVERNANCE CHARACTERISTICS
CORP	Equals one if firm is a non-subchapter S corporation
SUBS	Equals one if firm is a Subchapter S
PART	Equals one if firm is a partnership
PROP	Equal one if firm is a proprietorship (excluded from regressions as the base case)
OWNMG	Equals one if firm is owner-managed
CONC50	Equals one if at least 50% ownership is in one family

	INDUSTRY CHARACTERISTICS
CONSTR	Equals one if in construction industry
SERVICES	Equals one if in services industry
RETAIL	Equals one if in retail industry
OTHERIND	Equals one if in other industries (excluded from the regressions as the base case)
	INFORMATION/RELATIONSHIP CHARACTERISTICS
AGE	Number of years current owners have owned firm[2,3]
RELATE	Length of relationship with current lender in years[2]

[1]Because of data availability, cost of goods sold per day was used in place of purchases per day.

[2]A maximum limit of 30 years was imposed on AGE and RELATE.

[3]If the firm was diffusely held, then AGE equals the number of years that the firm has been in existence.

Table 2
Variable Means - Lines of Credit

Variable	All Firms	TA Above $500,000	TA Below $500,000
PREM[1]	1.49	1.32	1.73
COLLAT	.53	.59	.47
ARINV	.36	.46	.25
OTHERSEC	.18	.14	.22
GUAR	.41	.46	.35
COMPBAL	.07	.09	.05
LEV	.60	.60	.59
PROFMARG	.12	.08	.16
CURRRAT	3.51	2.90	4.13
QUICKRAT	2.52	1.85	3.20
ARTURN	34.11	42.14	25.87
INVTURN	103.30	103.98	102.62
APTURN	91.90	95.53	88.18
TA[2]	2,331.66	4,442.95	165.84
CORP	.55	.70	.38
SUBS	.16	.20	.13
PART	.07	.05	.08
PROP	.22	.04	.41
OWNMG	.89	.85	.92
CONC50	.80	.73	.86
CONSTR	.14	.13	.15
SERVICES	.16	.10	.22
RETAIL	.23	.19	.27
OTHERIND	.47	.57	.36
AGE	14.10	16.49	11.66
RELATE	11.39	12.67	10.08
Num. Obs.	863	437	426

[1]PREM available for 371, 219 and 152 observations only.
[2]000's omitted.

Table 3

Premium Over Prime Rate (Floating Only) for Loans Issued Under Lines of Credit - All Firm Sizes

(OLS regressions for PREM)

	Excluding Loan Contract Terms		Including All Variables		Loan Contract Terms Only	
Variable	**Coeff**	**t-stat**	**Coeff**	**t-stat**	**Coeff**	**t-stat**
INTERCEPT	2.3642**	2.704	2.5928**	2.886	1.3883**	9.632
ARINV			0.1330	0.703	0.2141	1.227
OTHERSEC			-0.2440	-0.982	0.0424	0.173
GUAR			0.0449	0.271	0.0091	0.056
COMPBAL			-0.0979	-0.285	-0.0319	-0.093
LEV	0.2262	0.783	0.1766	0.592		
PROFMARG	0.3232	0.933	0.3220	0.926		
CURRRAT	0.0058	0.093	0.0057	0.090		
QUICKRAT	-0.0473	-0.718	-0.0504	-0.760		
ARTURN	0.0029	1.591	0.0029	1.594		
INVTURN	0.0006	0.731	0.0005	0.634		
APTURN	-0.0004	-0.508	-0.0003	-0.419		
LNTA	-0.0286	-0.506	-0.0457	-0.778		
CORP	-0.5930**	-2.261	-0.6496**	-2.429		
SUBS	-0.5202*	-1.741	-0.5389*	-1.783		
PART	-0.1709	-0.403	-0.2051	-0.481		
OWNMG	0.3227	1.339	0.3218	1.317		
CONC50	0.1740	0.876	0.1972	0.986		
CONSTR	0.2366	0.813	0.2799	0.949		
SERVICES	0.2538	1.001	0.2629	1.021		
RETAIL	0.1281	0.584	0.1014	0.460		
LNAGE	-0.1376	-1.253	-0.1280	-1.155		
LNRELATE	-0.2004**	-2.217	-0.1981**	-2.164		
R^2	0.089		0.095		0.004	
Num. Obs.	371		371		371	

* Statistically significant at the 5% level, two-sided.

