

A Multistage Model of Loans and the Role of Relationships

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Abstract

The goal of this paper is to further our understanding of how relationships work in the borrower-lender interaction for a loan. A practical implication emerging from classical studies is that lenders overcome the problem of information asymmetry by collecting information about the borrowers through close relationships and using this information in credit approval and loan rate decisions. We test this implication in our paper using a robust sample selection methodology and data from the 1998 Survey of Small Business Finances. Our empirical model accounts for the entire fabric of the loan granting process within a unified framework, including (1) a borrower's decision to apply to a financial institution for a loan, (2) the financial institution's decision to approve the application for a loan, and (3) the loan rate the financial institution chooses for the borrower conditional on approving the loan. Our model also explicitly includes the analysis of discouraged borrowers (i.e., those that do not apply for loans because they believe they will be rejected). We find that relationships matter only in a borrower's decision whether to apply for a loan and in the loan approval/rejection decision by the financial institution. Relationships, however, are not important in determining the loan rate associated with the approved loan once the sample selection bias in the loan process is appropriately accounted for. Our conclusions remain robust to both "relationship-driven" loans and to the relative size of the business.

JEL: G21

Keywords: Credit Rationing, Relationships, Lender, Borrower, Small Business Loans, Sample Selection

This version: May 12, 2007

Acknowledgments: We thank the seminar participants at the Ohio State University; Purdue University; Boğaziçi University in Istanbul, Turkey; the 2005 Midwest Economic Association meetings; the 2005 Federal Reserve System's fourth annual community affairs research conference (entitled "Promises and Pitfalls") in Washington, D.C; and the 2004 conference on the Micro Foundations of Credit Contracts in Florence, Italy; as well as Carol Bertaut, Jonathan Crook, Jonathan Fisher, Mary Gitzen, Adam Hagen, Rick Lang, Toshihiko Mukoyama, Ed Nosal, George Pennacchi, Mitch Petersen, Raghuram Rajan, Ayşeğül Şahin, Avanidhar Subrahmanyam and Rick Widdows, for helpful comments and suggestions at various stages in the evolution of the paper. Patryk Babiarz provided exceptional research assistance. A previous version of this paper was entitled "A Reexamination of the Role of Relationships in the Loan Granting Process." The usual disclaimer holds.

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“Finally, you have the most sophisticated of all marketing tools: Person-to-person relationships....You know your customers personally by taking care of a variety of banking transactions for them on a daily or weekly basis and, for many, you know them through community activities as well. More than likely, you know when they get married, when they move, when they are having children, when their children are ready for college, when their kids graduate and when retirement is around the corner. No computer model has been developed that can compete with this kind of knowledge.”

Community Banker, June 2001

1. Introduction

The goal of this paper is to test a simple premise: Do relationships between a borrower and a (potential) lender in fact matter equally through all stages of a loan application/approval process? The basis to this question lies in two seemingly counter acting intuitions, one emerging from the literature and the other emerging from stylized facts from the banking industry and bank loan officers. Specifically, the current literature on the role of relationships on lending suggests that relationships will improve the loan efficiency by cutting down loan delinquencies and defaults and enable loans to be made at lower rates.¹ The counter to this intuition comes from the practitioners who suggest that while the credit approval decisions might be relatively flexible, the actual loan rates are strictly bound around the current prime lending rate, or the LIBOR, and there is very little room for adjustment.² The implication would be that loan rates should be driven by observables like the credit history of the borrower and not be driven by “soft information” metrics like relationships.

To answer the above question, we formally decompose the overall loan granting process into the following (sequential) decision stages in order to closely examine the effect of relationships on each stage of this process:

- **[The Application Decision]** a borrower’s decision whether to apply to a lender for a loan (or not),

¹ See, for example, Petersen and Rajan (1994), Berger and Udell (1995), Cole (1998) and Chakravarty and Scott (1999).

² The six C’s for getting a small business loan approved include Character, Capacity of pay, Capital, Collateral, Conditions and Confidence (See, for example, <http://www.sba.gov/smallbusinessplanner/index.html>). Recently, practitioners have added another C to their recommendations to small businesses, which is Communication. See for example, “Get your Bank Manager on your side with these simple strategies” on <http://smallbusinessloansecrets.com/>

- **[The Credit Approval Decision]** whether the lender approves the application for a loan (or not), and
- **[The Loan Rate Setting Decision]** the loan rate the lender chooses for the borrower.

We further assume that these stages are endogenously determined. Our analysis allows for the inherently distinct role possibly played by relationships in the different areas of the loan process and is based on the intuition that, collectively, relationships act as a sorting mechanism in either voluntarily self-rationing businesses out of the loan markets altogether or encouraging them to formally apply for a loan with a financial institution with whom they might enjoy a certain level of relationships. We hypothesize that, below a critical relationship value, firms will self-select into staying out of the loan markets (even though they need credit) and, above this critical value, they will apply for a loan. The bank may then evaluate the application based on its own (private) data about the firm, which includes information gleaned through relationships with the applicant. Subject to the firm meeting the bank's profit maximizing conditions, the bank either approve or reject the loan application. Consequently, a single equation ordinary least squares estimation of loan rates on the effect of relationships with this non-randomly selected sample data will give us estimates for "well-developed" relationships (relationships above a critical value) for the selected group of those firms that were approved for a loan, and will likely overestimate the true effect of relationships on loan rates.³

To examine the question in its fullest sense requires the inclusion of those potential borrowers who would want a loan for their businesses but do not choose to formally apply because they are sure to be turned down by the bank. We term these borrowers as "discouraged" borrowers. While the current body of relationship lending research, exemplified by the citations in footnote 1, have not included discouraged borrowers in their analysis, there is now a growing body of evidence that appears to suggest that owners of small businesses from certain demographic groups are discouraged from applying for a loan (see, for example, Blanchflower, Levine and Zimmerman, 2003 and Cavalluzzo, Cavalluzzo and Wolken, 2002).⁴ Given the significant numbers of discouraged borrowers in the population, they

³ The notion of relationships, such as the one we analyze in this paper, can conceivably comprise of two components: a mechanical sorting by which like-minded firms and banks are attracted to one another and develop a long tenure with each other simply because they are good fits; and a component that captures the real time productivity increases over time that lead to loan efficiencies and resulting lower loan rates. Ideally, it is the latter we want to capture through our relationship proxies. Unfortunately, the (cross-sectional) data does not permit us to disentangle the two effects. To the extent that the former is present, it will dilute the effect of (current) loan efficiencies on (future) loan rates. We discuss this issue in detail in Section 2.

⁴ The number of discouraged and credit-constrained borrowers is not negligible. According to Cavalluzzo et al. (2002), almost half of the small businesses in the 1993 National Survey of Small Business Finances (used by these authors in their analysis) that desired credit did not apply for a loan because they feared that the loan application would be turned down due to poor credit history, prejudice, or for some other reason. Similarly, almost 30 percent of the businesses that applied for a loan were denied credit. These numbers suggest that discouraged and credit-

cannot be thought to be mere random samples, and the unobserved characteristics of the firms, such as the manager's ability to develop "good" relationships and transmit the credit quality of the firm to the lenders, through the development and the nurturing of relationships, are likely to be correlated across the discouraged, credit-constrained, and non-constrained, borrowers. One may also argue that the discouraged, and the denied, have no pre-existing relationships with banks. Therefore, excluding them from the sample would not bias the parameter estimates of the relationship variables. However, in the 1998 Survey of Small Business Finances (used in this paper), over 98 percent of small businesses reported having a primary institution that they do business with – that is, they have a pre-existing relationship with at least one bank. Furthermore, the length of relationship with the primary institution of the discouraged and credit-constrained borrowers is comparable to the length of relationship of those that were approved for a loan.⁵

We employ a robust sample selection approach (discussed in detail later) that accounts for the double selectivity in the loan process.⁶ We use data from the 1998 Survey of Small Business Finances (SSBF) to examine the (possibly) distinct role possibly played by relationships in different areas of the loan process. Upon estimating our model, we find that relationship measures are most important in increasing the probability of applying for a loan and lowering the probability of being rejected for a loan. Among relationship variables, we find that measures capturing the existence of pre-existing relationships and pre-existing loan accounts, and the number of credit sources that the firm has association with, play important roles. Apart from relationship effects, we find that the financial characteristics of small businesses, such as the number of years under current management, total assets, and total liabilities, also have a powerful effect in explaining discouraged and/or credit-constrained borrowers.

constrained borrowers cannot, and should not, be excluded from any formal analysis of determinants of availability and/or cost of credit.

⁵ For example, almost 96 percent of the discouraged and a 100 percent of the credit-constrained businesses reported having a primary institution that they do business with. The mean length of relationship with the primary institution for discouraged and credit-constrained borrowers is 6.52 and 5.56 years, respectively, while the mean length of relationship for those that were approved for a loan is 7.03 years. In addition, among the discouraged (credit-constrained) borrowers, 41(15) percent have a relationship with a single institution, 31(33) percent have a relationship with two institutions, 15 (24) percent have a relationship with three institutions, and the remaining 13 (27) percent have a relationship with four or more institutions. The corresponding numbers for those businesses that were approved for a loan are as follows: 16 percent have a relationship with a single institution, 26 percent have a relationship with two institutions, 27 percent have a relationship with three institutions, and 31 percent have a relationship with four or more institutions.

⁶ Double selectivity refers to the fact that the financial institution's credit approval decision is usually observable only if the borrower decides to apply for a loan, while the loan rate is usually observable only if the borrower decides to apply for a loan *and* the financial institution approves the loan application.

