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**AVAILABILITY OF FIRMS' INFORMATION AND
THEIR CHOICE OF EXTERNAL CREDIT:
EVIDENCE FROM THE DATA OF
SMALL FIRMS**

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Availability of Firms' Information and their Choice of External Credit: Evidence from the Data of Small Firms[*]

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Abstract

The main purpose of this paper is to present the empirical findings derived from the data of small firms that the availability of private and public information on the borrowing firm leads to diverse borrowing patterns among firms. Exploring logit models to characterize the firm's choice of a financial source, we find that firms whose information is poorly recorded, or who are publicly less recognized, are more likely to choose institutional lending over trade credit but as the recorded information becomes more organized and firms become more transparent, they tend to graduate to a greater use of trade credit.

JEL Classification: C25, G21, G32

Keywords: availability of information, institutional lending, trade credit, nested logit models

1 Introduction

This paper intends to provide the empirical answer to the question: "Why do *specialist* financial intermediaries who engage solely in financial services exist?". The relevant answers have been addressed concerning banks that are the largest subset of specialist financial intermediaries.[1] Freixas and Roche (1997) name four roles of a bank: offering access to a payment system, transforming assets (for instance, transforming of terms of assets), managing risk (of the investment project), and processing information and monitoring borrowers. They place emphasis on the fourth role, of managing asymmetric information, which, they claim, has been the major theoretical contribution of the last 20 years to our understanding of the banking function. They explain:

> (I)t is reasonable to assume that banks have a specific part to play in managing some of the problems resulting from imperfect information on borrowers. Banks may invest in an informational technology that allows them to screen the different demands for loans they are confronted with and to monitor the projects, thus limiting the risk that the borrower may implement a project different from the one agreed upon initially.

Thus, the contemporary banking theory of asymmetric information restates the fundamental but vague question into the more manageable question: "Are specialist financial intermediaries more advanced (efficient) in processing information (on borrowers) and monitoring borrowers than other competing lenders that provide funds to the same customers?" We know that the recent development of financial instruments allow various unintermediated financial instruments to fulfill transformation of assets and risk management. If specialist intermediaries lack informational advantages, the size of institutional loans must be negligible and only as large as that of the pooled funds required for the settlement of payment needs. The size of institutional loans in the real world, however, certainly exceeds this magnitude.

Small firms have been characterized as being bank dependent for their external financing as they are blocked from access to unintermediated financial markets. Trade credit, on the other hand, has been analyzed rather as non-financial business practice among firms. In fact, however, trade credit can be viewed as a form of short term credit granted by firms supplying goods and services to buyer firms, and interestingly small firms are almost equally *trade credit dependent* as well as *bank dependent*. 43 percent and 37 percent of small firms' liability are trade credit and institutional borrowing, respectively. An analysis of small

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[1]It is not our intention to restrict the interpretation of our empirical findings to only banks since such specialist intermediaries include non-bank financial companies too.

firms' financial decision must consider their liability management of two largest items. This approach also allows us comparison of financial institutions as specialist lenders with trade credit providing firms as non-specialist lenders.

Using the 1998 Survey of Small Business Finances (SSBF) we investigated the relationship of the informational characteristics of small firms and the pattern of their borrowing demand. In particular we explored how the managerial and accounting information of the firms is recorded and made available to the lenders and how the openness of the managerial decision making process, and the firms' public recognition lead to different borrowing patterns among them. We modeled the firm's borrowing application behavior with a discrete choice econometric model. Use of data on firms' applications for loans and trade credit, which include data on denied loans, allows us to identify borrowing demand and is superior to the conventional use of balance sheet data that are themselves only a collection of agreed contracts matching lending demand and supply.

Our main findings are: 1. Informationally opaque and less publicly known young firms are more likely to choose institutional loans over trade credit; 2. They tend to switch to a greater use of trade credit besides institutional loans as they become more established and publicly known, and are more forthcoming in recording detailed and accurate information on their management and accounting. Such findings support the notion of the informational advantage of institutional lenders.

The remainder of the paper is organized as follows. Section 2 discusses the background of our empirical exercise. While reviewing the related theoretical and empirical literature, it explains the contractual characteristics of trade credit and distinguishes it from the institutional lending based on its informational structure. Section 3 describes the data and introduces the empirical method. Section 4 shows and interprets the results. Section 5 concludes the paper.

2 Background and the Related Literature

2.1 The Costly State Verification Model

The costly state verification model (Townsend [1979], Williamson [1987], Bernanke, Gertler and Glichrist [1999]) shows that the lender's offer on the terms of contract reflects the cost that the lender expends to verify the state of the project the borrower firm exercises.[2] Since

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[2]The model assumes that the return of the firm's project is the private information to the firm without the lender's monitoring. Unless the lender exercises costly ex-post monitoring, upon the borrower's default, he cannot know whether the borrower firm cheats the lender when the invested project is indeed successful or he truthfully reports that the project fails.

the higher cost of monitoring compresses the lender's expected profit from lending at any lending rate, the offering rate has to be forced up to make up for such loss of profit. The more efficient monitoring allows the lender to offer the cheaper funds to the firm. The firm compares contractual conditions that he would agree on with possible lenders and chooses the most favorable lender.

The size of the monitoring cost varies across lender-borrower pairs. It depends on the lender's monitoring technology, the borrower firm's transparency and public recognition, and the lender's special knowledge and expertise regarding the firm. Financial institutions staffed by competent and experienced auditing officers and equipped with the appropriate rating program can audit any firm more efficiently than those not so prepared. Any lender, regardless of its monitoring efficiency, can audit more transparent and more publicly known firms with greater ease than it can more opaque and less publicly recognized ones. Lenders who specialize in specific industries or those who have special relationships with certain borrowing firms and have access to hard to obtain information take advantage of overseeing such industries and firms more efficiently than other lenders.

Since the higher lending rate has two opposing effects on the lender's expected profit– a higher return upon the firm's success and an increased likelihood of the borrower firm's default–the lender's expected profit does not necessarily increase monotonically in the lending rate. Thus, the profit maximizing lender does not intend to increase lending supply monotonically in the lending rate, either. If the lending demand is sufficiently high, the supply and demand curves will not necessarily intersect, thus, leading to the Williamson's (1987) equilibrium credit rationing.[3]

2.2   Small Business Finance and Trade Credit

Before further developing the discussion on the theoretical background, we shift our focus briefly to the reality of small business finance. The major sources of external finance by small firms are institutional lenders, mostly so-called relationship lenders, and trade credit, a medium of short term credit.[4] Trade credit is a major alternative to institutional borrowing for small firms that are restricted access to unintermediated finance. The data in the 1998 SSBF show that 66 percent of small firms that employ less than 500 people use trade credit

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[3]Williamson (1987) shows the interesting case of a backward bending lending supply curve with a unique maximum supply of loans. In this case attainment of equilibrium credit rationing is ensured given a sufficiently high lending demand.

[4]Neither equity finance nor bond finance is visible presumably because of the small amount of external funds needed. Bolton and Freixas (2000a, 2000b) argue that the only option available to the riskiest start-ups is equity finance. It appears that such firms in the 1998 Survey of Small Business Finances (SSBF) do not issue equity publicly but either the owner, his family, or his acquaintances provide additional equity if it is needed.

and on average 43 percent of the total credit owed by the firms is trade credit.[5] Indeed both figures exceed the corresponding figures on relationship lending (44 percent and 37 percent).

Trade credit is a type of lending contract made between non-financial firms. A supplier firm of goods and services allows a buyer to defer the payment. The lag between the date of delivery of goods or services rendered and the date of payment means that the credit is granted by the supplier firm to the buyer firm.

There are two types of a trade credit contract. A complex *two-part terms* contract has four components: the discount rate, the discount due date, the net due date, and the penalty rate. These four components are set up so that the buyer is given an incentive to repay at the earlier time. The buyer firm is offered a one to two percent discount on sold goods if it pays within a shorter period of time. Thus missing the *discount due date* would require the buyer an expensive opportunity cost.[6] Further down the road, if the buyer fails to pay by a certain date called the *net due date*, the buyer is in default and a penalty rate is imposed on him. However, if as the buyer firm makes its remittance by the discount due date, the credit is cost free. A typical *two-part terms* contract structure is depicted in Figure 1. The discount is not offered under a *net* contract. The rest of its contractual structure is the same as that of a two-part terms contract.[7]

2.3 Specialist and Non-specialist Intermediaries

Unlike the conventional empirical works that intend to examine advantages of relationship lenders over non-relationship lenders, our empirical interest is in the relative advantage of the specialist financial intermediary, who is engaged solely in financial business, over the non-specialist, who is engaged in both financial and non-financial activities.[8] Institutional

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[5] A detailed description of the SSBF survey and the descriptive statistics on the survey data will appear in section 4.

[6] Under the typical contract with 10 days as the discount due date, 2 percent as the discount rate, and 30 days as the net due date, missing the discount due date would require the buyer to pay an annual 43.9 percent of opportunity cost, what we call the implicit interest rate.

The implicit interest rate r^i is calculated according to the following formula.

$$r^i = \left(\frac{100}{100 - r^d} \right)^{\frac{360}{NET - DIS}} - 1$$

where r^d is the discount rate, NET is the number of days from the date of derivery to the net due date, and DIS is the number of days to the net due date.

[7] For the detailed discussion on trade credit contract, see Ng, Smith, and Smith (1999). They discuss that a choice between two types of contracting form gives suppliers a greater flexibility in offering terms of contract though suppliers do not vary prices (interest rates) much across buyers within an industry (Petersen and Rajan ([1994], [1997]).

[8] The supplier - buyer relationship can be as long lasting and strong as the lender - borrower relationship. So many of supplier firms providing trade credits can be also relationship lenders. The literature review

lenders and trade credit providing firms are good real world examples of specialists and non-specialists respectively. Bond (2004) discusses that the specialist emerges when the total aggregate monitoring costs in the economy are reduced with the intermediary rather than without. According to his discussion trade credit is a more efficient form of financial intermediation than institutional lending, all other things being equal. Since the non-specialist intermediary does not have to monitor itself, intermediation by the non-specialist reduces the aggregate costs of monitoring in comparison to the intermediation by the specialist.

Figure 2 depicts the specialist intermediation and the non-specialist intermediation in a simple environment with only two borrowing firms (entrepreneurs). The non-specialist intermediary has to monitor only one entrepreneur whereas the specialist intermediary has to monitor and verify both entrepreneurs, and hence the total (aggregate) monitoring costs are higher with the non-specialist intermediary if the unit monitoring cost is the same for both the specialist and the non-specialist. Therefore the specialist intermediary emerges only when it is substantially more advanced in monitoring borrowers than the non-specialist.

2.4 Monitoring Technology and Transparency

It is the commonly held conventional wisdom that the advanced monitoring technology of the specialist lender allows it to audit opaque firms with obscure accounting and management records as easily as it can transparent firms with higher quality of written records.[9] A specialist lender equipped with better monitoring capability is able to offer funds to a viable firm whose written documents on accounting and management are poorly recorded more cheaply than a non-specialist. For instance, the advanced monitor has informal access through its close contacts with the manager to information that is not recorded in either the hard copy or electronic files. Unlike recorded hard information such soft information is hard to obtain without expertise and special knowledge.

However, the opposite scenario is also easily justifiable. The efficient lender could be good at processing and analyzing the recorded information rather than extracting the soft information through informal activities.[10] Therefore a specialist lender offers cheaper funds to firms with better management and accounting records. On the other hand, a non-specialist lender is indifferent to firms regardless of availability of information on them, since the recorded information, which would be useful for the advanced auditor to judge

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will appear in section 2.5.

[9]This point is particularly made in the relationship lending literature. For the relationship lending theory, see Diamond and Rajan (2000, 2001) and Kashyap, Rajan and Stein (2002).

[10]For instance Petersen and Rajan (2002) discuss that the historically observed widening distance of the (specialist) lender and the borrower is likely to reflect the fact that detailed hard information is easily obtainable electronically thanks to the rapid development of information technology.

the firm's solvency and viability, and to verify the firm's default, is nothing but a blank paper. Therefore the superior auditor charges a higher interest premium against opaque firms, whereas the inferior auditor provides funds to them at the same cost as the funds to more transparent borrowers.

In reality both cases must coexist. It is, therefore, an empirical question as to which case is more of relative importance. If the former dominates the latter, we observe that the more opaque small firm chooses institutional lending (a specialist) over trade credit (a non-specialist), and vice versa.

2.5 Empirical Literature

There are relatively few empirical works that attempt to relate the firms' financial decisions or the cost of lending directly to their informational characteristics. Based on the Duffie and Lando (2002) model of the credit spreads of bonds issued by firms with imperfect accounting and using the percentile ranking of the firm's transparency of accounting information calculated from the data published by the Association for Investment and Management Research, Yu (2004) finds that the spread attributable to the extent of the bond issuing firms' accounting imperfection is positive and statistically significant.