** Statistically significant at the 10% level, two-sided.

Table 4

Premium Over Prime Rate (Floating Only) for Loans Issued Under Lines of Credit - TA Above $500,000

(OLS regressions for PREM)

	Excluding Loan Contract Terms		Including All Variables		Loan Contract Terms Only	
Variable	**Coeff**	**t-stat**	**Coeff**	**t-stat**	**Coeff**	**t-stat**
INTERCEPT	3.2273*	1.864	3.5784**	2.004	1.0645**	5.667
ARINV			0.0329	0.145	0.3502*	1.656
OTHERSEC			-0.4210	-1.169	0.0907	0.257
GUAR			-0.0073	-0.036	0.1625	0.819
COMPBAL			-0.2836	-0.702	-0.1601	-0.393
LEV	0.5077	1.162	0.5614	1.229		
PROFMARG	0.1852	0.391	0.2057	0.430		
CURRRAT	0.0636	0.742	0.0705	0.816		
QUICKRAT	-0.2130**	-2.113	-0.2226**	-2.188		
ARTURN	0.0021	1.053	0.0021	1.002		
INVTURN	0.0000	0.043	0.0002	0.141		
APTURN	0.0001	0.141	0.0002	0.227		
LNTA	-0.0591	-0.554	-0.0810	-0.741		
CORP	-0.8768	-1.533	-0.9501	-1.637		
SUBS	-0.8700	-1.458	-0.9439	-1.561		
PART	-0.3607	-0.436	-0.4337	-0.520		
OWNMG	0.3931	1.505	0.4141	1.561		
CONC50	0.2579	1.105	0.2768	1.176		
CONSTR	0.3885	1.086	0.4348	1.204		
SERVICES	0.5679	1.600	0.5827	1.613		
RETAIL	-0.2966	-1.080	-0.3291	-1.183		
LNAGE	-0.1870	-1.397	-0.1729	-1.276		
LNRELATE	-0.2363**	-2.320	-0.2491**	-2.406		
R^2	0.155		0.165		0.018	
Num. Obs.	219		219		219	

* Statistically significant at the 5% level, two-sided.

** Statistically significant at the 10% level, two-sided.

Table 5

Premium Over Prime Rate (Floating Only) for Loans Issued Under Lines of Credit - TA Below $500,000

(OLS regressions for PREM)

	Excluding Loan Contract Terms		Including All Variables		Loan Contract Terms Only	
Variable	**Coeff**	**t-stat**	**Coeff**	**t-stat**	**Coeff**	**t-stat**
INTERCEPT	1.9547	0.961	2.0661	0.977	1.7136**	7.673
ARINV			0.1688	0.474	0.2020	0.653
OTHERSEC			-0.2014	-0.517	-0.0930	-0.266
GUAR			0.1636	0.523	-0.1116	-0.406
COMPBAL			-0.0120	-0.017	0.2502	0.416
LEV	0.0904	0.212	-0.0378	-0.083		
PROFMARG	0.5753	1.044	0.5895	1.056		
CURRRAT	0.0145	0.146	0.0073	0.072		
QUICKRAT	-0.0051	-0.052	-0.0074	-0.074		
ARTURN	0.0056	1.398	0.0061	1.481		
INVTURN	0.0010	0.813	0.0009	0.665		
APTURN	-0.0006	-0.473	-0.0006	-0.451		
LNTA	-0.0574	-0.359	-0.0678	-0.407		
CORP	-0.4234	-1.189	-0.5295	-1.398		
SUBS	-0.3263	-0.731	-0.3417	-0.749		
PART	0.0816	0.139	0.0429	0.071		
OWNMG	0.1645	0.308	0.1914	0.348		
CONC50	0.1682	0.439	0.1872	0.474		
CONSTR	0.3154	0.620	0.3695	0.694		
SERVICES	0.2533	0.609	0.2882	0.673		
RETAIL	0.6691*	1.723	0.6677*	1.674		
LNAGE	-0.1404	-0.660	-0.1303	-0.601		
LNRELATE	-0.0013	-0.007	0.0091	0.048		
R^2	0.084		0.091		0.007	
Num. Obs.	152		152		152	

* Statistically significant at the 5% level, two-sided.