Having identified that relationship measures, overall, play an important role in the loan application and approval/denial processes, we go a step further in determining the role of relationships in loan rate decisions. Initially, considering only those small businesses in our data that had outstanding loans (i.e., without accounting for the sample selection bias) we find that relationship measures, specifically, the length of relationship with the lender and the number of credit sources that the borrower has association with, do indeed have significant power in explaining loan rates as has been reported in the literature. However, the statistical significance of the length of relationship and the number of credit sources disappears when the selection bias is appropriately corrected for. That is, relationship measures have no power in explaining the loan rate once the interest rate equation is analyzed as part of the overall loan process (or, the loan rate estimation model is statistically linked with the application and credit approval stages of our loan model). Still, other characteristics of small business borrowers, such as the number of years under current management, total assets, and liabilities, continue to be significantly correlated with the loan rate.

Our estimation results also show that among relationship variables, the number of credit sources that the firm has association with has a varying effect on the different stages of a loan granting process. While the existence of multiple relationships plays a positive role in the decision to apply for credit, it plays a negative role in the decision to be approved for credit. Finally, without accounting for the sample selection bias, we find that the number of credit sources is positively associated with the loan rate. This finding is consistent with the literature that those who maintain multiple relationships are perceived by potential lenders as financially stressed and, therefore, face higher loan rates (see, for example, Petersen and Rajan, 1994 and Shikimi, 2005). When the selection bias is appropriately corrected for, the positive correlation between the number of credit sources and the loan rates disappears. We argue that this is due to the fact that those firms that are more likely to apply for credit also have associations with a larger number of credit sources. Consequently, the effect of competition among various financial sources reduces their loan rate with a given lender.

To ensure the robustness of our findings, we examine two distinct partitions of the data. First, we focus only on the smallest firms in our data as defined using a similar asset cut-off level to Berger and Udell (1995). Second, we focus on only those firms with existing lines of credit under the assumption that lines of credit are “relationship-driven” loans distinct from mortgage loans (say), which are transactional loans where the effect of relationships may not play a central role to begin with (see, for example, Berger and Udell, 1995). Our main finding, that relationships do not impact loan rates once the sample selection bias is appropriately controlled for survives both partitions. That is, we find that relationships play no significant role in the loan rate determination stage.

The remainder of this paper is structured as follows. Section 2 reviews the theoretical and empirical literature and compares our findings with the previous literature. Section 3 constructs the empirical framework. Section 4 describes the data and defines the variables used in the analysis. Section 5 presents the findings of our empirical analysis for small businesses loans. Section 6 presents the results of our robustness tests where we apply our empirical analysis to loans extended to the smallest of small businesses and to the lines of credit extended to small businesses. Finally, Section 7 concludes.

2. Background

The literature on relationship banking has shown that lenders can overcome the problems of asymmetric information by developing close relationships with borrowers. Development of long-term relationships with the borrower can produce valuable information about the prospects and creditworthiness of the borrower that can be used in (future) credit approval and loan rate decisions. The effects of relationship banking on the availability and the cost of funds for small businesses have been investigated in an impressive body of theoretical and empirical research. The findings of the previous literature demonstrate that two measures in particular, the length of relationship and single versus multiple banking relationships, can have significant benefits, as well as costs, for borrowers.

The theoretical papers on banking relationships have focused on how the duration of a financial relationship influences the price of a loan. Boot and Thakor (1994) show that as the relationship duration increases, borrowers obtain loans at lower rates because information asymmetries are overcome more efficiently and these efficiency gains are passed along to the firm. However, Sharpe (1990) suggests that interest rates increase as relationships mature, since the propriety information about the borrower that the bank obtains may provide the bank with an informational monopoly and create a switching cost for the borrower (defined as a lock-in problem). The cost of this lock-in problem for the borrower is also discussed in Rajan (1992), who notes that the informed lender has the power to prevent the firm from continuing a project that has a negative net present value.

While the empirical evidence supports the hypothesis that relationships increase the availability of credit (Cole, 1998), the hypothesis that the length of the relationship reduces the loan rate has been both supported and rejected. For example, using U.S. small business data, Petersen and Rajan (1994) have found no significant correlation between the relationship length and the loan rates while Berger and Udell (1995) have reported a significantly negative correlation between relationship length and the loan rates on relationship-driven loans. The ambiguity carries over in the international front as well. Here, using bank loans to Belgian small businesses, Degryse and Cayseele (2000) have reported a positive

correlation between relationship length and loan interest rates, while, using data from small businesses in Germany, Harhoff and Korting (1998) have reported a negative correlation.

Multiple banking relationships may reduce the lock-in problem. By having a relationship with more than one lender, a firm can reduce the possibility for its incumbent bank to exploit a monopolistic position.⁷ Evidence on the impact of multiple relationships on credit availability and loan rates is also mixed. Petersen and Rajan (1994) find the firms that have multiple relationships obtain credit at higher rates and are more credit-constrained than firms with a single banking relationship. Similarly, Cole (1998) finds that multiple relationships reduce credit availability. But, D'Auria, Foglia and Reedtz (1999) find that firms with multiple relationships have slightly lower interest rates. In addition, Shikimi (2005) finds that while the incidence of multiple relationships increases the cost of credit, it also increases the availability of credit for financially stressed firms.

Our analysis provides a generalized modeling framework of the entire loan granting process, which encompasses, and builds on, among others, the research of Petersen and Rajan (1994), Berger and Udell (1995), and Cole (1998). Using a sample of small business loans (that includes lines of credit as well as other types of small business loans) from the 1987 version of the National Survey of Small Business Finances data set, Petersen and Rajan (1994) show no significant effect of relationships on the loan rates charged by lenders. They obtain this result by regressing the interest rate quoted on a firm's most recent loan on proxies capturing the underlying cost of capital, as well as loan- and firm-specific characteristics and, most importantly, relationship measures. They also separately examine the role of relationships on the availability of credit and find "stronger" effects of relationships on their proxy for credit availability. In spirit, this finding is similar to what we uncover using data on small business loans. However, there are several important differences between their approach and ours.

First, unlike our data, Petersen and Rajan's data do not allow them to observe credit availability directly. The authors are therefore forced to find indirect proxies (i.e. the percentage of trade credits repaid late in Petersen and Rajan, 1994, and the percentage of offered early payment discounts taken by the firm in Petersen and Rajan, 1995). In our data, we directly observe whether or not the firm was discouraged or whether or not it is denied a loan, and use these direct measures as proxies for credit availability. Second, Petersen and Rajan separately estimate the role of relationships on loan rate and credit availability. However, conversations with bank officials and other theoretical considerations point unambiguously to the fact that the two decisions, credit availability and the determination of the

⁷ Competition among banks may actually harm a borrower if the competition imposes constraints on the ability of borrowers and lenders to share surpluses. Petersen and Rajan (1995) show that high competition makes it more difficult for banks to subsidize borrowers in earlier periods in return for a share of the rents in the future and this may discourage banks from lending to young firms.

loan rate, are inextricably woven together as part of the same loan process and should not be considered as distinct. In the current research, we provide such a unified analysis.

Berger and Udell (1995) use the same 1987 version of National Survey of Small Business Finances data set used by Petersen and Rajan (1994), and the same single equation regression format, with one important difference. Focusing solely on small business lines of credit (as a subset of the loans examined by Petersen and Rajan (1994) from the same data set), they regress the loan rate premium over the bank's prime rate on the length of relationship, characteristics of the loan contract and also financial, governance, and industry characteristics of the firm. They find a negative and significant correlation between relationship length and loan rates. That is, the longer the banking relationship, the lower is the rate on the loan. This finding, they argue, contrasts "sharply" with those of Petersen and Rajan (1994) who report a statistically insignificant effect of relationship length on loan rates.⁸ We are able to replicate the findings of Berger and Udell (1995) with the 1998 SSBF data as long as we estimate the appropriate regressions in isolation without controlling for the selection biases across the various stages of the entire loan granting process. Subsequently, we are able to demonstrate our result of the irrelevance of relationship measures on loan rates once we appropriately control for the sample selection bias.

Cole (1998) investigates the role of pre-existing relationships on the availability of credit for small businesses. Unlike our study, Cole (1998) does not examine the self-rationed businesses and, instead, focuses only on those businesses that applied for credit.⁹ He reports that the length of the relationship is unimportant in determining a potential lender's decision whether or not to approve the credit application and finds that a potential lender is more likely to extend credit to a firm with which it has a pre-existing relationship. When we estimate the decision to apply (or not) for credit and the decision to approve (or reject) credit together, our results show that, consistent with Cole, pre-existing relationships do play a significant role on being approved for credit, while the length of relationship does not. Additionally, Cole (1998) finds that multiple relationships reduce credit availability. Our estimation results show that it is in the decision to apply for credit where multiple relationships play a positive role, and it is in the

⁸ Blackwell and Winters (1997) use a single equation ordinary least squares estimation similar to those used by Petersen and Rajan (1994) and Berger and Udell (1995) to examine the effects of banking relationships and monitoring on loan interest rates. The authors, using a small sample of active lines of credit obtained from banks, find that firms with longer relationships are monitored less frequently by banks, and that less frequently monitored firms pay lower interest rates on average. Blackwell and Winters also infer from their results that, upon holding the bank's monitoring effort constant, the duration of the banking relationship has no direct effect on pricing the lines of credit.

⁹ Using the 1998 SSBF data, we are able to replicate Cole's findings when we analyze only the lender's decision of whether or not to approve the (small business) credit application.

credit approval stage where multiple banking relationships appear to play a negative role. Businesses that have associations with a larger number of lenders are likely to have applied for credit in the past and are more likely to apply in the future. Controlling for that effect, our results show that businesses that have a single banking relationship are more likely to be approved for a loan compared to those that have multiple banking relationships. Among those that have multiple relationships, credit approval does not significantly reduce with the number of credit sources that the business has association.