The closely related work attempting to examine the influence of the firm's informational characteristics on the cost of borrowing is Petersen and Rajan (2002). Interpreting that the geographical closeness to the borrower firm implies better monitoring, with 1987 and 1993 SSBF surveys, they estimate the effect of the distance predicted by the firm's informational characteristics on the probability that the institutional lender accepts the application and the contractual lending rate, and find that the effect has become less important. They discuss that the ease with which the lender can now acquire the borrower information through the development of information technology does not require the direct contact that the physical closeness allowed in the past. Using Argentine data on banks and small firms Berger, Klapper, and Udell (2001) find that large foreign owned firms, whose decisions on lending are likely to be made at their headquarters physically far from the small firms, are more inclined to supply loans to small firms in a period of financial distress than would small domestic banks. With 1987 SSBF data Petersen and Rajan (1994) find that an older firm is charged the lower interest rate on the most recently accepted loan. As a related area of study there are a large number of works examining the role of the relationship in small business finance.[11]

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[11]With 1987 data Petersen and Rajan (1994) find that the length of the relatiionship does not have significant negative effect on the interest rate charged on the most recently accepted loans, whereas Berger and Udell (1995) with the same data find the negative effect of the length of relationship on the premium over prime rate for loans issued under lines of credit. With 1993 data Cole (1998) examines the effect of pre-

Petersen and Rajan (1997) extrapolate from 1987 SSBF data that the demand for trade credit measured by the accounts payable over assets increases with the firm's age, and decreases in the length of a relationship with a financial institution, suggesting that an older firm uses less institutional lending and replaces its financial needs with trade credit. Petersen and Rajan (1994) also find that the use of trade credit measured by the percentage of trade credits that were paid after the due date and the negative of discounts taken by the borrowing firm decreases as firms age and is higher for a corporation. However, to the best of our knowledge there is not a single paper that directly examines the role of informational characteristics on the small firm's choice of external credit from trade credit and institutional lending, two of equally important financial sources for small firms.

3 Data and Empirical Methodology

3.1 Data Description

The Survey of Small Business Finances (SSBF) is conducted by the Board of Governors of the Federal Reserve System and collects information on for-profit, non-financial, non-farm, non-subsidiary business enterprises in the United States that have fewer than 500 employees. The information collected includes the firm's legal origin, various owner characteristics such as age, education, management experience, ownership concentration, the firm's geographical expansion, firm age, use of financial services, the firm's relationships with financial institutions, and the firm's income and balance sheets. The SSBF has provided the most reliable data set on the management and financial information of small firms, and is widely used by economics and finance researchers.[12]

The 1998 survey is the third in a series of surveys along with the 1987 and 1993 surveys. The number of firms surveyed was 3,561. Reflecting the development of information technology in the late 1990s, the 1998 survey collects data on the firm's use of computers for business purposes. This allows us to construct the more appropriate variable that captures how well hard information on the firm's accounting and management is recorded. Previous surveys have asked the firm what types of written records the firm uses, if there are any in

existing relationships such as the firm's possession of deposit accounts and the length of relationship on the lender institution's probability to extend the existing contract and find the significant effect of relationship variables. Degryse and Cayseele (1999) using the large Belgian contract level data on bank lending to small firms find that the length of relationship and the main bank reduces the contractual lending rate. Hoshi, Kashyap, and Scharfstein (1991) find that the Japanese firms in a *keiretsu* corporate group, who are expected to have close ties to the main bank in the group, are more insulated from liquidity shocks in their investments than firms not affiliated with a *keiretsu*.

[12]The complete set of works that use the SSBF are available on the web page of the Federal Reserve Board of Governors at http://www.federalreserve.gov/pubs/oss/oss3/abstract.html.

answering the survey. Such information may serve as a proxy for the state of maintenance of information, but it is not a direct measure. It may be that the firm with very good written records simply did not have the records within the respondent's reach. In this case, use of written records does not have economic meaning on the firm's business operation.

3.2   Econometric Model

We model the small firm's external financial demand as the firm's discrete choice of financial sources. The survey questionnaires of the SSBF include the firm's recent applications for items in liabilities. The advantage of using data on applications rather than post contract financial statements data is that one can identify the firm's demand from a certain financial source no matter if the application from such a source is granted or not. Firms unsuccessful in their credit applications have a credit demand but do not show it as a liability on their own balance sheets.

We assume that the small firm decides whether to apply to institutional lending or not and whether to apply to trade credit or not.[13] Under this assumption there are four states in one of which any given firm falls: no demand for trade credit or of institutional lending (no demand of external credit); only trade credit; only institutional lending; and both trade credit and institutional lending. Each firm chooses one of these financing alternatives depending on its informational and demographic characteristics. We employ probabilistic choice models discussed in Amemiya (1985) to characterize the firm's choice. More precisely, we estimate the following conditional probability that the firm i chooses a financial source (mix) j.

$$P_{ij} = \Pr(d_i = j \mid x_i), \; j = 0, 1, 2, \text{and } 3$$

d_i is the dichotomous variable that takes on values 1 if the firm i has no external credit demand, 2 if it applies to only trade credit, 3 if it applies to only institutional lending, and 4 if it applies to both trade credit and institutional lending. One widely used functional form for the conditional expectation P_{ij} is the logit family. Its mathematical simplicity allows us to estimate the model parameters relatively easily. The models can be derived from the optimal choice of the source of external credits by the firm. Denoting U_{ij} as the firm i's *utility* from choosing the financial source j and $J = \{0, 1, 2, 3\}$ we get,

$$P_{ij} = \Pr\left(U_{ij} > U_{ik}, \forall k \in J \backslash j \mid x_i\right), j = 0, 1, 2, \text{and } 3$$

We further assume that $U_{ij} = x_i \beta_j^* + \varepsilon_{ij}$ so that the firm's *utility* is composed of a determin-

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[13]Other alternatives for external finance by small firms are almost non-existent in the data.

istic part attributable to the firm j's various characteristics and the stochastic disturbance. We assume that there are k variables that capture the firm's characteristics so that x_i is a $1 \times k$ column vector. The logit family specifies the (joint) distribution function of ε_{ij} to be (the function of) the extreme value function given by $\exp\left[-\exp\left(-\varepsilon_{ij}\right)\right]$.

We examine three specifications: the multinomial logit model; the nested logit model; and the nested multinomial logit model. Their differences are based on assumptions made on the structure of the decision making. It is likely the case that only firms in need of external credits proceed to the decision of choosing one of the three alternative external credit sources. That is, the firm must decide at first whether or not to apply for external credits at all regardless of any specific source, and then choose only trade credit, only institutional lending, or both of them. The three specifications differ in the way they deal with such a structure of the decision making process. [14]

Multinomial logit model

The multinomial logit model does not take into account the firm's two-stage sequential decision. (the first figure of Figure 3) The firm chooses one of all four alternatives simultaneously. The model then assumes the independence of stochastic disturbance ε_{ij} across any alternative j.

One can derive the probability that firm i chooses an alternative j as the function of indices $x_i\beta_l$'s as,

$$P_{ji} = \frac{\exp\left(x_i\beta_j\right)}{1 + \sum\limits_{l=1}^{3} \exp\left(x_i\beta_l\right)}, \ j = 0, 1, 2, \text{ and } 3, \ \beta_0 = 0$$

Note that one cannot identify all parameter vectors for four different states. We can only identify the difference of the parameter vector for the comparison group (β_0^*) and each of the remaining three $\beta_j = \beta_j^* - \beta_0^*$.

Nested multinomial logit model

In the nested multinomial model the two-stage nature of the firm's decision making process is explicitly imposed. The firm decides whether to borrow or not before choosing the specific source of credits. (the second figure of Figure 3) The decision tree for the nested multinomial logit model is portrayed in the second figure of Figure 3. One can write the (unconditional) probability of not borrowing and the conditional probability of choosing the source j respectively with parameters β and γ_j's as,

$$P_{0i} = \Pr\left(d_i = 0\right) = \frac{1}{1 + \exp\left(x_i\beta\right)}$$

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[14] For a formal derivation of models, see Amemiya (1985).

$$\Pr(d_i = j \mid d_i \neq 0) = \frac{\exp\left(x_i \gamma_j\right)}{1 + \sum\limits_{l=1}^{2} \exp\left(x_i \gamma_l\right)}$$

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Nested logit model

The nested logit model is the most general model of the three.[16] It allows correlation among the firm's *utilities* from different sources of external credits but does not impose the explicit two-stage decision structure. (the third figure of Figure 3) One obtains the unconditional probability that the firm i does not apply to any of external credits P_{i0} and the probability of choosing an external credit source j conditional on that the firm i does apply to one of three external credit sources respectively as,

$$P_{0i} = \frac{1}{1 + a \left\{ \sum\limits_{l=1}^{3} \exp\left(\rho^{-1} x_i \beta_l\right) \right\}^{\rho}}$$

$$P_{2ji} = \Pr(d_i = j \mid d_i \neq 0) = \frac{\exp\left(\rho^{-1} x_i \beta_j\right)}{\sum\limits_{l=1}^{3} \exp\left(\rho^{-1} x_i' \beta_l\right)}, \; j = 1, 2, \text{ and } 3$$

where the subscript 2 represents the second stage, and ρ and a are model parameters. In particular, ρ is the correlation parameter. [17]

Marginal effects

We estimate these models by the maximum likelihood estimation. In non-linear discrete choice models coefficient vectors themselves are of little interest to us unlike in linear models in which coefficients themselves are marginal effects of changes in independent variables on the dependent variable.   We are interested in either levels of the unconditional and second stage conditional probabilities per se for a certain value for a vector of characteristics variables x_i or the effect of marginal change in a certain variable in the vector x_i on the probabilities (the marginal effect).

The marginal effect on the unconditional probability is given by $\frac{\partial \Pr(d_i = j)}{\partial x_{mi}}$ for a continuous variable x_m.   The marginal effect for a binary (dummy) variable $x_{m'}$ given by

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[15] Note, $\Pr(d_i = j) = \Pr(d_i = j \mid d_i \neq 0) \Pr(d_i \neq 0) = \frac{\exp(x_i \beta)}{1 + \exp(x_i \beta)} \frac{\exp\left(x_i \gamma_j\right)}{1 + \sum\limits_{l=1}^{2} \exp(x_i \gamma_l)}$

[16] Nested multinomial logit and multinomial logit models are special cases of the nested logit model.

[17] The unconditional probability of choosing an alternative $j \, (\neq 0)$ can be obtained by $P_{ji} = \Pr(d_i \neq 0)$
$\Pr(d_i = j \mid d_i \neq 0) = (1 - P_{0i}) P_{2ji}$.   The formula degenerates to the formula for the multinomial logit model if $\rho = a = 1$. $\beta_1 = 0$ and $\rho = 1$ in the second equation of the formula result in the formula for the second stage multinomial logit model in the nested multinomial logit model.

$\Pr\left(d_i = j\right)|_{x_{m'i}=1} - \Pr\left(d_i = j\right)|_{x_{m'i}=0}$, represents the associated change in the probability with a change of the m'th variable from 0 to 1. The marginal effects for the conditional probability are analogous. Since these marginal effects are the functions of x_i, one needs to compute the sample average to evaluate the effects numerically. In calculating the effect of each single variable for each observation, which is then used for averaging over all the observations, other variables are kept at the original value of the observation.[18] [19]

3.3 Variables

Dependent variable

Use of the data on the firm's applications of loans and trade credit that include rejected these attempts allows us to identify lending demand and is superior to the conventional use of balance sheet data that are themselves only a collection of agreed contracts matching lending demand and supply.

Regarding institutional lending, the SSBF asks not only how many times the firm applied for new loans but also if there were times when the firm needed credit but did not apply because it thought the application would be turned down. Since the firm that did not apply for loans for fear of being rejected by the institution can be interpreted to have had demand for loans, we should include both actual applications and voluntary withdrawals.[20] Table 1 shows the descriptive statistics on the variables used to construct the dependent variable and the dependent variable itself.

It appears that quite a few firms withdrew voluntarily from applying for a loan (22 percent) and a majority of them (63 percent) never applied for a loan afterward. Among the firms that applied for the loan afterward, 60 percent of them were never successful in any of their applications. Thus only 15 percent of firms that had ever withdrawn from application fearing rejection were indeed accepted by some lenders in the end. Among firms that had applied for a loan at least once, most of them (83 percent) obtained loans eventually and half of the firms who were successful at least once stopped submitting applications with their first successful application. Roughly speaking, there are two model groups within firms demanding institutional lending. The first group of firms do not even attempt applying for a loan and withdraw voluntarily in the last three years. The second group searches around for

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[18] As each probability is a non-linear function of $x_i\beta_l$'s, the marginal effect for each variable is not a function of only a coefficient for the variable of interest itself but a function of all parameters including parameters for other alternatives and other model parameters if they are modeled so. Thus neither the statistical significance nor the insignificance at any given significance level of a coefficient in the linear index of the model $x_i\beta_l$ does not say much about the statistical significance of the marginal effect.

[19] In estimating standard errors of marginal effects, the standard delta method is used.

[20] Petersen and Rajan (2002) employ the same approach to define firms that were rejected loan applications.

lenders until they are successful, then stop shopping. The mode of the number of demands for institutional lending within a three-year period is 1.[21]

Regarding trade credit, the SSBF asks both use of trade credit and experiences of rejection of trade credit by a supplier firm in the last one year period. Two thirds of firms used trade credit, whereas only 1 percent of firms had been denied and never had trade credit in the one year period.[22]

We construct the dependent variable by combining the data on the application to institutional lending and on use of trade credit and arranges firms into four groups, firms without demand for external credits (21 percent), firms demanding only trade credit (38 percent), firms demanding only institutional lending (11 percent), and firms demanding both trade credit and institutional lending (30 percent).