** Statistically significant at the 10% level, two-sided.

Table 6

Probability Tests on Collateral (All Types)
Lines of Credit

(Logit Regressions for the Probability of COLLAT)

	All Firms		TA Above $500,000		TA Below $500,000	
Variable	**Coeff**	**t-stat**	**Coeff**	**t-stat**	**Coeff**	**t-stat**
INTERCEPT	-2.6619**	3.4548	-0.8259	0.4635	-5.2428**	3.3701
LEV	1.0487**	4.1222	2.7432**	5.2775	0.5373**	2.0026
PROFMARG	-0.0437	0.1510	0.3182	0.6387	0.0631	0.1658
CURRRAT	0.0840	1.4998	0.1146	1.2018	0.0499	0.6768
QUICKRAT	-0.0826	1.3837	-0.0534	0.4707	-0.0761	1.0066
ARTURN	0.0032*	1.6697	0.0022	0.8941	0.0057*	1.8037
INVTURN	-0.0000	0.0141	-0.0005	0.3926	0.0006	0.7449
APTURN	-0.0009	1.3639	-0.0016	1.3922	-0.0008	0.9585
LNTA	0.2065**	3.9953	0.0755	0.6745	0.4043**	3.2936
CORP	0.0648	0.2963	-0.5081	0.9407	0.1003	0.3712
SUBS	0.0292	0.1109	-0.7419	1.2860	0.4021	1.1394
PART	0.3661	1.0662	-0.9854	1.3097	0.7528*	1.7761
OWNMG	0.3426	1.4543	0.5200*	1.6620	0.0357	0.0906
CONC50	0.0015	0.0100	-0.2020	0.7735	0.2556	0.7867
CONSTR	-0.2213	0.9767	-0.7832**	2.2868	0.3732	1.1462
SERVICES	0.1954	0.8500	0.2002	0.4890	0.5043*	1.6840
RETAIL	-0.0295	0.1439	-0.5794*	1.8985	0.4229	1.4359
LNAGE	-0.1942*	1.8814	-0.1321	0.8575	-0.2124	1.3836
LNRELATE	-0.2635**	3.1076	-0.3880**	3.1959	-0.1147	0.8936
Num. Obs.	863		437		426	
Diagnostics						
-2logL	1099.024		509.316		550.387	
d.f.	18		18		18	
Chi Sq. Covariates	93.311		81.394		39.037	

* Statistically significant at the 5% level, two-sided.

** Statistically significant at the 10% level, two-sided.

Note: The t-stat columns in this table refer to the square roots of the Wald Chi-Square and are compared to the critical values for Student's t distribution.

Table 7

Probability Tests on Collateral (A/R and Inventory) Lines of Credit

(Logit Regressions for the Probability of ARINV)

	All Firms		TA Above $500,000		TA Below $500,000	
Variable	**Coeff**	**t-stat**	**Coeff**	**t-stat**	**Coeff**	**t-stat**
INTERCEPT	-5.0383**	5.9557	-4.1130**	2.2371	-8 4317**	4.0608
LEV	0.5680**	2.4784	2.1056**	4.2758	0.2563	1.1283
PROFMARG	-0.4051	1.2208	0.3110	0.6106	-0.7795	1.5456
CURRRAT	0.1229**	2.1315	0.0690	0.7622	0.1673**	2.1305
QUICKRAT	-0.1374**	2.1312	-0.0747	0.6701	-0.1489*	1.8086
ARTURN	0.0042**	2.1659	0.0043*	1.7725	0.0053	1.5068
INVTURN	0.0002	0.2437	-0.0003	0.2973	0.0010	0.9306
APTURN	-0.0009	1.2565	-0.0029**	2.5628	0.0005	0.4925
LNTA	0.2909**	5.2200	0.1988*	1.7817	0.4697**	2.8612
CORP	0.6923**	2.6526	1.0707	1.5555	0.5532*	1.6839
SUBS	0.2845	0.9248	0.5495	0.7635	0.4290	1.0267
PART	1.0166**	2.7201	0.0220	0.0245	1.6301	3.4767
OWNMG	0.5838**	2.2669	0.4039	1.2527	1.0326*	1.9159
CONC50	-0.0392	0.1985	-0.2107	0.8223	0.0912	0.2565
CONSTR	-0.9110**	3.3097	-1.3344**	3.5423	-0.4014	0.9138
SERVICES	0.0545	0.2140	0.4567	1.1357	0.1312	0.3538
RETAIL	0.1678	0.7827	-0.3770	1.2431	0.6768**	2.0292
LNAGE	-0.1544	1.4455	-0.1378	0.9042	-0.1077	0.5962
LNRELATE	-0.2570**	2.8852	-0.3584**	2.9931	-0.1062	0.6952
Num. Obs.	863		437		426	
Diagnostics						
-2logL	974.127		508.366		419.591	
d.f.	18		18		18	
Chi Sq. Covariates	149.370		94.308		60.615	

* Statistically significant at the 5% level, two-sided.

** Statistically significant at the 10% level, two-sided.

Note: The t-stat columns in this table refer to the square roots of the Wald Chi-Square and are compared to the critical values for Student's t distribution.