Finally, an important econometric issue in the analysis of credit availability and cost of credit needs to be addressed. If there are omitted borrower-lender-specific unobservable effects in the estimation of the determinants of the cost of credit, correlations between these and the banking relationship proxies can either result in an upward, or a downward, bias in the estimate of the length of relationships (say). A good match between firms and banks implies a longer length of relationship since borrowers are less likely to approach other sources for credit. This will result in an observed negative correlation between the length of relationship and the loan rate. On the other hand, businesses that have a shorter length of relationship are businesses that approach a new lender in order to obtain a better match. This will result in a positive correlation between the length of relationship and the loan rate. In the same vein, the labor literature on the connection between earnings and job tenure (and experience) has recognized that the correlation between omitted individuals' job-specific unobservable characteristics and their tenure variables can result in an upwardly-biased estimate (Altonji and Shakotko, 1987 and Abraham and Farber, 1987) or in a downwardly-biased estimate (Topel, 1991). Unfortunately, in the context of banking relationships, this is a very difficult issue to resolve without a rich data set with information on a firm's full relationship with credit sources, loan application/approval and associated loan rates, and strong assumptions regarding the nature of the correlations.¹⁰

3. Model

In the introduction, we discussed the intuition that a borrower can be discouraged from applying for a loan if she believes that her relationships with the potential lender are not developed enough. We also illustrated how the applicant for a loan may be rejected if her relationships (from the lender's point of view) are not developed enough. Therefore, a single equation model with a non-randomly selected sample could easily lead to coefficient estimates that essentially confound the effects of various stages

¹⁰ In the labor literature, a discouraged worker defined as a person who wants a job and is available for work but who is not looking for work because she believes she could not find it. Specifically, the group of discouraged workers have received attention in the studies of labor supply in terms of (a) their similarities and dissimilarities to the unemployed and to those who are not in the labor force (see, for example, Kodrzycki, 2000 and Benati, 2001), and (b) on how they are affected from the fluctuations in the economic conditions (Finegan, 1981).

and thereby either enhance, or attenuate, the true effect of the independent variables on the particular dependent variable.

In this section, we present an empirical model of relationships as it pertains to the overall lending process. In so doing, we assume that the lending process is comprised of a three-stage decision. First, the borrower decides whether or not to apply for a loan. Second, the bank employs a screening process by which the loan applicant is either rejected or approved for the loan. Finally, conditional on approving the loan, the lender sets the loan interest rate. Since the credit approval decision is observable only if the borrower decides to apply for a loan, and the loan interest rate is observable only when the applicant decides to apply for a loan **and** the lender approves the application, we have a double selectivity model described by the following three equations:

Assume a borrower i is not discouraged from applying for a loan if

The Application Equation

$$y_{1i}^* = x_{1i}\beta_1 + \varepsilon_{1i} > 0, \tag{1}$$

and is not credit-constrained if

The Credit Approval Equation

$$y_{2i}^* = x_{2i}\beta_2 + \varepsilon_{2i} > 0, \tag{2}$$

where y_{1i}^* and y_{2i}^* are latent variables representing the borrower's decision to apply to the lender for a loan and the lender's decision to approve the loan, respectively; x_{1i} and x_{2i} are vectors of independent variables; β_1 and β_2 are vectors of parameters; ε_{1i} and ε_{2i} are normally distributed error terms with standard deviations σ_1 and σ_2 , respectively and, without loss of generality, $\sigma_1=\sigma_2=1$. The borrower applies for a loan ($y_{1i} = 1$) if $y_{1i}^* > 0$, and does not apply for a loan ($y_{1i} = 0$), otherwise. Also, the borrower is not credit-constrained ($y_{2i} = 1$) if $y_{2i}^* > 0$, and is refused a loan or credit-constrained ($y_{2i} = 0$), otherwise. Essentially, we observe y_{2i} only if $y_{1i} = 1$. That is, if the borrower decides not to apply for a loan ($y_{1i} = 0$), we do not, in fact, observe whether she is, or isn't, approved for a loan.

The loan rate for borrower i is represented by the following equation:

The Loan Rate Equation

$$y_{3i} = x_{3i}\beta_3 + \varepsilon_{3i}, \tag{3}$$

where y_{3i} is the observable loan rate; x_{3i} is a vector of independent variables; β_3 a vector of parameters; and ε_{3i} is an error term with the standard deviation σ_3 . Recall that the loan rate is

observed only when the borrower is not discouraged from applying for a loan and is approved for a loan conditional on applying: i.e., $y_{1i} = y_{2i} = 1$.

The error terms are assumed to be independently and identically distributed across the sample with a joint normal distribution:¹¹

$$\begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \varepsilon_3 \end{pmatrix} \sim N \left[\begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 & \rho & \sigma_{13} \\ & 1 & \sigma_{23} \\ & & \sigma_3^2 \end{pmatrix} \right]. \quad (4)$$

where ρ is the correlation between ε_1 and ε_2 .

We employ a two-stage selection estimator to obtain the consistent estimates of the Loan Rate Equation (Ham, 1982 and Tunalı, 1986). The crucial issue in correcting for bias with the double selection rule is the expectation of the loan rate conditional on $y_{1i}^* > 0$ and $y_{2i}^* > 0$. This conditional expectation can be expressed as

$$\begin{aligned} E(y_{3i} | y_{1i}^* > 0, y_{2i}^* > 0) &= x_{3i}\beta_3 + E(\varepsilon_{3i} | \varepsilon_{1i} > -x_{1i}\beta_1, \varepsilon_{2i} > -x_{2i}\beta_2) \\ &= x_{3i}\beta_3 + \sigma_{13}\lambda_{1i} + \sigma_{23}\lambda_{2i} \end{aligned} \quad (5)$$

where

$$\lambda_{1i} = \frac{\phi(x_{1i}\beta_1)\Phi\left(\frac{x_{2i}\beta_2 - \rho x_{1i}\beta_1}{(1-\rho^2)^{1/2}}\right)}{F(x_{1i}\beta_1, x_{2i}\beta_2, \rho)} \quad \text{and} \quad \lambda_{2i} = \frac{\phi(x_{2i}\beta_2)\Phi\left(\frac{x_{1i}\beta_1 - \rho x_{2i}\beta_2}{(1-\rho^2)^{1/2}}\right)}{F(x_{1i}\beta_1, x_{2i}\beta_2, \rho)} \quad (6)$$

and $\phi(\cdot)$ and $\Phi(\cdot)$ are the univariate standard normal density and the distribution functions, respectively, and $F(\cdot)$ is the bivariate standard normal distribution function. If σ_{13} and σ_{23} are not both equal to zero, the expectation in Equation (5) is not equal to $x_{3i}\beta_3$ and the resultant least squares estimation of Equation (5) on the censored sample will lead to the same sort of specification error bias that Heckman (1976) described in his single selection rule case.

We follow the same estimation procedure as Heckman (1976). That is, we first estimate the parameters of the selection Equations (1) and (2) by maximizing the following likelihood function:

$$L = \sum_{\substack{y_{1i}=1 \\ y_{2i}=1}} \ln\{F(x_{1i}\beta_1, x_{2i}\beta_2, \rho)\} + \sum_{\substack{y_{1i}=1 \\ y_{2i}=0}} \ln\{F(x_{1i}\beta_1, -x_{2i}\beta_2, -\rho)\} + \sum_{y_{1i}=0} \ln\{1 - \Phi(x_{1i}\beta_1)\}, \quad (7)$$

¹¹ Extant research has shown that the estimated parameters may be sensitive to the distributional assumptions made in the selection models. It has been suggested that approaches based on semiparametric and nonparametric estimators may be more appropriate. However, it is almost impossible to apply these methods to our specific question. See Greene (2003, p. 789) for a discussion of these methods and the inherent difficulties in estimating them.

where the first term on the right hand side of Equation (7) denotes the likelihood of a borrower applying and being approved for the loan, the second term denotes the likelihood of a borrower applying and being rejected for a loan, and the third term denotes a borrower not applying for a loan (i.e., self-rationing).¹²

We then use the parameter estimates of β_1 , β_2 and ρ to form consistent estimates $\hat{\lambda}_{1i}$ and $\hat{\lambda}_{2i}$ of λ_{1i} and λ_{2i} in Equation (6). A least squares estimation of Equation (5) provides consistent estimators of parameters β_3 , σ_{13} and σ_{23} .¹³ The least square estimation does not account for the fact that $\hat{\lambda}_{1i}$ and $\hat{\lambda}_{2i}$ are estimators of λ_{1i} and λ_{2i} and includes some of the same variables in x_{3i} . Therefore, the standard errors of the parameter estimates may be inconsistent. We therefore use a bootstrapping method to obtain consistent standard errors.¹⁴

4. Data

We use the 1998 version of the SSBF dataset, sponsored by the Federal Reserve Board. In particular, the SSBF survey includes a nationally representative sample of 3,561 small businesses operating in the U.S. The survey provides detailed information on each firm's credit history including the firm's most recent borrowing experience, income statement and balance sheet, firm characteristics including organizational form, and characteristics of the firm's primary owner.

While the 1998 SSBF is uniquely suited to the study of credit rationing because discouraged and credit-constrained borrowers are identified directly, it has its own limitations. For example, the 1998 survey only includes information on the most recent "new" loan application experience. Therefore, our

¹² Also, see Van de Ven and Van Praag (1981) and Meng and Schmidt (1985) for the likelihood function of a bivariate probit model when one of the dependent variables in the second stage is only partially observed.

¹³ Problems of double selectivity have been addressed in other areas of economics. For example, Cox and Jappelli (1993) estimate the demand for consumer liabilities conditional on being unconstrained in the credit markets and holding positive debt. Ham (1982) estimates labor supply in the presence of unemployed and underemployed workers. Tunali (1986) applies the double-selection framework to migration and earnings decisions. We follow the same estimation techniques utilized in these papers.

¹⁴ Specifically, we generate 250 random samples with replacement from the original sample. For each of these random samples, we estimate Equation (7) and use the estimates of β_1 , β_2 and ρ to calculate $\hat{\lambda}_{1i}$ and $\hat{\lambda}_{2i}$. We then use $\hat{\lambda}_{1i}$ and $\hat{\lambda}_{2i}$ as independent variables in Equation (5) to estimate the remaining unknown coefficient, β_3 , as well as the sample selection coefficients, σ_{13} and σ_{23} . We repeat this process 250 times, compute the standard deviations of these coefficients for each of those cases, and report them as the corresponding standard errors of the coefficients in Model 4 in Tables IV, V and VI.

model only focuses on new loans and does not investigate the role of relationships on the renewal of previous credit with the main lending institution, which could be driven by different relationship dynamics.