Though the period of time during which institutional lending is surveyed is much longer (three years) than that for trade credit (one year), combining both sets of data does not cause serious problems since firms are almost split between those using trade credit and those not using it, and this division among firms seems to be a steady state phenomenon. Firms that used trade credit in the survey year are very likely to have used trade credit in the previous two years, too, whereas those that did not in the year are not very likely to have stopped use of trade credit all of a sudden after two years of trade credit use. This is a reasonable assumption also because use of trade credit is a high frequency event and not an event which takes place only once or twice in three years. Indeed firms that use trade credit on average used trade credit for 72 percent of all purchases they made.

Independent variables

Table 2 shows the descriptive statistics of independent variables that are meant to measure the firm's informational characteristics.

RECORD is a dummy variable which takes a value of 1 if the respondent used some kind of written records to answer the survey questionnaires and 0 if he/she relied on his/her memory. If the firm keeps the written records in an organized manner, they must be readily available to the firm's manager (respondent). Well organized records must also be more informative to outside lenders. Seventy nine percent of firms used some kind of written records.[23]

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[21] The SSBF investigates the decomposition of institutions to determine which firms made their most recent approved and denied applications separately. 91.8 percent of approved and 88.4 percent of denied applications were made to depository institutions. This means that in analyzing the sample of small firms institutional lending and bank lending are almost synonymous. The decomposition of institutional lenders to which firms withdraw without an actual attempt is not available in the survey, but it appears reasonable to assume that such firms consider applying mostly to banks as well.

[22] The low rejection rate of applied trade credit suggests that it is unlikely that large number of firms withdraw applying to credit voluntarily.

[23] It may be the case that the respondent simply did not use the written records to answer the survey

PCFMAN is a dummy variable which takes a value of 1 if the firm uses computers for its accounting. Use of computers for accounting would leave more accurate records of the firm's accounting information. As we described earlier, this variable is new in the 1998 data and our primary interest in estimating discrete choice models. Seventy percent of firms use computers for accounting.

RECORD and PCFMAN are meant to be direct measures of availability of hard information to lenders. Besides, two additional variables are included as indirect proxies. They are dummy variables indicating whether the firm is managed by an owner (OWNER) or whether it is a corporation (CORP). A firm managed by a hired manager is more likely to leave better detailed and informative hard information for communications between the owner and the manager. Corporations are required to have higher standard of accounting records.

The dummy variable indicating whether its sales region stretches nation wide (NATIONAL) is also included. In addition such continuous variables as the number of branches (BRANCH), owner experience (C_EXP), owner age (C_OAGE) and firm's age (C_FAGE) are included as independent variables. They are all meant to measure the firm's transparency and public recognition. The geographical expansion of the firm, an older owner with longer experience, and a longer firm history all tend to make the firm more recognized by the general public.[24]

Demographic variables such as the industry, the geographic location, and the ethnic origin are included to control the firm's other fixed characteristics. A complete set of independent variables and their explanations are listed in Table 3.

4 Results

4.1 Estimation results

Comparison of models and parameter estimates

In conducting the empirical analysis firms whose answers on questionnaires concerning recent loan applications and trade credit applications were questionable are dropped. Firms that report holding zero gross assets are not likely to be reflecting their true balance sheets, and therefore, are dropped. 3477 firms remain in the sample.

Table 4 shows the parameter estimates and the maximized log likelihoods of three es-

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although it has the informative written records. If this is true for large number of firms that did not use written records, RECORD may have little economic meaning.

[24]CORP captures the firm's transparency besides availability of written records since corporations are required to maintain a higher standard of disclosure.

timated models. The data support the sequential structure of the firm's decision making. The general log likelihood principle proposed by Vuong (1989) shows that the nested logit model is superior to the multinomial logit model but is statistically equivalent to the nested multinomial logit model.[25] Table 5 shows the marginal effects of variables on the conditional probabilities of choosing a source of external credit for three models. Both point estimates and standard errors appear to be independent of the choice of a model. Therefore our further discussion will be based on the results of the most general nested logit model. Many of the coefficients for variables that are meant to capture the availability of the firm's information and its transparency are estimated relatively accurately, supporting the choice of variables. Among 27 coefficients that represent the first nine elements of coefficient vectors for three choices of external credit source, 13 are statistically significant. In particular, coefficients on CORP and BRANCH are significant across all the alternatives.[26] [27] [28]

Table 5 presents the marginal effects of individual variables on the firm's unconditional probabilities of financial choices and conditional probabilities of choices of external credits (Panel A). In order to show that results are robust across the models, marginal effects on conditional probabilities computed with multinomial logit and nested multinomial logit models are attached (Panel B). Table 6 presents the average, taken from observations, of levels of unconditional probabilities for each financial choice (Panel A) and conditional probabilities for each choice of external credit source (Panel B) when each dummy variable indicated as the title of column entries is held constant either at 0 or at 1 across observations, and other variables are kept at the original observed values. [29] The rest of this subsection presents our empirical findings in Tables 5 and 6 and supplemental figures for continuous

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[25] The nested logit model nests the multinomial logit model, whereas the nested logit model and the nested multinomial logit models are strictly non-nested. Under Vuong's framework, the standard likelihood ratio statistic (15.8196), which follows the chi-square distribution with 2 degrees of freedom, selects the nested logit model over the multinomial logit model at the 1 percent significance level. In contrast, the standardized log likelihood ratio test statistic (0.8432), which follows the standard normal distribution, does not distinguish the nested logit model from the nested multinomial logit model at the 10 percent significance level.

[26] Dummy variables PCFMAN and RECORD are only two variables that measure the secular informational characteristics.

[27] Some of such variables may capture not only the informational characteristics but other effects. For instance the firm's legal status and branching may capture its endogenous management strategy rather than fixed effect characteristics.

[28] The point estimate of the correlation parameter ρ is negative and statistically significant. It is hard to interpret the negative estimate of ρ since it normally takes the value in the range from 0 (perfect correlation) to 1 (no correlation, multinomial logit). The negative ρ, however, is not ruled out in the econometric theory. The estimate of ρ may not be so reliable. Indeed the estimate of the model which assumes $\alpha = 1$ but keeps ρ as a free parameter results in the positive and statistically insignificant ρ. We find that results on estimated probabilities and marginal effects are robust to such model assumptions.

[29] For each dummy variable, a number in one of the cells in Table 5 is equal to a number in the corresponding cell in the second panel (a dummy variable is held at 1) of Table 6 less a number in the corresponding cell in the first panel (a dummy variable is held at 0) of Table 6.

variables.

Availability of the firm's hard information

As we will detail below, our empirical findings on the relationship between the availability of the recorded information on small firms and their credit demand are summarized in three main points. First, these firms whose accounting and management information are thought to be better kept are more likely to seek some form of external credit than those firms whose information is poorly recorded. Second, firms with poor written records start with institutional borrowing, and add trade credit as their second choice of financing as their records become better organized. Third, the empirical results from the dummy variable PCFMAN shows the clearest evidences, whereas the results from other variables are supportive of the findings from PCFMAN.

Direct measures (PCFMAN, RECORD)

The probability that firms using computers for accounting (firms with PCFMAN=1) apply for some external credit is 82.3 percent, whereas the probability that firms without computer assistance (PCFMAN=0) apply to it is only 72.1 percent. That is, use of computers for accounting increases the firm's demand of external credit by 10.2 percentage points.[30] Such firms are 4.3 percent more likely to choose trade credit only (34.8 percent for the firms not using computers for accounting as opposed to 39.1 percent for firms without them. For any dummy variable to be mentioned, the first percentage is the probability of each choice for the *less transparent* firm and the second one is that for the *more transparent* firm implied by the variable, unless noted otherwise), 9.0 percentage points more likely (23.9 percent, 32.9 percent) to apply to both lending and trade credit, and 3.1 percentage points less likely (13.3 percent, 10.3 percent) to choose lending only. All of these effects are statistically significant. Thus, introduction of computers for managing accounting raises the unconditional likelihood of applying to trade credit, exclusive use of not, by 13.3 percentage points. On the other hand, it raises the likelihood of applying for institutional lending only by 5.9 percentage points.

Indeed the shift from institutional borrowing to trade credit is the shift from demand of institutional lending to demand of trade credit besides lending. Conditional on the firm's need of external credit, the probability that the firm applies only to lending falls by 7.0 percentage points (20.0 percent,13.0 percent) and the probability that it applies both to lending and trade credit rises by 7.2 percentage points (32.1 percent, 39.3 percent) as the firm introduces computers for accounting. Both effects are statistically significant at the 1

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[30]Note that reported figures for marginal effects are point estimates. They accompany standard errors. Thus these figures are merely expectations (averages) over randomization based on the empirical distribution of model parameters and not deterministic.

percent level. [31] The total likelihood of choosing trade credit, exclusive use or not, increases by 7.0 percentage points (80.0 percent, 87.0 percent). In contrast, the total probability to choose lending barely increases.

The findings on the influence of RECORD on the firm's financing requests are consistent with the findings for PCFMAN. On average, firms using written records to answer the survey are more likely to apply to external credit than firms answering the survey without them, and are more likely to apply for both institutional lending and trade credit. The marginal effect on the unconditional probability that the firm applies to lending only and the effect on the probability that it applies to trade credit only is negligible. Regarding the chances that firms in need of credit choose one of the three alternatives, firms answering the survey with some kind of written records are less likely to choose lending only and more likely to choose the mix of lending and trade credit. None of the reported marginal effects, however, are significant.

Indirect measures

Firms managed by an employee (OWNER=0) are 4.7 percentage points more likely to apply for external credit than owner managed firms (78.5 percent, 83.1 percent) and the effect is significant. Employee managed firms are more likely to apply for trade credit only, more likely to apply for both trade credit and lending, and less likely to apply for lending only, though none of these effects is significant. The unconditional probability of applying to trade credit rises by 8.0 percent (74.9 percent, 67.0 percent) as the owner managed firm hands its management over to a hired manager. As for the conditional probabilities of the choice of a financial source, the owner managed firm is 5.4 percentage points more likely to choose lending only than the employee managed firm by 5.4 percent (15.7 percent, 10.4 percent, significant at the 10 percent significance level) and is less likely to choose the other two alternatives.

Corporations (CORP=1) are 7.1 percentage points more likely to apply for some external credit than non-corporations (15.5 percent, 22.6 percent), and 5.1 percent points more likely to apply to both trade credit and institutional lending (29.0 percent, 34.1 percent). These effects are statistically significant. The unconditional likelihood that the corporation chooses trade credit only is higher than the likelihood that a non-corporation chooses one, but the difference in likelihoods between two types of firms, 2.9 percent, is small and not significant. The (unconditional) marginal effect on the choice of lending only is insignificant but negative. As for the marginal effects on the conditional probabilities when the firm needs credit, a corporation is more likely to choose the mix of lending and trade credit and less likely to

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[31] Two effects almost cancel each other out and leave little room for the likelihood change of applying for trade credit only. Marginal effects for alternatives are summed up to 0 since corresponding probabilities are summed up to 1.

choose lending only than a non-corporation. (Neither of the marginal effects is significant. The conditional likelihood of choosing trade credit only remains unchanged across different types of legal entities.

The firm's public recognition

More branches encourage the firm to attempt to give up self-reliance and to seek trade credit, supporting the evidence from examining variables on availability of the firm's hard information. In contrast, older firms, firms owned by more experienced or older owners, are not necessarily more likely to seek external credits than otherwise. Such *time* factors tend to induce firms to shift from lending only to trade credit only rather than to mix both types of borrowing.

Marginal effects of the increased number of branches on unconditional probabilities are negative and significant for a choice of no application to any external credit, and positive and significant for choices of trade credit only and the mix of trade credit and lending. However, the only conditional choice on which the marginal effect of marginal increase in the number of branches is statistically significant is a positive effect on the choice of the mix of lending and trade credit. The marginal effect on the conditional probability of choosing lending only is negative but not significant. The effect for the choice of trade credit only is negligible. As the number of branches increases, dependence on internal funds vanishes and is replaced by demand of the mix of trade credit and institutional lending (Figure 4). Very few firms (1.9 percent) at the top 99 percentile of the number of branches (at least 11 branches) are estimated to refrain from the external credit voluntarily, whereas nearly half of them (44.0 percent) are estimated to apply both for trade credit and lending institutions. In contrast, the corresponding figures are 22.5 percent and 29.2 percent for firms with only one site of business.[32] [33]

Marginal effects of operating nation wide as opposed to operating locally on both conditional and unconditional probabilities are positive for lending only and negative for trade credit only. These effects, however, are not significant. A possible explanation for this is that the variable NATIONAL captures the geographical network of lenders rather than the firm's characteristics. While financial lending institutions represented by banks have relatively large geographical networks and are able to satisfy the financial needs of firms expanding their sales channels nationwide, supplier firms providing trade credit to small firms, whose trade partners, many of whom are also likely to be small firms with small numbers of business sites, are less likely to match their financial needs.

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[32]Firms operating only a single branch are the dominant majority and constitute 79 percent in the sample.

[33]Indeed the unconditional probability of applying only for trade credit keeps increasing in the number of branches until it reaches11, and then starts to decrease. Ninety nine percent of firms, however, have less than 12 branches. The negative relationship does not alter the course of the discussion.

Figure 5 shows the estimated relationship between the owner experience and the firm's financial choice. The more experienced owner demands external credit (the relationship is not statistically significant). Figures on the unconditional and conditional probabilities consistently show that the more experienced owner is more likely to choose trade credit only and less likely to choose lending only. The likelihood that the least experienced owner (in the first year of his business career) is dependent solely on institutional lending is substantial (21.2 percent). In contrast, the owner's thirty-year experience in the small business reduces the likelihood by almost half. The decline in bank dependence is almost replaced by the rise in dependence on trade credit (42.8 percent to 50.6 percent).[34]

Figure 6 shows the estimated relationship between the firm's age and the firm's financial choice. The marginal effect of the firm age on the unconditional probability of being self reliant for its financing is negligible. On the other hand, younger firms are more likely to choose institutional lending and older firms are more likely to be dependent on trade credit. For instance thirty-years of staying in business increases the likelihood that the firm chooses trade credit only from 40.9 percent to 55.1 percent, reduces the likelihood that it chooses lending only from 17.6 percent to 12.0 percent and the likelihood that it chooses the mix of lending and trade credit from 41.4 percent to 32.9 percent

Figure 7 shows the relationship between the owner age and the firm's financial choice. Unconditionally the firm is more likely to withdraw from external credit and less likely to apply to lending institutions as the owner ages. All effects but that for trade credit only are significant. [35] The likelihoods that a forty year old owner chooses to be self-reliant, chooses lending only, lending and trade credit, and trade credit only are 17.6 percent, 12.7 percent, 32.5 percent, and 37.2 percent, respectively. Corresponding figures for 60 year old are 24.1 percent, 9.2 percent, 28.3 percent, and 38.4 percent. The effect on the conditional likelihood of choosing trade credit is positive and significant, but effects of the other two alternatives are negative but not statistically significant.

The firm's demography and its financial choice

Firms whose owner has advanced degrees (degree granting college or higher) are more likely to choose trade credit and less likely to choose lending only than firms owned by the less educated. Minority owners are more likely to choose institutional lending and less likely to be either exclusively dependent on trade credit or to be self-financed (no demand for external credit). Female owners are less likely to seek external credit. They are likely

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[34]Owners with 30 year experience of doing business are at the top 86.3 percentile of the sample. The median of owner experience is 18 years. Thirty year old firms are at the top 91.4 percentile and the median firm age is 11 years.

[35]This may indicate that the terms of borrowing contracts in general are unfavorable to older individuals. Interest rates charged may also be higher. Faced with only expensive credits are available, they would choose to be self-financed.

to choose lending only over other financing alternatives if they consider applying for some external credit. Family owned firms are less likely to seek external credit than non-family owned firms.

None of the region dummies except a few entries are statistically significant. The estimated marginal effects of these dummy variables are not small, but accompanying standard errors are large.[36] None of industry dummies are statistically significant.[37]

4.2 Discussion

The firm's information availability and its financial choice

Records of the firm's accounting and management may not be publicly available but lenders may have access to them upon their request to the borrowing firm. Firms whose information is poorly recorded are more likely to choose institutional lending than those with better records and less likely to choose trade credit. In contrast firms that record hard information are unlikely to be bank dependent, and more likely to attempt to borrow from both banks and supplier firms.

Such findings are consistent with the view that specialist lenders can obtain information about borrowers from undocumented sources. Such lenders are equipped with the expertise for handling information, and are able to obtain the information of borrowing firms not only through written documents or electronic documents recorded and kept by firms but also through less formal measures such as meetings, phone conversations, and on site inspections of the borrowers' production facilities, operating sales sites, and so on. Specialist lenders, then, process such soft information to assess the viability of borrowers. In other words, specialist lenders are able to read between the lines of written documents with their special monitoring technology and can offer the cheap credits to informationally opaque firms.

Unlike specialist lenders, non-specialist lenders, represented by good supplying firms that allow buyers late payments, are less likely to possess such expertise. However, daily

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[36]The estimated marginal effects on the unconditional likelihood as well as on the likelihood conditional on the firm's demand of credit imply that firms in East North Central are more likely to choose lending only than firms elsewhere. The estimated marginal effect on the unconditional likelihood for firms in West South Central is negative and statistically significant . These effects, however, are only statistically significant at the 10 percent significance level.

[37]There are several large point estimates of marginal effects that draw our attention. The results on both unconditional and conditional probabilities suggest that firms in construction and manufacturing industries are more likely to use trade credit (a large positive sum of entries for trade credit and the mix of lending and trade credit), and that those in communication and transportation, and finance industries are less likely to use trade credit (a large negative sum of entries for trade credit and the mix of lending and trade credit). Results on conditional probabilities of choosing a financial alternative suggest that firms in construction and manufacturing are less likely to choose lending only, and that those in communication and transportation, and finance industries are more likely to choose lending only.

transactions and delivery of goods and services may allow them for as close relationships with borrowing firms as specialist lenders. They can exert leverage on a borrowing buyer by threatening to cut off the future supply of goods and services if they ever detect a bad signal from a borrower. [38] Yet, our findings imply that such supplier firms perhaps lack the ability to collect and process unrecorded soft information from borrowers. Thus they do not offer cheap trade credit to firms opaque to them. As a result the optimal choice for firms with poor management and accounting records is to seek cheaper institutional borrowing.

There are three possible reasons why firms do not switch entirely to trade credit but to seek to add trade credit as an adjunct to institutional borrowing. First, the theory discussed in Section 2 does not necessarily prove that the funds provided to firms with a higher quality of recorded information by a superior monitor is cheaper than those provided to such firms by a poor monitor. Firms may have an incentive to reduce their interest rate risks by borrowing from two sources. Second, institutional borrowing could involve the substantial fixed transaction costs for a borrower firm. Giving up bank loans entirely would waste the firm's investment of such costs. Third, many firms' motives for using trade credit are not restricted to the financial. For instance they may use trade credit to smooth transactions by reducing the number of bills paid.[39] In this case firms choosing trade credit only could constitute a group of such firms with non-financial motives.

Less publicly recognized firms, young firms with few branches, are also less likely to choose bank lending over trade credit, supporting our findings concerning the availability of the firm's private information to lenders. These findings are consistent with the findings of Petersen and Rajan (1994, 1997) that costs of institutional lenders fall as a firm ages. Our findings show that the direct and indirect costs of trade credit, which is provided by a non-specialist, is more sensitive to a firm's age than is the institutional lending.

Interpreting measures of general public recognition needs caution. First and most importantly, it is availability and accuracy of information to the lenders per se that matters in determining the terms of the lending contract. Second, the owner's business experience and the firm's age may involve the classical sample selection bias, and capture not only the firm's public recognition but also the talents and performance of the firm and its owner. A long business history could mean that the firm has outperformed its market competitors year after year. Alternatively, it could imply that the firm has lagged behind other firms that have grown much faster and become large entities. Third, younger firms are likely to demand longer-term credits (institutional borrowing) for financing setup costs.[40]

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[38] Such bargaining power could be the reason that supplier firms can act as non-specialist intermediaries. See the discussion in Petersen and Rajan (1997).

[39] Elliehausen and Wolken (1993), Petersen and Rajan (1997), and Ng, Smith and Smith (1999) provide non-financial motives of use of trade credit.

[40] Public recognition seems to encourage a firm to switch from bank dependence to exclusive trade credit

Inventory management and trade credit

Large but statistically insignificant industry effects on use of trade credit are observed in the positive effects of construction and manufacturing industries and the negative effects of communication and transportation, and the finance industries. Trade credit serves as a device for supplier firm to manage its inventories efficiently. A supplier may offer trade credit on sales of goods beyond its warehousing capacity to customers that have a better ability to carry them.[41] Manufacturing firms usually have large warehouses for intermediate and final goods. Likewise construction companies have a large quantity of equipment, machinery, and building materials to store. Thus these industries are more likely to buy intermediate and final goods through trade credit arrangements. That there is no recognizable effect on the services industry is not inconsistent with its limited ability for storing materials.

Some caveats

There is the potential that independent variables are not exogenous and cause a simultaneity bias. Suppose there are two lenders, an institutional lender and a goods (services) supplier firm to the borrowing firm. If one of them required the borrowing firm to submit its accounting records or the business plans, the borrowing firm, which previously had not used computers for accounting would now have an incentive to utilize its computer resources or buy new ones for keeping up and organizing its accounting. Then the marginal effect of PCFMAN on the likelihood of choosing the lender requesting such documents conditional on the firm's need for external credit would be biased upwardly. Similarly if the borrowing firm needed the well organized bookkeeping for repaying to specifically one of two, the marginal effect on the conditional likelihood of choosing the lender would be biased upwardly again.

However, such a bias would be likely only to underestimate our findings. Trade a credit providing supplier firm, a lender of short-term credit, is less likely to require the submission of specific documents on the borrower firm's accounting or management.[42] On the other hand, an institutional lender as a provider of longer term credit would request such documents from a borrower more frequently than a trade credit providing firm. As for the firm's voluntary use of computers for planned repayments, the longer term loans would require more detailed planning and involve more complicated calculations than trade credit. This implies that correcting biases, if there were any, would reinforce our conclusions even more.

Timings of institutional borrowing vary across the three year period prior to the date of polling of the firms, whereas timings of trade credit contracts span the one year period

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financing rather than mixing its demand for both. This may reflect firms' preference change on length of finance.

[41] See discussions in Emery (1987), Petersen and Rajan (1997) and Choi and Kim (2003).

[42] The firm would simply use the generic rating services such as Dun & Bradstreet credit scoring if necessary.

prior to the date of inquiries.[43] On the other hand, the survey questions the firm's current informational characteristics at the date of inquiries. Thus, unfortunately, independent variables are not predetermined. It would be idealistic if the data on the availability of the firm's information before the three-year period prior to the date of inquires for each firm were available to us so that independent variables could be predetermined.

This, however, does not cause a serious problem. The constructed dependent variable collects applications to the same type of credit source into a single group, and captures the static (structural) preference of the firm. The construction of the variable does not take into account the frequency of applications for each type of credit source. Therefore, in the empirical exercise, we are examining the structural relationship between static properties of the firm, implying that the timing of events is of little relevance.

PCFMAN is one of the few independent variables that could capture the timing of an event as well as static characteristics. As for this variable, it is the timing of the firm's introduction of computers for accounting purposes that is relevant to the claim. If the firm had introduced them later than the firm's most recent application from each source, the variable would be indeed predetermined. However, even if it is a late user of computers for bookkeeping, such a firm is likely to have kept better accounting records with low technology methods including hard copies of well organized and detailed books and timely accounting statements. The firm that uses computers just for online shopping, emailing, and web surfing at the time of the survey (1999-2000) is less likely to have kept better records than the firm with some level of computerized accounting system. In other words, PCFMAN is not only the direct measure of the availability of the firm's records but also the indirect measure of the more general stance of the firm on recording information.

5 Conclusion

The main purpose of this paper is to present the empirical findings from the 1998 Survey of Small Business Finances that the availability of private and public information on the borrower firm and other informational characteristics of the firm leads to diverse borrowing patterns among borrower firms.

Small firms often portrayed as being exclusively bank dependent in fact also use trade credit as a source of external credit. The share of external credit in small business finance is as dominant as institutional loans. Though term structures of the two forms of finance differ, use of trade credit leaves the average balance in the firm's balance sheet just as using

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[43]A date of survey for each firm varies in the two year period from 1999 to 2000. Therefore, a timing of an attempted institutional borrowing covered ranges from 1996 to 2000. Likewise a timing of an attempted trade credit contract ranges from 1998 to 2000.

an institutional lender would. As a total financial management, the firm makes a choice between institutional borrowing and trade credit.

Institutional lenders are specialized in financial services whereas trade credit providing firms play a dual role of non-financial service provider and lending service provider. Therefore, theoretically, institutional lenders, who are specialist lenders, emerge only when they are substantially more efficient in monitoring and assessing the viability of borrower firms than non-financial firms granting trade credit. Whether the firm that do not allow that recorded accounting and management information be made available to lenders chooses institutional borrowing or trade credit is an empirical question.

We explored a family of probabilistic logit models to characterize the firms' choice of a financial source. Constructing the four state dependent variable that indicates whether firms applied to external credit or not, and if it did whether the source is trade credit, institutional lending, or both of them, we then estimated how the availability of private and public information about the firm to lenders affects the likelihood, particularly the likelihood conditional on the firm's need for credit, that the firm would choose each credit source. Use of the data on the firms' applications, which include denied loans, allowed us to identify borrowing demand. We paid special attention to the variable PCFMAN, the dummy variable indicating whether the firm employs computers for accounting or not, which is based on the new questionnaires that appear for the first time in the 1998 version of the SSBF. The variable overcomes the shortcomings of other preexisting variables.