The following two questions were used to define a “discouraged borrower:” (1) During the last three years, were there times when the firm needed credit but did not apply because it thought the application would be turned down? and (2) How many times did the firm apply for new loan in the past three years? Based on these questions, we define a discouraged small business borrower as one who answered “yes” to (1) and “zero-times” to (2). We have 406 discouraged borrowers who were discouraged from applying for a loan. We have 808 small business borrowers who answered “no” to (1) and “once or more” to (2) and thus are defined as not discouraged from applying.^{15, 16} Next, a credit-constrained small business borrower is defined as one who applied for a new loan (i.e., answered “once or more” to (2)) and whose application was denied. Finally, a non-constrained small business borrower is defined as one who applied for a new loan and whose application was approved. Of the 808 borrowers who were not discouraged from applying, 139 were turned down and, therefore, were credit-constrained. The remaining 669 were approved for a loan. These were the non credit-constrained businesses.

4.1 Defining relationship factors

Our choice of relationship variables is guided by the extant literature related to small businesses (see, for example, Petersen and Rajan, 1994; Berger and Udell, 1995 and Cole, 1998). Specifically, the relationship variables included are as follows: LENGTH is defined as the duration (in years) that the firm has conducted business with the potential lender. ZERO_LENGTH is defined as a dummy variable capturing a zero length of relationship with the potential lender. CHECK and SAVE are defined as dummy variables capturing if the firm has a checking and savings account with the potential lender, respectively; and PRELOAN is defined as a dummy variable capturing whether there were pre-existing loans with the potential lender. Finally, NUMBER_SOURCE is defined as the number of credit sources that the small business has associations with.

Collectively, our relationship variables -- LENGTH, ZERO_LENGTH, CHECK, SAVE and PRELOAN-- measure the strength of relationship with the main credit source. A longer relationship

¹⁵ Small businesses that answered “no” to (1), but did not apply for a loan in the past three years, are excluded from the sample because they did not need credit.

¹⁶ There are 252 small businesses that answered “yes” to (1) and still reported that they applied for a loan in the past three years. Out of these 252 small businesses, 136 applied and approved for a loan and are included in the non-constrained group. The remaining 116 small businesses that applied, and were not extended a loan, are included in the credit-constrained group.

(LENGTH and ZERO_LENGTH) should provide the financial institution with more (and precise) private information about the borrower. Similarly, CHECK and SAVE should also provide more information about the borrower since the lending institution can monitor the cash flow of the small business through these accounts. While PRELOAN increases the leverage of the firm, it also provides valuable information (through the servicing of that loan) to the bank about the character of the corresponding business owner and his credit quality. We would expect that -- within our unified framework of examining loan application, loan approval and loan rate setting -- these relationship proxies are associated with higher probabilities of being approved for a loan and negatively associated with loan rates.¹⁷

The expected correlation between NUMBER_SOURCE and the probability to apply for a loan is positive, since the businesses that have associations with a larger number of lenders are likely to have applied for credit in the past and are more likely to apply in the future. In our unified framework, the expected correlation between NUMBER_SOURCE and loan approval is negative. Having multiple credit sources may proxy for a poor credit quality of the firm, and firms may not start multiple relationships as long as their loan needs are met by their primary lenders. We also include SOURCE_1 to the Loan Approval Equation defined as a dummy variable capturing a single banking relationship (versus multiple relationships) to measure how single versus multiple relationships are related to loan approval. The influence of NUMBER_SOURCE on the loan rate is ambiguous. While having multiple credit sources mitigates the lock-in problem, a firm associated with multiple credit sources could also signal financial stress.

4.2 Other factors affecting loan application, loan approval and loan rate

Berger and Udell (1995) and Cole (1998) have argued about the importance of accounting for the potentially confounding effect of firm age, which previous studies have shown to be highly correlated with the relationship-length variable discussed above. Additionally, Diamond (1991) argues that the age of a firm should influence whether it receives credit, simply because a firm that has been in business for a longer period of time has generated enough reputational capital through its ability to survive the critical start-up period. We, therefore, include AGE, defined as the number of years that the current owners have owned the business, as a public information proxy.

We control for borrower riskiness with the traditional borrower-specific measures of riskiness that include size, creditworthiness and leverage. We proxy for size and creditworthiness with total business assets (ASSETS), pretax profit margin (PROFMARG), accounts receivable turnover (ARTURN), and

¹⁷ The five relationship variables also capture the pre-existing relationships with the credit source (the institution the firm applied for a loan). By the same token, businesses do not report their pre-existing relationship with the financial institutions they did not apply to.

inventory turnover (INVTURN). We expect to find that as credit availability increases, the loan rate decreases with the size and creditworthiness of the firm. We proxy for leverage with business liability (DEBT) and accounts payable turnover (APTURN). We expect to find that leverage is negatively related to credit availability and positively related to the loan rate.

We also include control variables that measure the governance and industry characteristics of small businesses. The legal form of the business is reflected in the dummy variables for (non-Subchapter S) corporation (CORP), Subchapter S Corporation (SUBS), partnership (PART), and proprietorship (PROP). We include a dummy variable indicating whether or not 50% or more of the business is owned by a single family (CONC50). The industry characteristics are measured by dummy variables for construction (CONSTR), service (SERVICE), retail (RETAIL) and other industries (OTHERIND).¹⁸ The governance and industry characteristics are included as a proxy for credit risk to the lenders. We include a dummy variable to measure the education level of the current owner for those with college degrees (COLLEGE). Also, the characteristics of the potential lender are measured by dummy variables for commercial banks (BANK), other financial institutions (FINANCIAL), and non-financial institutions (NONFINANCIAL). The characteristics of the financial market are measured by Herfindahl index for financial institutions (HHINDEX) and a dummy that indicates whether the firm is located in a Metropolitan Statistical Area (MSA).¹⁹

We control for the market interest rate by PRIME RATE at the time the loan was approved, and also by TERM STRUCTURE SPREAD and DEFAULT SPREAD. TERM STRUCTURE SPREAD is based on the maturity of the loan, and is the difference between the yield on government bonds of the same maturity as the loan and the yield on treasury bills at the time the loan was approved. DEFAULT SPREAD is defined as the difference between the yield on corporate bonds rated BAA and the yield on the ten-year government bonds at the time loan was approved.²⁰

Finally, we control for loan contract characteristics by dummy variables as to whether the loan is secured by accounts receivable or inventory (ARINV), by a security other than accounts receivable and inventory (OTHERSEC), whether the loan is guaranteed (GUAR) and whether the loan has a floating

¹⁸ Note that the governance proxies (CORP, SUBS, PART, PROP and CONC50), and the industry characteristics (CONSTR, SERVICE, RETAIL and OTHERIND) are defined as in Burger and Udell (1995).

¹⁹ Note that the characteristics of the potential lender (BANK, FINANCIAL, and NONFINANCIAL) and financial market concentration (HHINDEX) are defined as in Petersen and Rajan (1994).

²⁰ The cost of capital proxies, PRIME RATE, TERM STRUCTURE and DEFAULT SPREAD, are defined as in Petersen and Rajan (1994).

rate (FLOAT).²¹ Table I presents a formal description of the variables used in the empirical estimation.

4.3 Comparing across discouraged, credit-constrained and non-constrained small businesses

Table II presents summary statistics for the variables introduced above for discouraged, credit-constrained, and non-constrained small businesses in the 1998 SSBF data.^{22, 23}

First, we compare the discouraged small businesses to those that were not discouraged from applying for a loan. The number of financial institutions that a discouraged borrower has association with (NUMBER_SOURCE) is lower (1.9 versus 3.1). Also, while 42.0% of the discouraged firms have a single relationship (SOURCE_1), only 15.4% of those that applied for a loan have a single banking relationship. Total assets (ASSET), liabilities (DEBT) and accounts receivable turnover (ARTURN) are lower for the discouraged borrowers relative to those that applied for a loan. Discouraged businesses are less likely to be Subchapter corporations (SUBS) and owned by college graduates (COLLEGE); they are more likely to be sole proprietorships (PROP) and to be majority owned by a single person or family (CONC50), compared to those businesses that applied for a loan. Finally, discouraged borrowers are located in areas of lower concentrations of banks (i.e., lower HHINDEX) and are more likely to be located in a MSA (MSA).

Next, we compare the credit-constrained with the non-constrained small business borrowers. Compared to non-constrained borrowers, credit-constrained borrowers are more likely to have no banking relationships (ZERO_LENGTH) (24.4% versus 33.4%) and are less likely to have pre-existing loans (PRELOAN) (11.4% versus 27.5%) with their potential lender at the time they applied for a loan. However, there appears to be no significant difference in the number of credit sources (NUMBER_SOURCE) between constrained and non-constrained small businesses. Among the financial variables measuring borrower characteristics, there are significant differences between the credit-constrained and non-constrained businesses. For instance, the number of years under the current management (AGE) is lower for credit-constrained businesses. Also, the inventory turnover (INVTURN) and accounts payable turnover (APTURN) of credit-constrained businesses are higher than those of the non-constrained businesses. Finally, credit-constrained businesses are less likely to be

²¹ Note that ARINV, OTHERSEC and GUAR are defined as in Burger and Udell (1995), while FLOAT is defined as in Petersen and Rajan (1994).

²² Businesses that have relationships lasting longer than 30 years with the current lender and those that were owned by the current owners longer than 30 years are excluded from the sample. Those that were extended loans from “Family or Other Individuals” and “Owner” are also excluded.