We find that firms whose information is poorly recorded, or that are publicly less recognized, are more likely to choose institutional lending over trade credit. As recorded information is better organized and firms become more transparent, they tend to switch to a greater use of trade credit besides institutional loans. This finding is robust across various measures of availability of information to lenders. Our empirical findings are consistent with the classical hypothesis which claims that institutional lenders are capable of auditing borrowers regardless of the availability of the recorded information. Firms with better private recorded information tend to keep using bank lending as well as further use of trade credit rather than switching entirely to trade credit.

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NET

DISC

Delivery   Discount due date   Net due date

Discount rate to the purchased goods   No discount, no penalty   Penalty rate applies
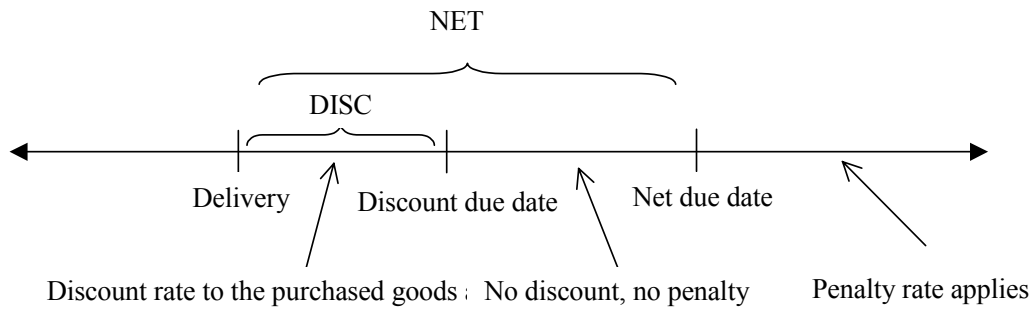
Figure 1: Contractual details of trade credit

Intermediation by an entrepreneur 1 (non-specialist)

Entrepreneur 2

Entrepreneur 1
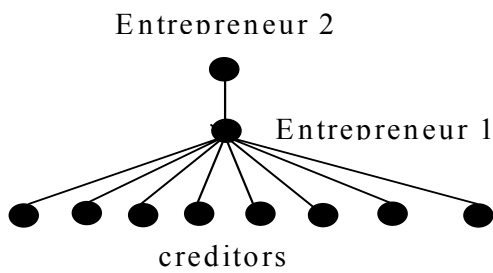
creditors

Intermediation by one of creditors (specialist)

Entrepreneur 1   Entrepreneur 2

creditor 1

creditors
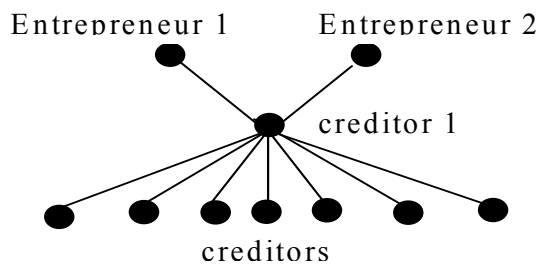
Figure 2: Specialist and non-specialist lenders (from Bond (2004))

Multinomial logit

Bank only

Bank and trade credit

Trade credit only

No external credit

Nested logit

Bank only

Bank and trade credit

Trade credit only

No external credit

Nested multinomial logit

Stage 2

Bank only

Stage 1

Yes

Bank and trade credit

Apply to external
credits

Trade credit only

No
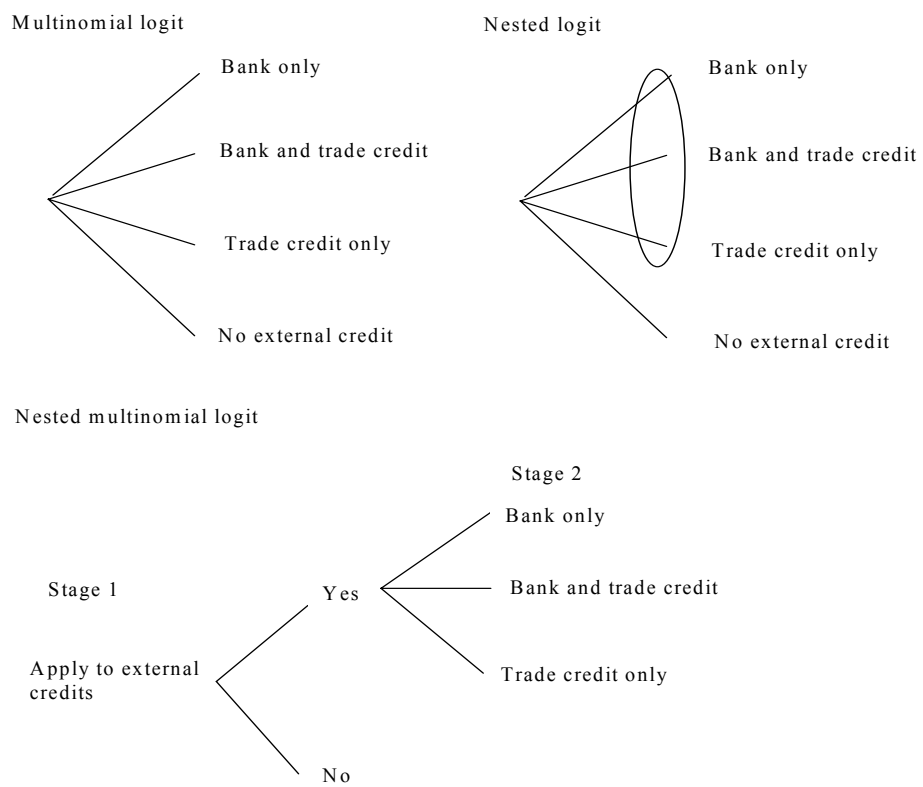
Figure 3: Decision trees of logit models

Unconditional probabilities

Number of branches

☐ No external credit ☐ Lending only ▨ Lending/Trade credit ▨ Trade credit only

Conditional probabilities

Number of branches

☐ Lending only ▨ Lending/Trade credit ▨ Trade credit only
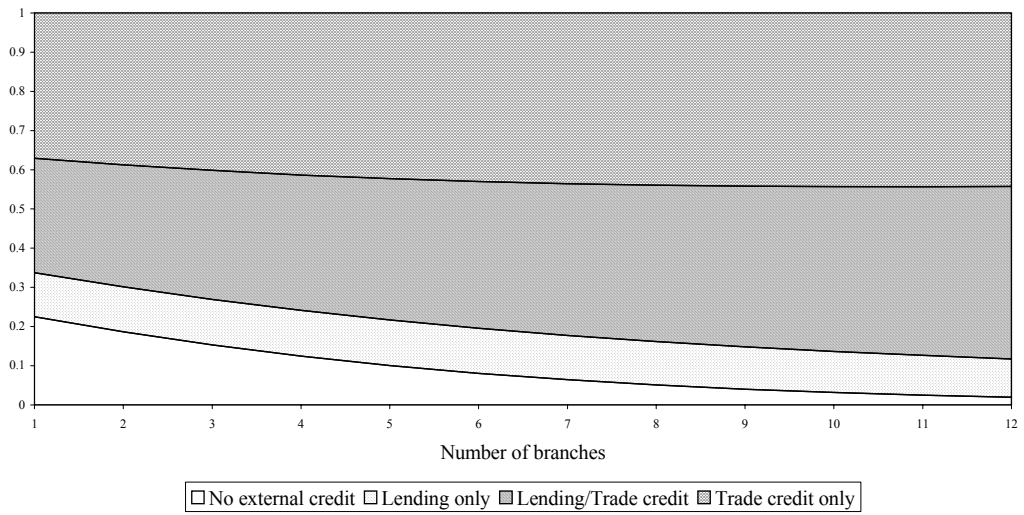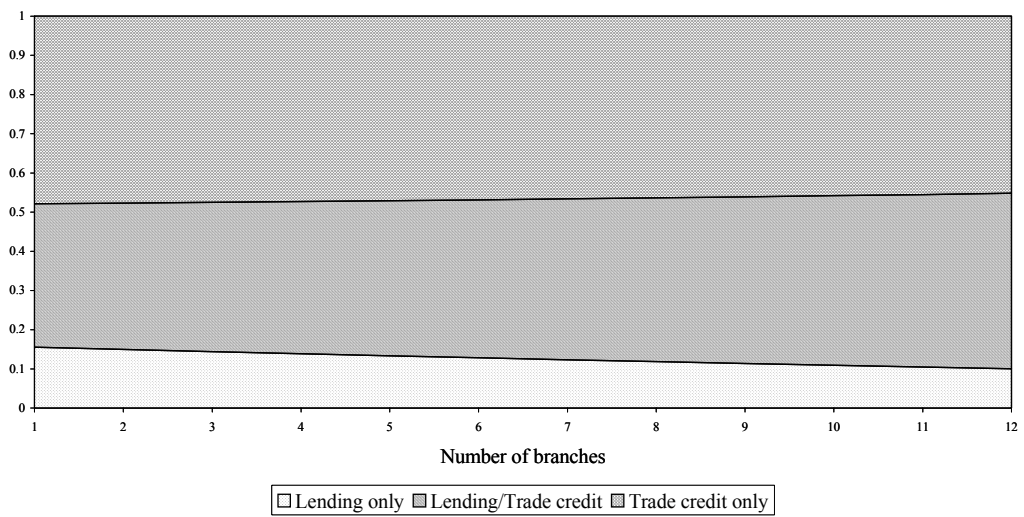
Figure 4: Number of branches and financial choice

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Unconditional Probabiities

Owner experience

☐ No external credit ☐ Lending only ▨ Lending/Trade credit ▨ Trade credit only

Conditional Probabilities

Owner experience

☐ Lending only ▨ Lending/Trade credit ▨ Trade credit only
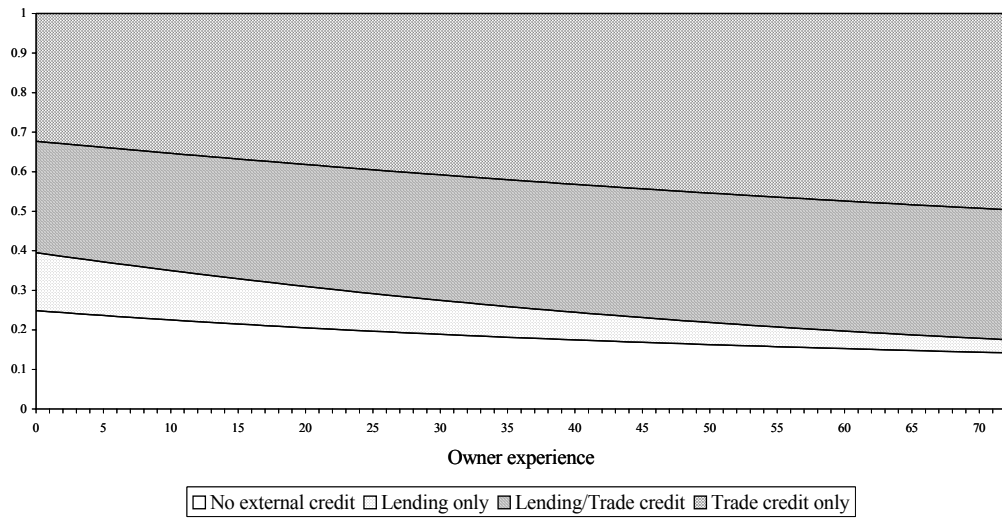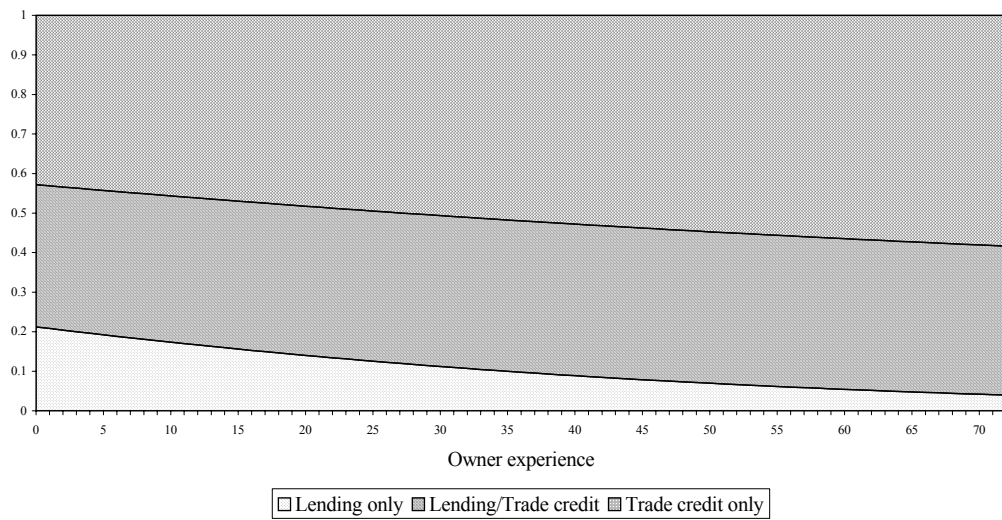
Figure 5: Owner experience and financial choice

Unconditional probabilities

No external credit ☐ Lending only ☐ Lending/Trade credit ☐ Trade credit only

Conditional probabilities

☐ Lending only ☐ Lending/Trade credit ☐ Trade credit only
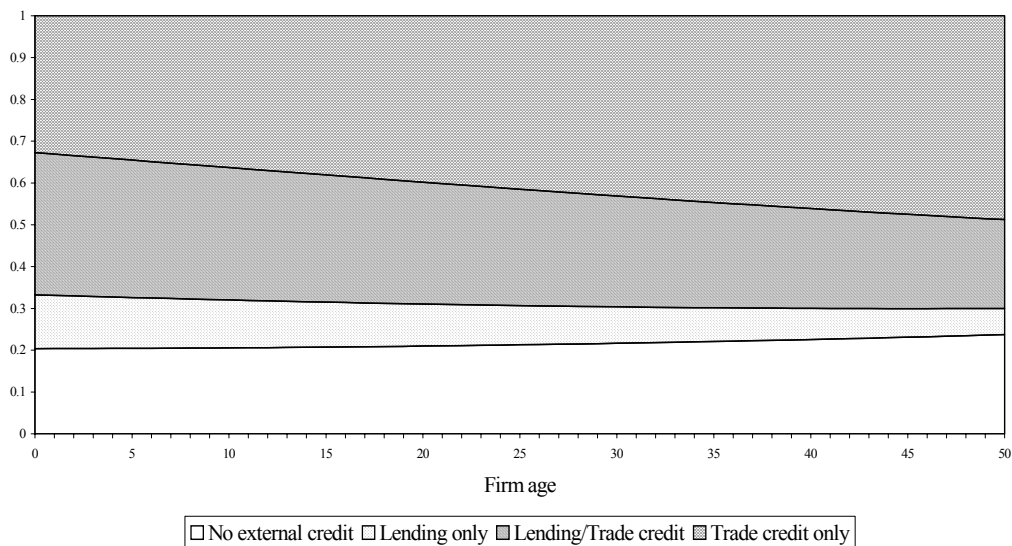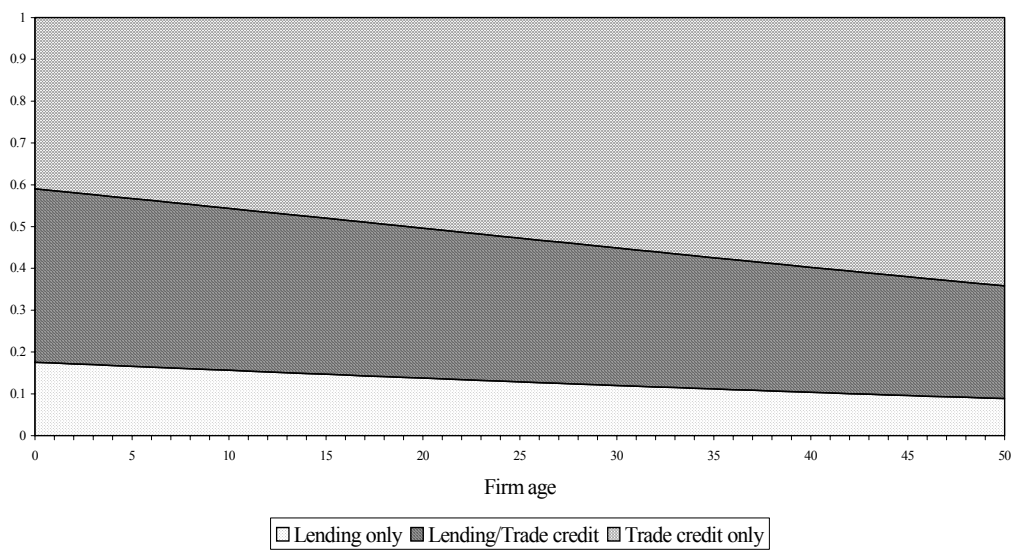
Figure 6: Firm age and financial choice

Unconditional Probabilities

No external credit □ Lending only □ Lending/Trade credit ■ Trade credit only

Conditional Probabilities

□ Lending only ■ Lending/Trade credit ■ Trade credit only
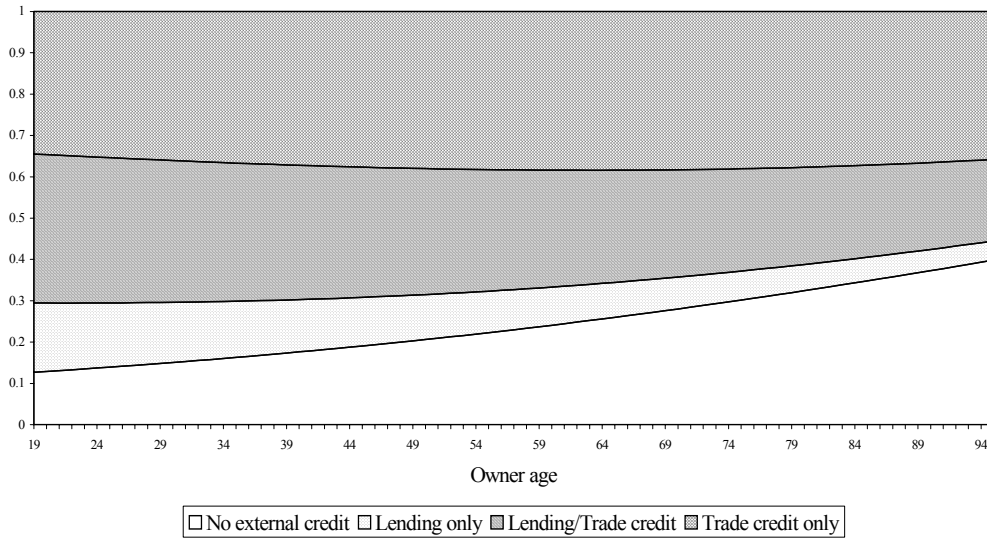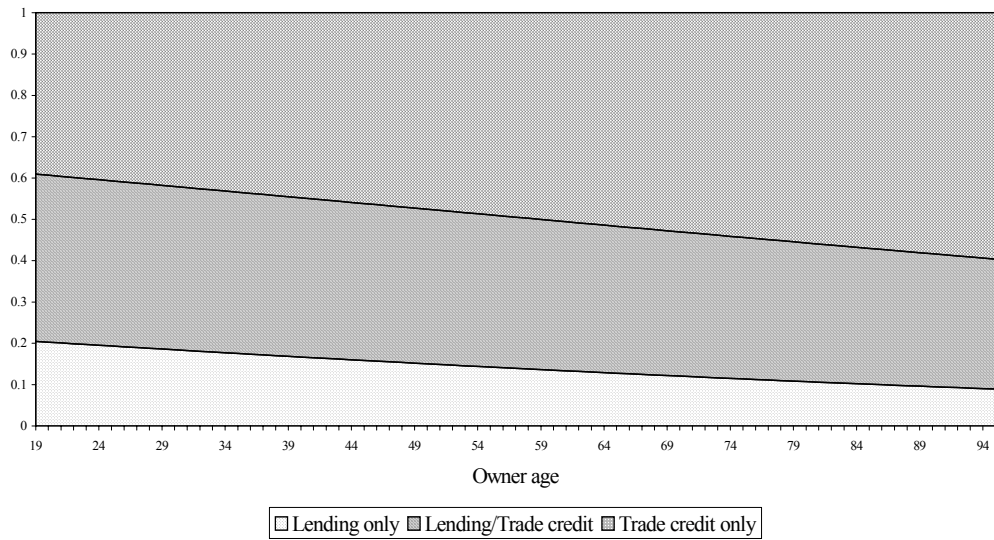
Figure 7: Owner age and financial choice

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Table 1 Descriptive statistics on the variables used to construct the dependent variable

Voluntary withdrawal

		Yes	No
Frequency of applying new loans	zero	487	2046
		63.0	75.5
	once	114	318
		14.8	12.8
	more than once	172	347
		22.3	11.7
	total	773	2711
		22.2	77.8

Top entries are frequencies. Bottom entries for individual items are proportions to the column total, and those for "Total" are proportions to the entire sample size.

Approval of applications

		always	not always	none
Number of applications for new loans	1	363	0	67
		38.3	0.0	7.1
	2	127	32	35
		13.4	3.4	3.7
	3	76	15	25
		8.0	1.6	2.6
	> 3	142	34	58
		15.0	3.6	6.1
	total	708	81	160
		74.6	8.5	16.9

Top entries are frequencies. Bottom entries are proportions to the entire sample size.

Applications

		approved	denied
Institutions	commercial bank	395	108
		50.1	44.8
	savings bank	159	49
		20.2	20.3
	S&L	126	32
		16.0	13.3
	credit union	44	25
		5.6	10.4
	non-bank	65	27
		8.2	11.2
	total	789	241

Top entries are frequencies. Bottom entries are proportions to the column total.

Trade credit denied

		yes	no
Use of trade credit	yes	172	2147
		5.0	61.8
	no	34	1124
		1.0	32.3
	total	206	3271
		5.9	94.1

Top entries are frequencies. Bottom entries are proportions to the entire sample size.

Table 2. Descriptive statistics of information related independent variables

	Value 1	0		mean	median	Mode	top 90 percentile	standard deviation
RECORD	2732	745	BRANCH	1.65	1	1	2	2.62
	78.6	21.4	C_EXP	19.29	18	20	35	11.75
PCFMAN	2421	1056	C_OAGE	50.76	50	55	66	11.25
	69.6	30.4	C_FAGE	14.52	11	3	29	12.14
CORP	849	2628						
	24.4	75.6						
NATIONAL	549	2928						
	15.8	84.2						

Top entries are frequencies. Bottom entries are proportions to the entire sample.

Table 3 List of independent variables

Variable types	Variables	Description
Availability of private information	RECORD	Use of written records to answer the survey
	PCFMAN	Use of computers for accounting
	OWNER	Managed by owner
	CORP	Corporation
Geographical expansion	NATIONAL	Operating nationwide
	BRANCH	The number of branches
Age	C_EXP	Owner's managerial experiences
	C_FAGE	Firm age
	C_OAGE	Owner age
Demography	EDUC	Owner's education
	MINORITY	Minority owned
	FEMALE	Female owned
	FAMILY	Family owned
Region dummies	Mid Atlantic	
	East N Central	
	West N Central	
	South Atlantic	
	East S Central	
	West S Central	
	Mountain	
	Pacific	
Industry dummies	Construction	
	Manufacturing	
	Communication/transportation	
	Wholesale	
	Retail	
	Finance	
	Services	

Table 4 Panel A Parameter estimates (Nested logit and multinomial logit models)

		Nested logit			Multinomial logit		
		j=1	j=2	j=3	j=1	j=2	j=3
β's	RECORD (use of written record)	0.1607	0.0474	0.3278*	0.1717	0.2416*	0.0084
		(0.1288)	(0.1519)	(0.1962	(0.1156)	(0.1242)	(0.1499)
	PCFMAN (computer use for accounting)	0.6116***	0.3074	1.3143***	0.6530***	0.8625***	0.1972
		(0.1212)	(0.1951)	(0.3220)	(0.1083)	(0.1174)	(0.1415)
	OWNER (managed by owner)	-0.2494	-0.1624	-0.9877**	-0.3759**	-0.3816**	0.2833
		(0.1870)	(0.2123)	(0.4336)	(0.1755)	(0.1834)	(0.2772)
	CORP (corporation)	0.5009***	0.3599**	0.8146	0.4993***	0.5981***	0.2665
		(0.1392)	(0.1606)	(0.2604)	(0.1303)	(0.1355)	(0.1814)
	NATIONAL (nationally operating)	0.1304	0.0714	-0.3081	-0.0662	-0.0045	0.2495
		(0.1719)	(0.1775)	(0.2694)	(0.1518)	(0.1558)	(0.1903)
	BRANCH (number of branches)	0.2581***	0.2232***	0.3148***	0.2494***	0.2721***	0.2113***
		(0.0585)	(0.0603)	(0.0795)	(0.0589)	(0.0591)	(0.0658)
	C_EXP (owner experience)	0.0032	0.0089	0.0466**	0.0157**	0.0138**	-0.0058
		(0.0081)	(0.0083)	(0.0204)	(0.0065)	(0.0070)	(0.0093)
	C_FAGE (firm age)	-0.0182**	0.0083	0.0177	0.0009	-0.0163***	-0.0241***
		(0.0071)	(0.0096)	(0.0152)	(0.0053)	(0.0059)	(0.0090)
	C_OAGE (owner age)	-0.0312***	-0.0177**	-0.0046	-0.0164***	-0.0252***	-0.0299***
		(0.0079)	(0.0076)	(0.0128)	(0.0059)	(0.0063)	(0.0077)
	EDUC (owner higher education)	-0.2975**	-0.0934	0.2716	0.0039	-0.1356	-0.3847***
		(0.1346)	(0.1254)	(0.2321)	(0.1036)	(0.1095)	(0.1382)
	MINORITY (minority owner)	0.6347***	0.1173	-0.0533	0.0223	0.4071***	0.5826***
		(0.2148)	(0.1836)	(0.2380)	(0.1468)	(0.1478)	(0.1685)
	FEMALE (female owner)	-0.1711	-0.1401	-0.6054***	-0.3058***	-0.3385***	-0.0475
		(0.1294)	(0.1455)	(0.2240)	(0.1107)	(0.1176)	(0.1410)
	FAMILY (family owned)	-0.4638**	-0.2211	-0.4595	-0.2971**	-0.4650***	-0.2465
		(0.1782)	(0.1871)	(0.2643)	(0.1602)	(0.1634)	(0.2118)
	Mid Atlantic	-0.2889	-0.5244	-0.1094	-0.3616	-0.2037	-0.4895
		(0.3096)	(0.3525)	(0.4826)	(0.2866)	(0.3036)	(0.3775)
	East N Central	-0.5300**	-0.3347	0.4536	-0.2111	-0.2855	-0.8156**
		(0.3176)	(0.3431)	(0.5880)	(0.2845)	(0.3031)	(0.3862)
	West N Central	-0.4624	-0.4362	-0.3256	-0.3856	-0.4454	-0.4957
		(0.3295)	(0.3685)	(0.5005)	(0.3043)	(0.3245)	(0.3988)
	South Atlantic	-0.2685	-0.3957	-0.2615	-0.3147	-0.2734	-0.4255
		(0.3014)	(0.3357)	(0.4498)	(0.2780)	(0.2951)	(0.3614)
	East S Central	-0.5540	-0.5900	-0.0613	-0.4498	-0.3998	-0.8585*
		(0.3451)	(0.3877)	(0.5832)	(0.3195)	(0.3401)	(0.4448)
	West S Central	-0.1417	-0.4499	-0.9218*	-0.5922**	-0.3922	-0.0597
		(0.3365)	(0.3543)	(0.4995)	(0.2941)	(0.3107)	(0.3704)
	Mountain	-0.0929	-0.3890	-0.3866	-0.3605	-0.1233	-0.0950
		(0.3483)	(0.3820)	(0.5075)	(0.3195)	(0.3352)	(0.4069)
	Pacific	-0.3923	-0.4542	-0.7260	-0.4984*	-0.4806	-0.3562
		(0.2986)	(0.3302)	(0.4533)	(0.2743)	(0.2914)	(0.3534)