²³ To minimize the effect of outliers, those businesses whose interest rate on the latest approved loan was in the upper 1% of the loan rate distribution (higher than 20 percentage points) and those that have associations with more than 10 financial institutions, were excluded from the sample.

corporations (CORP) and are more likely to be sole proprietorships (PROP); they are more likely to be majority-owned by a single person or family (CON50), compared to their non-constrained counterparts.²⁴

Overall, there are significant differences in characteristics between small business borrowers that were discouraged from applying for a loan and those that were not. Furthermore, among those businesses that applied for a loan, there are significant differences in characteristics between those that applied for credit but were constrained (i.e., turned down for the loan), and those that applied and received the loan.

5. Multivariate Analysis

5.1 *Estimating the two-stage selection: applying and being approved for a loan*

Whether or not a given small business borrower is credit-constrained is not observable if the borrower is discouraged from applying for a loan. We estimate the likelihood of being constrained, given by Equation (7), by appropriately correcting for this sample selection bias. We also note that in this section we are testing for an overall validation of our hypothesis in the realm of small business loans. Therefore, we do not partition the loans on any dimensions (such as whether they were transaction-driven), instead focusing on all valid small business loans in the data. We, however, do separately examine small business lines of credit in our robustness section later in the paper.

The results of our estimation are presented in Table III. The independent variables, capturing borrower-lender relationships and borrower characteristics, including governance and industry characteristics, have been discussed in Section 4. The marginal effects of the independent variables included in Equation (7) are also provided in Table III. The marginal effects of each independent variable are calculated while holding all other explanatory variables at their respective sample means.²⁵

The role of relationships in applying for a loan. The relationship with the potential lender (LENGTH, ZERO_LENGTH, CHECK, SAVE and PRELOAN) and the characteristics of the potential lender (BANK, FINANCIAL and NONFINANCIAL) are not observed if the small business did not formally apply for a loan, and therefore these variables are not included in from the Application equation. Those that have relationships with more credit sources (NUMBER_SOURCE) are more likely to apply for a loan. An increase by one unit in the number of credit sources (NUMBER_SOURCE) increases the probability of applying for a loan by 7.9 percentage points. Younger businesses (lower

²⁴ For those small businesses holding a loan, the average interest rate on their most recent loan equals 9.34 percent.

²⁵ We add one and take the natural logarithm of LENGTH and DEBT. For instance, LENGTH is operationalized as $\ln(1+LENGTH)$ to ensure we do not lose observations with zero length. At the same time, we include ZERO_LENGTH in our estimation.

AGE) and those with larger assets (ASSETS), and those with lower accounts receivable turnover (ARTURN) and inventory turnover (INVTURN), are more likely to apply for a loan. In addition, those in construction (CONSTR) are more likely to apply for a loan. The financial market characteristics (HHINDEX and MSA) significantly affect the probability of applying for a loan. Businesses located in more competitive financial markets (higher HHINDEX) are more likely, and those that are located in MSAs are less likely to apply for a loan. Finally, the probability of applying for a loan increases with the education of the business owner (COLLEGE). The remaining governance characteristics (CORP, SUBS, PART and CONC50) do not appear to affect the probability of applying for a loan.

The role of relationships in being approved for a loan. Among relationship variables, the coefficients for LENGTH, ZERO_LENGTH, PRELOAN and SOURCE_1 are significant. Businesses that do not have a relationship with the potential lender (ZERO_LENGTH) are 7.4 percentage points less likely to be approved for a loan. Controlling for a zero length of relationship, businesses that have longer relationships (LENGTH) with the potential lender are less likely to be approved for a loan. At the same time, those that have a pre-existing loan (PRELOAN) with the financial institution are 6.7 percentage points more likely to be approved for a loan. The coefficient of a single credit source (SOURCE_1) is significant and positive, showing that those that have a single banking relationship are more likely to be approved for a loan. However, among those that have multiple banking relationships, the number of credit sources (NUMBER_SOURCE) does not significantly affect loan approval.

The probability of being approved for a loan increases with the number of years under the current management (AGE) and total liability (DEBT). The probability of being approved for a loan decreases with account payable turnover (APTURN) and increases with the education of the business owner (COLLEGE). Small businesses that applied to banks (BANK) (relative to other types of financial institutions) were less likely to be approved for a loan.

Our finding of a negative correlation between the length of relationship and loan approval is different from the previous literature. Cole (1998), for example, finds that the length of relationship is positively correlated with the likelihood of being approved for a loan. However, when zero length of relationship is included in the estimation, the coefficient of the length of relationship in Cole's estimation is insignificant. We also interact the length of relationship (LENGTH) with the variable measuring whether there was a pre-existing loan with the lender (PRELOAN) in order to investigate whether the length of relationship has a varying effect for those businesses that have a pre-existing loan. These estimation results are reported in Table III (Model 2). Our results show that for those that do not have a pre-existing loan (PRELOAN) with the lending institution, the length of relationship (LENGTH) does not have a significant effect on loan approval. However, for those businesses that have a pre-existing loan (PRELOAN) with the lending institution, the impact of pre-existing loans (PRELOAN) on

the likelihood of being approved for a new loan decreases as the length of relationship (LENGTH) increases. In other words, at the initial stages of the relationship, being approved for a new loan is positively and significantly correlated with a pre-existing loan (PRELOAN).

In sum, the results of a two-stage selection model show that relationship variables are significant predictors of being discouraged from applying for a loan and of being approved for a loan. We now turn to the role of relationships in determining loan rates.

5.2 *Estimating the loan rate*

We first calculate $\hat{\lambda}_{1i}$ and $\hat{\lambda}_{2i}$ in Equation (6) using the estimates of β_1 , β_2 , and ρ . Then we estimate Equation (5) using the sample of those businesses that obtained a loan in the past three years. The estimation results are given in Table IV, which also provides estimation results without correcting for selection bias. Note that the loan rate is defined as the interest rate on the latest loan.

In Model 1, we include the financial variables, governance and industry characteristics, and the length of relationships and the number of credit sources. The coefficient of the length of relationship (LENGTH) at -0.241 suggests that a small business with an additional 5 years of relationship -- 6 years versus 1 year -- pays 30.3 basis points less on its most recent loan.²⁶ The coefficient for the number of credit sources (NUMBER_SOURCE) is significant, suggesting that businesses that maintain multiple banking relationships face higher loan rates. When pre-existing accounts (CHECK, SAVE and PRELOAN) are added in the estimation (Model 2) to measure the effect of the nature of the relationship with the lender, the length of relationship (LENGTH) and the number of credit sources (NUMBER_SOURCE) are still significant while the corresponding coefficients for the nature of the relationship (CHECK, SAVE and PRELOAN) are not significant. Finally, we include the zero length of relationship (ZERO_LENGTH) variable in our estimation (Model 3). In this estimation, the length of relationship (LENGTH) becomes insignificant and decreases from -0.266 to -0.137, suggesting that, among businesses that have a relationship with the potential lender, the rate does not decrease with the length of relationship. The coefficient for the zero length of relationship (ZERO_LENGTH) variable is significant and negative, suggesting that businesses that have no relationship with the lender, at the time they apply for a loan, receive loans at rates that are about 51 basis points higher.

Model 4 corrects for the sample selection bias discussed previously. Zero length of relationship (ZERO_LENGTH) becomes insignificant as well as the number of credit sources (NUMBER_SOURCE). Among financial characteristics, small businesses with higher levels of years under the current management (AGE), total assets (ASSET) and liabilities (DEBT) have lower rates. The coefficient of the number of years under current management (AGE), -0.281, suggests that a small

²⁶ Since LENGTH is operationalized as $\ln(1+\text{LENGTH})$ and the estimated coefficient of $\ln(1+\text{LENGTH})$ is -0.241, the effect of 5-years of relationship -- 6 years versus 1 year -- equals $-0.241 * (\ln(1+6) - \ln(1+1))$.

business with an additional 5 years of AGE (6 years versus 1 year) receives its most recent loan at about 40 basis points lower.

6. Robustness

In this section, we explore the robustness of our findings reported above through selective partitioning of the data. Thus, for example, we examine whether relationships play a more important role for the loan processes of the smallest businesses in our data. Specifically, 831 small businesses, defined using a similar asset cut-off level as in Berger and Udell (1995), comprise the smallest businesses in our data set. About half of those businesses (359) were discouraged from applying for a loan. Of those businesses applying for a loan, 357 of them were extended a loan and 115 were rejected. This indicates that most of the firms in our original sample that were discouraged from applying for a loan, or those that were credit-constrained, were actually the very smallest firms. This is an important finding in light of policymakers' (and some academics') concerns about small businesses overall being squeezed out of the credit markets (Hancock and Wilcox, 1998; Berger and Udell, 1998, and Berger and Udell, 2002).

Our research is able to precisely identify the size of such small businesses, and our estimation results, in fact, show that relationships play an even greater role in the loan granting processes of these firms relative to our overall sample. For example, the probability of applying for a loan increases by 13.6 percentage points with a unit increase in the number of credit sources (NUMBER_SOURCE). In addition, a firm that has a pre-existing loan (PRELOAN) is about 10 percentage points more likely to be approved for a loan. For the smallest firms, the effect of the number of credit sources on loan approval is different than our findings in Table III. While a single banking relationship (SOURCE_1) does not significantly affect loan approval, the probability of being approved for a loan significantly increases with the number of credit sources (NUMBER_SOURCE). We conclude that the smallest firms do not benefit from single banking relationships and that their chances of being approved for a loan increase as the number of sources they are in association with increases. Finally, the correlation coefficient is significant, suggesting that applying for a loan, and being approved for a loan, are correlated decisions for the smallest firms.²⁷

The loan rate estimation results for the loans of the smallest businesses are given in Table V, which also provides the estimation results without correcting for sample selection bias. As before, when only the length of relationship (LENGTH) among the relationship variables is included in the estimation

²⁷ For brevity, we do not formally present the loan application and approval stage results of our analysis for the smallest businesses. These estimation results are available on request.