		Nested logit			Multinomial logit		
		j=1	*j*=2	*j*=3	*j*=1	*j*=2	*j*=3
β's	Construction	0.3459	0.2196	1.7424	0.7256	0.5686	-0.6068
		(0.9707)	(1.0206)	(1.4127)	(0.9113)	(0.9086)	(1.0737)
	Manufacturing	0.4200	0.3075	1.5851	0.7146	0.5711	-0.4039
		(0.9706)	(1.0168)	(1.3928)	(0.9119)	(0.9090)	(1.0729)
	Communication/transportation	-0.1758	-0.7457	-1.3744	-0.9555	-0.7189	-0.2369
		(1.0181)	(1.0283)	(1.3548)	(0.9297)	(0.9206)	(1.0713)
	Wholesale	-0.1718	0.1332	0.2567	0.2670	-0.1456	-0.4184
		(0.9743)	(1.0169)	(1.3322)	(0.9141)	(0.9129)	(1.0719)
	Retail	-0.2662	0.1067	0.5083	0.3386	-0.1440	-0.6010
		(0.9613)	(1.0006)	(1.3099)	(0.9005)	(0.8983)	(1.0504)
	Finance	-1.0095	-0.3165	-2.3693	-0.9573	-1.6460*	-0.5211
		(0.9767)	(1.0699)	(1.4404)	(0.9110)	(0.9153)	(1.0586)
	Services	-0.6417	-0.2980	-0.5832	-0.2569	-0.7256	-0.6258
		(0.9556)	(0.9967)	(1.2971)	(0.8964)	(0.8936)	(1.0427)
	Constant	4.1662	3.2854	3.0760	1.1752	1.8882*	1.7691
		(83.5458)	(83.5403)	(83.5437)	(1.0065)	(1.0144)	(1.2050)
a		1.7236					
		(143.9665)					
ρ		-1.4681**					
		(0.6273)					
Maximized likelihood		-4177.3456			-4185.2554		

***, **, and * show that a coefficient is statistically significant at the 1 percent, the 5 percent, and the 10 percent level, respectively. Standard errors are in parentheses. The same hold true for coming tables.

Table 4 Panel B Parameter estimates (Nested multinomial logit model)

		First stage logit	Second stage multinomial logit	
		$j\neq1$	$j=2$	$j=3$
β's	RECORD (use of written record)	0.1602	0.0725	-0.1501
		(0.1034)	(0.1083)	(0.1466)
	PCFMAN (computer use for accounting)	0.6386***	0.2050*	-0.4903***
		(0.0962)	(0.1057)	(0.1392)
	OWNER (managed by owner)	-0.3012	-0.0258	0.6085**
		(0.1644)	(0.1315)	(0.2567)
	CORP (corporation)	0.4994***	0.0973	-0.2337
		(0.1215)	(0.0987)	(0.1628)
	NATIONAL (nationally operating)	0.0191	0.0534	0.3182*
		(0.1376)	(0.1227)	(0.1759)
	BRANCH (number of branches)	0.2524***	0.0233	-0.0379
		(0.0580)	(0.0146)	(0.0356)
	C_EXP (owner experience)	0.0115**	-0.0028	-0.0256***
		(0.0059)	(0.0060)	(0.0092)
	C_FAGE (firm age)	-0.0070	-0.0178***	-0.0259***
		(0.0049)	(0.0048)	(0.0088)
	C_OAGE (owner age)	-0.0217***	-0.0091	-0.0157**
		(0.0053)	(0.0056)	(0.0077)
	EDUC (owner higher education)	-0.1171	-0.1418	-0.3984***
		(0.0936)	(0.0909)	(0.1312)
	MINORITY (minority owner)	0.2858**	0.3747***	0.5309***
		(0.1281)	(0.1283)	(0.1617)
	FEMALE (female owner)	-0.2596**	-0.0255	0.2889**
		(0.0983)	(0.1039)	(0.1370)
	FAMILY (family owned)	-0.3596**	-0.1692	0.0305
		(0.1480)	(0.1175)	(0.1894)
	Mid Atlantic	-0.3325	0.1600	-0.1261
		(0.2654)	(0.2334)	(0.3410)
	East N Central	-0.3253	-0.1002	-0.6491*
		(0.2650)	(0.2293)	(0.3484)
	West N Central	-0.4268	-0.0442	-0.1082
		(0.2817)	(0.2514)	(0.3618)
	South Atlantic	-0.3157	0.0612	-0.0689
		(0.2582)	(0.2239)	(0.3235)
	East S Central	-0.4936*	0.0390	-0.3956
		(0.2944)	(0.2675)	(0.4138)
	West S Central	-0.4097	0.2094	0.5555*
		(0.2702)	(0.2429)	(0.3351)
	Mountain	-0.2353	0.2270	0.2468
		(0.2941)	(0.2572)	(0.3652)
	Pacific	-0.4693*	0.0302	0.1884
		(0.2544)	(0.2224)	(0.3162)

		First stage logit	Second stage multinomial logit	
		$j \neq 1$	$j=2$	$j=3$
β's	Construction	0.4778	-0.0639	-1.1938
		(0.8184)	(0.7085)	(0.9661)
	Manufacturing	0.5091	-0.0582	-0.9964
		(0.8195)	(0.7062)	(0.9633)
	Communication/transportation	-0.6702	0.3073	0.8041
		(0.8269)	(0.7346)	(0.9751)
	Wholesale	0.0021	-0.3330	-0.5250
		(0.8212)	(0.7127)	(0.9640)
	Retail	-0.0006	-0.3960	-0.7907
		(0.8076)	(0.7040)	(0.9466)
	Finance	-1.0868	-0.5960	0.6855
		(0.8147)	(0.7305)	(0.9621)
	Services	-0.4992	-0.3765	-0.2353
		(0.8034)	(0.7015)	(0.9399)
	Constant	2.6243***	0.6840	0.7020
		(0.9063)	(0.7964)	(1.0898)
Maximized likelihood		-1630.7325	-2549.5978	

Table 5 Panel A Marginal effects for the nested logit model

	Unconditional probabilities				Conditional probabilities		
	No external credit	Trade credit only	Lending/ Trade credit	Lending only	Trade credit only	Lending/ Trade credit	Lending only
RECORD (use of written record)	-2.3578	0.5743	2.5992	-0.8157	-0.5852	2.3314	-1.7462
	(1.8602)	(2.0093)	(1.9822))	(1.3564)	(2.3981)	(2.3415)	(1.8965)
PCFMAN (computer use for accounting)	-10.2432***	4.3446**	8.9555***	-3.0569*	-0.2841	7.2413***	-6.9571***
	(2.3365)	(2.1494)	(2.7434)	(1.5706)	(2.4844)	(2.3394)	(2.2377)
OWNER (managed by owner)	4.6758*	-3.3592	-4.5946	3.2781	-1.6368	-3.7194	5.3562*
	(2.6262)	(2.8927)	(3.1143)	(2.1424)	(3.2239)	(3.1644)	(2.8317)
CORP (corporation)	-7.0972***	2.9283	5.1183**	-0.9494	-0.4392	3.2807	-2.8415
	(2.0446)	(2.1165)	(2.4794)	(1.5268)	(2.3066)	(2.2783)	(1.9777)
NATIONAL (nationally operating)	-0.3720	-1.7151	-0.3953	2.4825	-2.6228	-0.7628	3.3856
	(2.3808)	(2.3837)	(2.5023)	(1.7885)	(2.8018)	(2.7131)	(2.4456)
BRANCH (number of branches)	-3.8643**	1.6827**	1.8962***	0.2854	-0.1705	0.7386**	-0.5680
	(1.8448)	(0.7592)	(0.6145)	(0.4823)	(0.4066)	(0.3755)	(0.4909)
C_EXP (owner experience)	-0.1948	0.2737**	0.1132	-0.1920**	0.2505*	0.0680	-0.3186**
	(0.1282)	(0.1237)	(0.1212)	(0.0976)	(0.1433)	(0.1415)	(0.1329)
C_FAGE (firm age)	0.0405	0.3355***	-0.2391**	-0.1368	0.4619***	-0.2766**	-0.1853
	(0.1017)	(0.1051)	(0.0996)	(0.0855)	(0.1154)	(0.1190)	(0.1186)
C_OAGE (owner age)	0.3284**	0.0488	-0.2058*	-0.1714**	0.2717**	-0.1124	-0.1592
	(0.1647)	(0.1215)	(0.1142)	(0.0799)	(0.1270)	(0.1264)	(0.1011)
EDUC (owner higher education)	1.8901	2.7033	-1.5981	-2.9952**	4.8137**	-1.0832	-3.7305**
	(1.7132)	(1.7780)	(1.7445)	(1.3176)	(2.0542)	(2.0343)	(1.7510)
MINORITY (minority owner)	-4.4522**	-5.0594**	6.0276**	3.4840*	-8.9385***	5.3178*	3.6207
	(2.1674)	(2.5009)	(2.7700)	(1.7837)	(2.8453)	(2.8855)	(2.2378)
FEMALE (female owner)	3.7229**	-2.7929	-2.8284	1.8984	-1.5530	-2.0843	3.6373*
	(1.8746)	(1.9387)	(1.9229)	(1.3497)	(2.3173)	(2.2642)	(1.8734)
FAMILY (family owned)	5.3103**	-0.0889	-4.9326*	-0.2887	2.9069	-3.7588	0.8519
	(2.3146)	(2.4215)	(2.7955)	(1.7679)	(2.6983)	(2.6886)	(2.2970)
Mid Atlantic	5.5070	-4.3479	1.2956	-2.4546	-2.1248	4.3045	-2.1798
	(4.9956)	(4.3614)	(4.9023)	(2.7385)	(5.2151)	(5.3000)	(3.9936)
East N Central	5.0432	1.8485	-1.8703	-5.0214*	6.1269	0.0094	-6.1363*
	(5.0130)	(4.4615)	(4.6423)	(2.6289)	(5.2310)	(5.1298)	(3.6731)
West N Central	7.0277	-2.7795	-2.3948	-1.8534	0.8788	0.0767	-0.9554
	(5.4719)	(4.6185)	(4.8558)	(2.9185)	(5.6194)	(5.5534)	(4.3765)
South Atlantic	4.9230	-3.4999	-0.1868	-1.2363	-1.4736	1.9865	-0.5129
	(4.7504)	(4.2097)	(4.5726)	(2.7728)	(4.9968)	(5.0085)	(4.0006)
East S Central	8.1567	-3.0820	-1.3356	-3.7391	1.4567	2.1853	-3.6420
	(5.8913)	(4.9259)	(5.2132)	(2.9706)	(6.0617)	(6.0591)	(4.5135)
West S Central	6.5457	-7.9743*	-0.9176	2.3463	-6.9816	1.5656	5.4161
	(5.2807)	(4.3697)	(4.8129)	(3.2817)	(5.2904)	(5.4534)	(4.8866)
Mountain	4.0120	-5.3908	1.3112	0.0676	-4.6916	3.4766	1.2151
	(5.4431)	(4.7449)	(5.4050)	(3.2487)	(5.6724)	(5.8143)	(4.7434)
Pacific	7.6032	-5.1093	-2.7773	0.2833	-2.1680	-0.2933	2.4613
	(4.8550)	(4.1144)	(4.3784)	(2.8321)	(4.9363)	(4.9128)	(4.1782)
Construction	-6.6174	5.3093	7.2607	-5.9526	2.9331	6.0430	-8.9761
	(11.4344)	(14.3917)	(15.8619))	(6.3157)	(16.1572)	(15.7630)	(7.8334)
Manufacturing	-7.2886	5.3621	6.8786	-4.9521	2.5324	5.2676	-7.8000
	(11.0936)	(14.3298)	(15.7444)	(6.6870)	(16.0262)	(15.5851)	(8.2162)
Communication/transportation	10.8532	-12.7962	-1.0416	2.9847	-11.7131	3.4158	8.2973
	(16.9037)	(12.0126)	(14.5462)	(9.0796)	(15.4317)	(15.7967)	(14.5452)
Wholesale	-0.0034	4.1482	-2.6057	-1.5391	5.3986	-3.2070	-2.1916
	(13.7994)	(13.5999)	(14.1199)	(7.8649)	(16.0128)	(14.5938)	(10.7203)
Retail	0.2431	5.6335	-2.6852	-3.1913	7.6008	-3.1581	-4.4427
	(13.6683)	(13.3761)	(14.0479)	(7.5743)	(15.7666)	(14.5771)	(10.2654)
Finance	20.4747	-9.3584	-16.2643	5.1480	-1.2649	-15.0697	16.3346
	(18.1010)	(11.7498)	(10.5895)	(9.2745)	(16.5796)	(12.2786)	(16.4507)
Services	7.8781	-0.4160	-6.6736	-0.7885	4.2684	-5.0419	0.7735
	(13.7631)	(13.1588)	(13.8357)	(8.2144)	(15.6162)	(14.6418)	(11.2454)
N	735	1307	1046	389	1307	1046	389