(Model 1), it has a negative and significant effect on the loan rate. When relationship variables measuring the nature of the relationship (CHECK, SAVE and PRELOAN) are added to the estimation (Model 2), the length of relationship (LENGTH) loses its power to be a significant negative determinant of the loan rate. When zero length of relationship (ZERO_LENGTH) is included in the estimation (Model 3), both zero length of relationship (ZERO_LENGTH) and length of relationship (LENGTH) do not significantly explain the loan rate. Finally, Model 4 corrects for the sample selection bias. Note that the selection term, λ_Apply , is significant, implying that there is a significant problem with sample selection bias in estimating the Loan Rate Equation using only the smallest businesses that hold loans in our data. That is, conditional on the observable characteristics of the businesses, it appears that there is negative selectivity: those businesses that are more likely to apply for loans have lower loan rates than their otherwise identical counterparts, which is what we would expect. Therefore, we conclude that our estimation approach is the appropriate way to analyze such businesses.

Financial (INVTURN and APTURN) and governance (CON50) characteristics and the characteristic of the loan contact (GUAR), play a more significant role on the determination of the loan rates of the smallest businesses. Our finding in Table IV was that only the number of years under the current management (AGE), total assets (ASSET) and liabilities (DEBT) have significant effects on the determination of the loan rate. For the smallest firms, however, our results show that governance and loan contract characteristics are also important determinants of the loan rates.

The second partitioning of the data is inspired by Berger and Udell (1995), who contend that relationships should play a differential role depending on the nature of the loan. In particular, they focus exclusively on the lines of credit (L/C). In defense of their sample selection, they argue (p. 353): “*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 that are “transaction-driven” rather than “relationship-driven” and may thus avoid diluting our relationship lending results.*” The implication is that L/Cs are most likely to reveal relationship effects than other types of loans.

Consistent with the above argument, and to ensure that our findings are robust to L/Cs, we too use our empirical model to separately investigate the role of relationships on L/Cs that businesses were approved for within our data. Accordingly, we re-estimate the first and second stages in order to calculate variables λ_Apply and $\lambda_Approve$ and correct for the sample selection problem.²⁸

²⁸ It should be underscored that, within the SSBF data, the nature of the loans that discouraged borrowers decided to not apply for are not reported. That is, the type of the loan (such as L/Cs, mortgage loans or equipment loans, etc.) is known only if the loan application was approved or rejected. To circumvent this issue, we assume that the decision made by the small business to apply (or not) for a loan, and the decision made by the financial institution to approve the loan (or not), made at the Application and Credit Approval stages, respectively, should not depend

The loan rate estimation results for the latest L/Cs of small businesses are given in Table VI. Out of 669 small businesses that were approved for a loan, 218 of them were approved for a L/C. From Table VI, we see that when the variables in Berger and Udell (1995, p. 364, Table 3) are included in the estimation (Model 1), length of relationship (LENGTH) has a negative and significant effect on the loan rate for the L/C. This finding is very similar to the results reported by Berger and Udell (1995). We add the nature of the relationship (CHECK, SAVE and PRELOAN) and the number of credit sources (NUMBER_SOURCE) and other loan contract and financial market characteristics, and re-estimate the model (Model 2). We see that the length of relationship (LENGTH) now loses its power to explain the rates for the L/C. In Model 3, zero length of relationship (ZERO_LENGTH) is significant, suggesting that businesses that have had no relationships at the time of application have loan rates that are about 96.0 basis points higher. Finally, Model 4 corrects for the sample selection bias. Consequently, the length of relationship (LENGTH) and zero length of relationship (ZERO_LENGTH) lose their power to explain the loan rates. The loan contract characteristics (OTHERSEC and GUAR) significantly affect the loan rate for L/C.

In sum, estimations including only the smallest firms in our data set, and estimations involving the latest L/C of small businesses, demonstrate convincingly that relationships are important in the selection stage of a loan process and that they do not play a significant role in the loan rate setting decision of the loan granting process.

7. Discussion and Conclusion

While an impressive body of empirical research exists investigating the role of relationships in lowering the probability of being credit-constrained or lowering the interest rate on the borrower's most recent loan, the overall evidence regarding the role of relationships on credit availability, or loan rate, is mixed. In addition, according to a report prepared by Consumer Bankers Association (CBA), small business owners feel that they do not receive adequate sales attention from financial institutions, which should send a wake-up call to financial institutions working to increase loans to small businesses. The report also notes that *"if banks are going to enhance their profitability in this area, employing solid sales strategies and individualized customer attention is the first order of business, and is what the customer wants."*²⁹ In light of such concerns, we re-examine the role of relationships in credit rationing through a close-up lens relative to what has been accomplished in the literature.

on the nature of the loan. This issue is not a factor in Section 5 where we consider all loans in our analysis without specifically focusing on a single loan-type.

²⁹ See <http://www.cbanet.org/news/Press%20Releases/sbmq092401.htm> for the details of this report.

We use a generalized estimation technique that accounts for the fact that the overall loan granting process is a multistage process involving a borrower's decision to apply to a financial institution for a loan, whether the financial institution approves the application for a loan and, conditional on approval, the loan rate it chooses for the borrower. More importantly, we argue that all three stages of the process are endogenously determined, so that any model estimating a particular stage, such as the loan rate setting stage, in isolation may be estimating a mis-specified model. Also, the multistage nature of the loan granting process raises the intriguing question of whether relationships are equally important in all stages of the loan granting process. Do relationships, in fact, have a distinct role in different stages of the loan process? Our empirical model is also able to explicitly account for discouraged borrowers.

Using the SSBF data, which allows us to directly observe credit-constrained and discouraged small businesses, we examine the role of relationship measures on the probability of applying for a small business loan, the probability of approving/rejecting a loan applicant for a loan, and determining the loan rate, within a unified framework. We find that relationships matter only in the first and second stages of the loan process, i.e., a borrower's decision whether to apply for a loan and the loan approval/rejection decision by the financial institution. Once the sample selection bias is appropriately controlled for, relationships appear to not be important in determining the loan rate associated with the approved loan. Our conclusions appear to be robust to loans that are relationship-driven as well as to loans associated with the smallest firms in our data.

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Table I. Variable Description. Data are from the 1998 Survey of Small Business Finances.

Variable Name	Description
Relationships	
LENGTH	Length of relationship with credit source (in years)
ZERO_LENGTH	=1 if the length of relationship with credit source is zero; =0, otherwise
CHECK	=1 if firm has checking accounts with credit source; =0 otherwise
SAVE	=1 if firm has savings accounts with credit source; =0 otherwise
PRELOAN	=1 if a pre-existing loan obtained from credit source; =0 otherwise
SOURCE_1	=1 if firm has association with only one credit source; =0 otherwise
NUMBER_SOURCE	Number of credit sources that a borrower has association with – either through asset accounts, loans or financial services
Interest rate variables	
RATE	The interest rate on the latest loan
PRIME RATE	The interest rate charged by banks to their most creditworthy customers
TERM STRUCTURE SPREAD	Difference between the yield on government bonds of the same maturity as the loan and the yield on treasury bills, computed for the month when the loan was approved
DEFAULT SPREAD	Difference between the yield on corporate bonds rated BAA and the yield on the ten-year government bonds. The values are from Federal Reserve System, computed for the month when the loan was approved
Loan characteristics	
FLOAT	=1 if loan has floating rate; =0, otherwise
ARINV	=1 if loan is secured by account receivable and/or inventory; =0, otherwise
OTHERSEC	=1 if loan is secured by other than accounts receivable and/or inventory; =0, otherwise
GUAR	=1 loan is guaranteed; =0, otherwise
Financial characteristics	
AGE	The number of years current owners owned the business
ASSET	Total assets
DEBT	Total debt
PROFMARG	Profit/Sales
ARTURN	Accounts receivable turnover in days [(accounts receivable)/(sales/day)]
INVTURN	Inventory turnover in days [inventory/((cost of goods sold)/day)]
APTURN	Accounts payable turnover in days [accounts payable/((cost of goods sold)/day)]
Governance Characteristics	
CORP	=1 if firm is a non-Subchapter S corporation; =0, otherwise
SUBS	=1 if firm is a Subchapter S corporation; =0, otherwise
PART	=1 if firm is a partnership; =0, otherwise
PROP	=1 if firm is a proprietorship; =0, otherwise (excluded from the regressions as the reference group)
CONC50	=1 if at least 50% ownership is in one family; =0, otherwise
COLLEGE	=1 if the current owner has a college degree; =0, otherwise
Industry Characteristics	
CONSTR	=1 if firm is in construction industry; =0, otherwise
SERVICES	=1 if firm is in services industry; =0, otherwise
RETAIL	=1 if the firm is in retail industry; =0, otherwise
OTHERIND	=1 if the firm is in other industries; =0, otherwise (excluded from the regressions as reference group)
Credit source and credit market characteristics	
BANK	=1 if credit source is a bank; =0, otherwise
FINANCIAL	=1 if credit source is a financial institution; =0, otherwise (excluded from the regressions as the reference group)
NONFINANCIAL	=1 if credit source is a non-financial institution =0, otherwise
HHINDEX	Herfindahl index for financial intuitions (1, 2, 3)
MSA	=1 if the firm is located in a MSA; =0 otherwise

Table II. Univariate Statistics for Discouraged, Credit-constrained and Non-constrained borrowers.

Data are from the 1998 Survey of Small Business Finances. The results are for 1,214 small businesses.

	Discouraged Borrowers		Applied for a Loan		Applied for a loan			
	N=406		N=808		Credit-constrained N=139		Non-constrained N=669	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Relationships								
LENGTH ^d			6.6	6.3	6.3	5.4	6.5	6.5
ZERO_LENGTH			0.262	0.440	0.334	0.472	0.244	0.430 ^b
CHECK			0.496	0.500	0.492	0.500	0.497	0.500
SAVE			0.124	0.330	0.112	0.315	0.127	0.334
PRELOAN			0.243	0.429	0.114	0.318	0.275	0.446 ^a
SOURCE_1	0.420	0.494	0.154	0.361 ***	0.145	0.352	0.156	0.363
NUMBER_SOURCE	1.9	1.1	3.1	1.7 ***	2.9	1.4	3.1	1.7
Interest rate variables								
RATE							9.34	2.24
PRIME RATE							8.24	0.31
TERM								
STRUCTURE								
SPREAD							0.74	0.48
DEFAULT								
SPREAD							1.92	0.41
Loan characteristics								
FLOAT							0.292	0.455
ARINV							0.105	0.307
OTHERSEC							0.520	0.500
GUAR							0.558	0.497
Financial characteristics								
AGE	10.9	7.4	11.2	7.1	9.3	6.2	11.6	7.2 ^a
ASSET	146 252	524 112	585 401	2 382 006 ***	315 955	1 516 115	653 045	2 549 220
DEBT	118 229	376 600	448 047	1 994 293 ***	242 326	796 001	499 692	2 191 646
PROFMARG	0.3	0.4	0.3	0.4	0.3	0.4	0.2	0.3
ARTURN	25.4	44.7	29.7	43.1 *	26.5	41.9	30.5	43.4
INVTURN	40.4	68.7	35.7	66.1	43.7	73.4	33.7	64.0 ^c
APTURN	42.7	86.9	37.8	75.9	54.0	90.8	33.7	71.1 ^a
Governance Characteristics								
CORP	0.206	0.404	0.216	0.411	0.128	0.334	0.238	0.426 ^a
SUBS	0.219	0.413	0.299	0.458 ***	0.279	0.449	0.303	0.460
PART	0.072	0.259	0.086	0.281	0.065	0.246	0.092	0.289
PROP	0.503	0.500	0.399	0.490 ***	0.528	0.499	0.367	0.482 ^a
CONC50	0.904	0.294	0.854	0.353 **	0.927	0.261	0.835	0.371 ^a
COLLEGE	0.438	0.496	0.495	0.500 *	0.407	0.491	0.517	0.500 ^b
Industry Characteristics								
CONSTR	0.114	0.318	0.126	0.332	0.149	0.356	0.120	0.325
SERVICES	0.423	0.494	0.391	0.488	0.445	0.497	0.378	0.485
RETAIL	0.200	0.400	0.176	0.381	0.188	0.391	0.173	0.378
OTHERIND	0.263	0.440	0.307	0.461	0.218	0.413	0.329	0.470 ^a
Credit source and credit market characteristics								
BANK			0.700	0.458	0.718	0.450	0.695	0.460
FINANCIAL			0.268	0.443	0.245	0.430	0.273	0.446
NONFINANCIAL			0.032	0.177	0.038	0.190	0.031	0.174
HHINDEX	2.1	0.7	2.2	0.7 ***	2.2	0.7	2.2	0.7
MSA	0.841	0.365	0.755	0.430 ***	0.804	0.397	0.742	0.437

*** indicates that the difference in the means of discouraged and non-discouraged group is significant at the .01 level; ** indicates that the difference in the means of discouraged and non-discouraged group is significant at the .05 level; * indicates that the difference in the means of discouraged and non-discouraged group is significant at the .1 level. ^a indicates that the difference in the means of credit-constrained and non-constrained group is significant at the .01 level; ^b indicates that the difference in the means of credit-constrained and non-constrained group is significant at the .05 level; ^c indicates that the difference in the means of credit-constrained and non-constrained group is significant at the .1 level. ^d excludes those that have zero length of relationships.

Table III. Regression Results for Applying and Being Approved for a Small Business Loan.

The dependent variables in the regressions are the probability of applying for a loan and being approved for a loan. The independent variables are defined in Table I. Data are from the 1998 Survey of Small Business Finances. The results are for 1,214 small businesses, 808 applied and 406 were approved for a loan. "Coeff" represents the coefficient estimates and "SE" represents the standard errors. "Marginal" represents marginal effects of the variables computed holding all other variables at their sample averages. The marginal effects for LENGTH, AGE, ASSET and DEBT show the effect of a 100 percent increase in these variables.

Variable Name	Model 1						Model 2							
	Applied for a loan			Approved for a loan			Applied for a loan		Approved for a loan					
	Coeff	SE	Marginal	Coeff	SE	Marginal	Coeff	SE	Coeff	SE				
Relationships														
ln (LENGTH)				-0.199	0.087	**	-0.036		-0.117	0.097				
ZERO_LENGTH				-0.407	0.198	**	-0.074		-0.285	0.207				
CHECK				-0.110	0.174		-0.020		-0.133	0.177				
SAVE				0.229	0.182		0.042		0.232	0.184				
PRELOAN				0.433	0.161	***	0.067		1.185	0.416	***			
ln (LENGTH)*PRELOAN									-0.373	0.188	**			
SOURCE_1				0.534	0.231	**	0.080		0.521	0.232	**			
NUMBER_SOURCE	0.257	0.018	***	0.079	0.017	0.119	0.003	0.257	0.018	***	0.014	0.118		
Financial characteristics														
ln (AGE)	-0.089	0.035	**	-0.027	0.190	0.100	*	0.035	-0.089	0.035	**	0.188	0.102	*
ln (ASSET)	0.172	0.020	***	0.053	0.117	0.114		0.021	0.172	0.020	***	0.120	0.113	
ln (DEBT)	-0.001	0.010		0.000	0.066	0.023	***	0.012	-0.001	0.010		0.068	0.023	***
PROFMARG	0.076	0.076		0.023	0.165	0.186		0.030	0.076	0.076		0.178	0.186	
ARTURN	-0.168	0.061	***	-0.051	-0.080	0.170	-0.015	-0.168	0.060	***	-0.091	0.171		
INVTURN	-0.087	0.048	*	-0.026	-0.135	0.113	-0.025	-0.086	0.048	*	-0.132	0.113		
APTURN	-0.044	0.037		-0.013	-0.210	0.082	**	-0.038	-0.044	0.037		-0.218	0.082	***
Governance Characteristics														
CORP	-0.067	0.076		-0.021	0.136	0.188	0.024	-0.067	0.076		0.133	0.189		
SUBS	0.068	0.068		0.021	-0.081	0.166	-0.015	0.068	0.068		-0.090	0.166		
PART	0.071	0.104		0.021	-0.126	0.260	-0.025	0.071	0.104		-0.140	0.262		
CONC50	-0.069	0.073		-0.021	-0.105	0.178	-0.018	-0.069	0.073		-0.089	0.179		
COLLEGE	0.117	0.052	**	0.036	0.273	0.137	**	0.050	0.116	0.052	**	0.265	0.136	*
Industry Characteristics														
CONSTR	0.173	0.088	**	0.050	-0.164	0.219	-0.032	0.173	0.088	**	-0.148	0.220		
SERVICES	-0.009	0.064		-0.003	-0.273	0.150	*	-0.051	-0.009	0.064		-0.269	0.151	*
RETAIL	-0.115	0.085		-0.036	-0.193	0.181	-0.038	-0.115	0.086		-0.190	0.182		
Credit source and credit market characteristics														
BANK				-0.339	0.156	**	-0.062					-0.329	0.157	**
NONFINANCIAL				-0.097	0.390		-0.018					-0.079	0.395	
HHINDEX	0.074	0.041	*	0.023	-0.054	0.090	-0.010	0.074	0.041	*	-0.051	0.090		
MSA	-0.231	0.074	***	-0.067	-0.299	0.214	-0.049	-0.231	0.074	***	-0.303	0.212		
CONSTANT	-1.935	0.249	***		-0.545	2.070		-1.935	0.249	***	-0.726	2.060		
rho	-0.009	1.200						0.001	1.188					

*** indicates that the coefficient is significant at the .01 level, ** indicates that the coefficient is significant at the .05 level, * indicates that the coefficient is significant at the .1 level.

Table IV. Regression Results the Interest rate on the Latest Loan.

The dependent variable the interest rate on the latest loan. The independent variables are defined in Table I. Data are from the 1998 Survey of Small Business Finances. "Coeff" represents the coefficient estimates and "SE" represents the consistent standard errors. The results are for 669 small businesses in our data that have indicated having been approved for a loan in the last three years.

Variable Name	Model 1		Model 2		Model 3		Model 4	
	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE
Relationships								
ln (LENGTH)	-0.241	0.079 ***	-0.266	0.093 ***	-0.137	0.109	-0.147	0.127
ZERO_LENGTH					0.507	0.297 *	0.468	0.328
CHECK			0.122	0.222	0.183	0.227	0.224	0.228
SAVE			0.094	0.213	0.086	0.214	0.078	0.218
PRELOAN			-0.043	0.185	0.007	0.188	0.016	0.227
NUMBER_SOURCE	0.075	0.044 *	0.079	0.044 *	0.081	0.043 *	-0.055	0.097
Interest rate variables								
PRIME RATE	-0.089	0.264	-0.088	0.264	-0.099	0.264	-0.073	0.262
TERM STRUCTURE SPREAD	0.056	0.199	0.059	0.199	0.075	0.200	0.074	0.200
DEFAULT SPREAD	0.257	0.218	0.252	0.218	0.242	0.219	0.231	0.221
Loan characteristics								
FLOAT	0.163	0.167	0.155	0.171	0.157	0.170	0.127	0.170
ARINV	-0.189	0.205	-0.191	0.205	-0.202	0.205	-0.197	0.204
OTHERSEC	-0.145	0.184	-0.140	0.184	-0.163	0.187	-0.157	0.186
GUAR	0.254	0.177	0.260	0.177	0.266	0.176	0.241	0.176
Financial characteristics								
ln (AGE)	-0.337	0.135 **	-0.327	0.136 **	-0.355	0.135 ***	-0.281	0.153 *
ln (ASSET)	-0.122	0.063 *	-0.125	0.064 *	-0.130	0.063 **	-0.245	0.101 **
ln (DEBT)	-0.111	0.049 **	-0.109	0.049 **	-0.110	0.050 **	-0.101	0.054 *
PROFMARG	-0.251	0.292	-0.236	0.295	-0.233	0.294	-0.246	0.297
ARTURN	-0.175	0.190	-0.178	0.190	-0.174	0.191	-0.088	0.200
INVTURN	0.130	0.136	0.137	0.136	0.152	0.137	0.190	0.157
APTURN	0.128	0.136	0.132	0.136	0.134	0.137	0.148	0.151
Governance Characteristics								
CORP	-0.134	0.277	-0.138	0.278	-0.149	0.277	-0.123	0.279
SUBS	-0.356	0.264	-0.363	0.265	-0.370	0.264	-0.437	0.271
PART	-0.384	0.415	-0.394	0.416	-0.439	0.419	-0.518	0.412
CONC50	0.143	0.197	0.142	0.198	0.144	0.198	0.182	0.202
Industry Characteristics								
CONSTR	0.083	0.249	0.076	0.250	0.073	0.250	-0.057	0.267
SERVICES	0.040	0.200	0.028	0.202	0.028	0.201	-0.026	0.217
RETAIL	-0.116	0.243	-0.124	0.243	-0.146	0.244	-0.108	0.252
Credit source and credit market characteristics								
BANK	0.248	0.221	0.196	0.241	0.195	0.241	0.144	0.251
NONFINANCIAL	0.195	0.670	0.215	0.674	0.236	0.662	0.250	0.666
HHINDEX	-0.149	0.116	-0.151	0.116	-0.142	0.116	-0.196	0.122
MSA	-0.164	0.199	-0.163	0.200	-0.154	0.198	-0.030	0.234
λ _Apply							-1.671	1.090
λ _Approved							0.357	1.067
Constant	13.232	2.349 ***	13.231	2.376 ***	13.103	2.374 ***	15.233	3.050 ***
R2	0.136		0.137		0.141		0.145	

*** indicates that the coefficient is significant at the .01 level, ** indicates that the coefficient is significant at the .05 level, * indicates that the coefficient is significant at the .1 level.

Table V. Regression Results for the Interest rate on the Latest Loan Extended to Smallest Businesses.

The dependent variable is the interest rate on the latest loan. The independent variables are defined in Table I. Data are from the 1998 Survey of Small Business Finances. "Coeff" represents the coefficient estimates and "SE" represents the consistent standard errors. The results are for 357 smallest businesses in our data and have indicated having been approved for a loan in the last three years.

Variable Name	Model 1		Model 2		Model 3		Model 4	
	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE
Relationships								
ln (LENGTH)	-0.205	0.119 *	-0.176	0.136	-0.075	0.160	-0.009	0.181
ZERO_LENGTH					0.413	0.423	0.574	0.468
CHECK			-0.312	0.321	-0.259	0.328	-0.043	0.353
SAVE			0.473	0.442	0.439	0.448	0.379	0.444
PRELOAN			0.028	0.287	0.069	0.294	-0.093	0.365
NUMBER_SOURCE	0.098	0.067	0.072	0.070	0.072	0.069	-0.200	0.173
Interest rate variables								
PRIME RATE	-0.632	0.395	-0.647	0.402	-0.640	0.403	-0.646	0.404
TERM STRUCTURE SPREAD	0.214	0.298	0.198	0.296	0.228	0.296	0.236	0.300
DEFAULT SPREAD	0.336	0.326	0.378	0.325	0.369	0.326	0.368	0.328
Loan characteristics								
FLOAT	-0.047	0.261	-0.021	0.275	0.005	0.277	-0.067	0.279
ARINV	0.084	0.360	0.102	0.361	0.094	0.363	0.065	0.364
OTHERSEC	-0.205	0.254	-0.215	0.256	-0.261	0.265	-0.241	0.264
GUAR	0.456	0.272 *	0.478	0.271 *	0.482	0.271 *	0.520	0.269 *
Financial characteristics								
ln (AGE)	-0.414	0.194 **	-0.430	0.198 **	-0.457	0.199 **	-0.359	0.202 *
ln (ASSET)	-0.058	0.106	-0.061	0.109	-0.059	0.108	-0.290	0.198
ln (DEBT)	-0.128	0.057 **	-0.125	0.058 **	-0.124	0.059 **	-0.157	0.069 **
PROFMARG	-0.162	0.410	-0.168	0.410	-0.155	0.409	-0.405	0.451
ARTURN	-0.526	0.309 *	-0.550	0.323 *	-0.544	0.325 *	-0.159	0.404
INVTURN	0.240	0.177	0.249	0.178	0.249	0.179	0.407	0.235 *
APTURN	0.202	0.189	0.218	0.188	0.213	0.189	0.341	0.220
Governance Characteristics								
CORP	0.114	0.334	0.140	0.333	0.116	0.336	0.071	0.358
SUBS	-0.361	0.318	-0.362	0.319	-0.370	0.321	-0.411	0.326
PART	0.095	0.626	0.116	0.629	0.060	0.639	0.176	0.639
CONC50	0.456	0.380	0.472	0.378	0.447	0.384	0.733	0.416 *
Industry Characteristics								
CONSTR	-0.182	0.407	-0.156	0.409	-0.164	0.413	-0.286	0.420
SERVICES	-0.301	0.282	-0.313	0.284	-0.325	0.285	-0.413	0.290
RETAIL	-0.229	0.360	-0.235	0.358	-0.266	0.363	-0.222	0.367
Credit source and credit market characteristics								
BANK	0.244	0.312	0.335	0.336	0.307	0.340	0.339	0.354
NONFINANCIAL	0.142	0.764	0.164	0.773	0.175	0.756	0.064	0.757
HHINDEX	-0.214	0.170	-0.232	0.172	-0.216	0.173	-0.259	0.180
MSA	-0.051	0.300	-0.027	0.303	-0.022	0.301	0.374	0.431
λ _Apply							-2.700	1.584 *
λ _Approved							-2.087	1.618
Constant	16.873	3.595 ***	17.026	3.725 ***	16.767	3.739 ***	21.407	5.087 ***
R2	0.111		0.116		0.119		0.126	

*** indicates that the coefficient is significant at the .01 level, ** indicates that the coefficient is significant at the .05 level, * indicates that the coefficient is significant at the .1 level

Table VI. Regression Results the Interest rate on the Latest Line of Credit.

The dependent variable is the interest rate on the latest line of credit. The independent variables are defined in Table I. Data are from the 1998 Survey of Small Business Finances. "Coeff" represents the coefficient estimates and "SE" represents the consistent standard errors. The results are for 218 small businesses in our data that have indicated having been approved for a line of credit in the last three years.

Variable Name	Model 1		Model 2		Model 3		Model 4					
	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE				
Relationships												
ln (LENGTH)	-0.315	0.157	**	-0.202	0.186	0.039	0.216	0.005	0.271			
ZERO_LENGTH						0.960	0.529	*	0.883	0.628		
CHECK				0.064	0.408	0.303	0.439		0.292	0.446		
SAVE				0.346	0.493	0.340	0.490		0.361	0.489		
PRELOAN				-0.453	0.438	-0.379	0.446		-0.332	0.490		
NUMBER_SOURCE				0.117	0.082	0.137	0.083		0.092	0.206		
Interest rate variables												
PRIME RATE				-0.310	0.520	-0.342	0.508		-0.306	0.516		
TERM STRUCTURE SPREAD				1.138	0.492	**	1.310	0.503	**	1.294	0.512	**
DEFAULT SPREAD				0.202	0.398		0.221	0.399		0.223	0.405	
Loan characteristics												
FLOAT				-0.049	0.363	-0.009	0.356		-0.028	0.356		
ARINV	-0.248	0.370		-0.430	0.399	-0.505	0.408		-0.485	0.406		
OTHERSEC	-0.569	0.297	*	-0.772	0.343	**	-0.817	0.338	**	-0.837	0.332	**
GUAR	1.014	0.343	***	1.073	0.337	***	1.106	0.334	***	1.089	0.337	***
Financial characteristics												
ln (AGE)	-0.066	0.258		-0.074	0.259	-0.124	0.252		-0.069	0.293		
ln (ASSET)	0.038	0.124		0.080	0.127	0.087	0.124		0.067	0.193		
ln (DEBT)	-0.220	0.085	**	-0.277	0.087	***	-0.301	0.085	***	-0.285	0.102	***
PROFMARG	0.235	0.555		0.200	0.557		0.230	0.548		0.264	0.559	
ARTURN	-0.187	0.300		-0.132	0.320		-0.184	0.323		-0.166	0.338	
INVTURN	-0.046	0.288		-0.005	0.302		0.059	0.299		0.043	0.317	
APTURN	0.139	0.266		0.082	0.260		0.095	0.268		0.062	0.339	
Governance Characteristics												
CORP	0.257	0.571		0.234	0.543		0.231	0.529		0.267	0.547	
SUBS	-0.060	0.540		-0.006	0.536		-0.006	0.527		-0.017	0.534	
PART	-0.355	0.765		-0.526	0.750		-0.547	0.732		-0.564	0.718	
CONC50	0.426	0.442		0.378	0.450		0.359	0.441		0.342	0.440	
Industry Characteristics												
CONSTR	-0.177	0.414		-0.096	0.463		-0.033	0.470		-0.119	0.561	
SERVICES	0.119	0.361		-0.047	0.375		-0.037	0.372		-0.093	0.410	
RETAIL	-0.231	0.475		-0.335	0.466		-0.400	0.461		-0.403	0.493	
Credit source and credit market characteristics												
BANK				0.410	0.589		0.362	0.597		0.293	0.609	
NONFINANCIAL				-0.394	1.390		-0.273	1.340		-0.315	1.346	
HHINDEX				-0.231	0.212		-0.238	0.209		-0.258	0.219	
MSA				-0.043	0.425		-0.076	0.418		-0.074	0.490	
λ _Apply										-0.494	2.043	
λ _Approved										0.564	1.993	
Constant	11.112	1.287	***	12.727	4.156	***	12.484	3.998	***	12.553	5.243	**
R2	0.174			0.225			0.240			0.241		

*** indicates that the coefficient is significant at the .01 level, ** indicates that the coefficient is significant at the .05 level, * indicates that the coefficient is significant at the .1 level.