Table 5 Panel B Marginal effects for multinomial logit and nested multinomial models (conditional probabilities)

	Multinomial logit			Nested multinomial logit		
	Trade credit only	Lending/ Trade credit	Lending only	Trade credit only	Lending/ Trade credit	Lending only
RECORD (use of written record)	-0.1883	2.4281	-2.2399	-0.3182	2.4173	-2.0991
	(2.4192)	(2.3437)	(1.9426)	(2.4321)	(2.3526)	(1.9723)
PCFMAN (computer use for accounting)	-0.7732	7.1013***	-6.3282***	-0.4910	7.1833***	-6.6922***
	(2.4811)	(2.3256)	(2.2024)	(2.5087)	(2.3442)	(2.2806)
OWNER (managed by owner)	-4.0322	-3.5694	7.6016***	-3.3374	-3.7700	7.1074**
	(3.2120)	(3.1376)	(2.7347)	(3.2223)	(3.1599)	(2.8053)
CORP (corporation)	-0.2512	3.4414	-3.1902	-0.2273	3.4149	-3.1876
	(2.3211)	(2.2733)	(1.9705)	(2.3286)	(2.2830)	(2.0023)
NATIONAL (nationally operating)	-3.0486	-0.2555	3.3041	-2.8996	-0.4663	3.3659
	(2.7884)	(2.6897)	(2.4421)	(2.8089)	(2.7067)	(2.4923)
BRANCH (number of branches)	-0.1543	0.7109*	-0.5565	-0.1667	0.7237*	-0.5570
	(0.3990)	(0.3653)	(0.4670)	(0.4023)	(0.3701)	(0.4777)
C_EXP (owner experience)	0.1681	0.0688	-0.2369*	0.2064	0.0721	-0.2786**
	(0.1368)	(0.1338)	(0.1218)	(0.1406)	(0.1377)	(0.1297)
C_FAGE (firm age)	0.4548***	-0.2573**	-0.1975*	0.4672***	-0.2639**	-0.2034*
	(0.1125)	(0.1143)	(0.1180)	(0.1158)	(0.1176)	(0.1216)
C_OAGE (owner age)	0.2371*	-0.1279	-0.1092	0.2547**	-0.1230	-0.1317
	(0.1239)	(0.1222)	(0.0958)	(0.1264)	(0.1246)	(0.1005)
EDUC (owner higher education)	4.8506**	-1.1148	-3.7357*	4.9234**	-1.1024	-3.8209**
	(2.0924)	(2.0582)	(1.7763)	(2.0930)	(2.0595)	(1.8022)
MINORITY (minority owner)	-10.1780***	5.7499**	4.4281*	-9.7676***	5.6497*	4.1180*
	(2.8249)	(2.8961)	(2.3074)	(2.8385)	(2.9015)	(2.3105)
FEMALE (female owner)	-1.0522	-2.0849	3.1372*	-1.3558	-2.0883	3.4441*
	(2.3276)	(2.2529)	(1.8684)	(2.3415)	(2.2659)	(1.9184)
FAMILY (family owned)	2.5918	-4.0490	1.4572	2.7298	-3.9664	1.2366
	(2.7340)	(2.6965)	(2.2796)	(2.7388)	(2.7046)	(2.3298)
Mid Atlantic	-1.9339	4.2268	-2.2929	-1.9778	4.2616	-2.2839
	(5.2570)	(5.3120)	(4.0050)	(5.2719)	(5.3297)	(4.0744)
East N Central	5.0769	1.4786	-6.5554*	5.7649	1.1467	-6.9115
	(5.2566)	(5.1652)	(3.6945)	(5.2772)	(5.1691)	(3.7427)
West N Central	1.7266	-0.7735	-0.9531	1.4358	-0.4280	-1.0078
	(5.6537)	(5.5187)	(4.3970)	(5.6760)	(5.5536)	(4.4666)
South Atlantic	-0.0206	1.5088	-1.4882	-0.6277	1.7385	-1.1108
	(5.0393)	(5.0003)	(3.9193)	(5.0503)	(5.0228)	(4.0188)
East S Central	1.6944	3.2616	-4.9560	1.7867	2.9506	-4.7373
	(6.1227)	(6.1066)	(4.3724)	(6.1418)	(6.1153)	(4.5020)
West S Central	-6.8030	1.7306	5.0724	-7.0676	1.8001	5.2674
	(5.3409)	(5.4476)	(4.9226)	(5.3518)	(5.4768)	(5.0123)
Mountain	-5.7737	3.9612	1.8125	-5.4513	3.8138	1.6375
	(5.6988)	(5.8633)	(4.8589)	(5.7116)	(5.8685)	(4.8900)
Pacific	-1.1999	-0.3406	1.5405	-1.6916	-0.3090	2.0006
	(4.9805)	(4.9131)	(4.1156)	(4.9931)	(4.9325)	(4.2210)
Construction	11.0691	3.4158	-14.4849	8.5238	4.8184	-13.3422
	(16.0683)	(15.5633)	(7.1498)	(16.2689)	(15.7287)	(7.5465)
Manufacturing	9.4961	2.6028	-12.0989	7.1990	3.9120	-11.1111
	(16.0360)	(15.4254)	(7.5057)	(16.2048)	(15.5717)	(7.9494)
Communication/transportation	-8.6019	1.5824	7.0195	-10.3015	2.6996	7.6019
	(16.1202)	(15.5261)	(14.4338)	(15.9738)	(15.6850)	(14.8743)
Wholesale	11.4419	-5.7227	-5.7192	9.0102	-4.7402	-4.2700
	(15.8107)	(14.2808)	(9.2463)	(16.0944)	(14.4613)	(10.0712)
Retail	14.2482	-5.9738	-8.2744	11.7496	-4.7656	-6.9840
	(15.3972)	(14.3061)	(9.4292)	(15.7256)	(14.4808)	(9.9182)
Finance	9.1966	-17.8019	8.6053	6.0250	-17.0025	10.9775
	(16.6356)	(11.9824)	(14.7992)	(16.9450)	(12.1073)	(15.9690)
Services	10.4325	-8.6412	-1.7913	7.9599	-7.2374	-0.7225
	(15.3232)	(14.5377)	(11.1428)	(15.6352)	(14.6400)	(11.3912)
N	1307	1046	389	1307	1046	389

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Table 6 Panel A Unconditional probabilities of financial choice when one dummy variable is held fixed

	Dummy variable=0				Dummy variable=1			
	No external credits	Trade credit only	Lending/Trade credit	Lending only	No external credits	Trade credit only	Lending/Trade credit	Lending only
RECORD (use of written record)	22.9445	37.1596	28.0724	11.8235	20.5867	37.7339	30.6717	11.0078
PCFMAN (computer use for accounting)	27.9457	34.7930	23.9425	13.3188	17.7025	39.1376	32.8980	10.2619
Owner (managed by owner)	16.8665	40.6519	34.2903	8.1913	21.5423	37.2926	29.6957	11.4694
CORP (corporation)	22.5901	37.0192	28.9679	11.4229	15.4929	39.9475	34.0862	10.4735
NATIONAL (nationally operating)	21.2034	37.8273	30.1586	10.8106	20.8314	36.1122	29.7633	13.2931
BRANCH (number of branches)	-	-	-	-	-	-	-	-
C_EXP (owner experience)	-	-	-	-	-	-	-	-
C_FAGE (firm age)	-	-	-	-	-	-	-	-
C_OAGE (owner age)	-	-	-	-	-	-	-	-
EDUC (owner higher education)	20.1782	36.1070	30.9830	12.7318	22.0683	38.8103	29.3849	9.7365
MINORITY (minority owner)	21.7990	38.2786	29.3536	10.5688	17.3468	33.2192	35.3812	14.0529
FEMALE (female owner)	20.0429	38.3766	30.9296	10.6509	23.7659	35.5836	28.1012	12.5493
FAMILY (family owned)	16.4700	37.7347	34.3394	11.4559	21.7802	37.6458	29.4068	11.1672
Mid Atlantic	20.5358	38.0859	29.9005	11.4778	26.0428	33.7379	31.1961	9.0232
East N Central	20.5366	37.2495	30.3478	11.8662	25.5798	39.0980	28.4774	6.8448
West N Central	20.6687	37.7441	30.2642	11.3230	27.6964	34.9646	27.8694	9.4695
South Atlantic	20.3866	38.1480	30.0734	11.3920	25.3096	34.6481	29.8866	10.1556
East S Central	20.7319	37.7171	30.1589	11.3921	28.8886	34.6351	28.8232	7.6530
West S Central	20.5054	38.4447	30.1847	10.8652	27.0510	30.4704	29.2671	13.2115
Mountain	20.9225	37.9339	29.9900	11.1536	24.9345	32.5431	31.3012	11.2212
Pacific	19.7503	38.5684	30.6192	11.0621	27.3536	33.4591	27.8420	11.3454
Construction	21.6942	37.0971	29.3166	11.8920	15.0768	42.4064	36.5774	5.9394
Manufacturing	21.7058	37.1545	29.4010	11.7387	14.4172	42.5165	36.2796	6.7867
Communication/transportation	20.7455	38.0683	30.1686	11.0176	31.5987	25.2721	29.1270	14.0022
Wholesale	21.1384	37.2584	30.3152	11.2880	21.1350	41.4065	27.7095	9.7490
Retail	21.1331	36.3642	30.5929	11.9099	21.3761	41.9977	27.9076	8.7185
Finance	19.9887	38.1007	31.1580	10.7527	40.4633	28.7422	14.8937	15.9007
Services	17.7434	37.7870	32.9433	11.5264	25.6215	37.3709	26.2697	10.7379
N	735	1307	1046	389	735	1307	1046	389

Table 6 Panel B Conditional probabilities of financial choice when one dummy variable is held fixed

	Dummy variable=0			Dummy variable=1		
	Trade credit only	Lending/Trade credit	Lending only	Trade credit only	Lending/Trade credit	Lending only
RECORD (use of written record	48.1415	35.2245	16.6340	47.5563	37.5559	14.8878
PCFMAN (computer use for accounting)	47.9638	32.0512	19.9851	47.6797	39.2924	13.0279
Owner (managed by owner)	49.1842	40.4383	10.3776	47.5474	36.7188	15.7338
CORP (corporation)	47.8625	36.3097	15.8278	47.4234	39.5904	12.9863
NATIONAL (nationally operating)	48.0205	37.1492	14.8303	45.3977	36.3864	18.2159
BRANCH (number of branches)	-	-	-	-	-	-
C_EXP (owner experience)	-	-	-	-	-	-
C_FAGE (firm age)	-	-	-	-	-	-
C_OAGE (owner age)	-	-	-	-	-	-
EDUC (owner higher education)	45.1594	37.6614	17.1792	49.9732	36.5782	13.4487
MINORITY (minority owner)	48.9472	36.3988	14.6540	40.0086	41.7166	18.2747
FEMALE (female owner)	48.1361	37.6667	14.1972	46.5830	35.5824	17.8345
FAMILY (family owned)	45.1909	40.2611	14.5480	48.0977	36.5024	15.3999
Mid Atlantic	47.9108	36.5315	15.5576	45.7861	40.8361	13.3779
East N Central	46.8350	37.0870	16.0781	52.9619	37.0963	9.9418
West N Central	47.5819	37.0462	15.3718	48.4607	37.1229	14.4164
South Atlantic	47.9159	36.6978	15.3863	46.4423	38.6844	14.8733
East S Central	47.5663	36.9351	15.4986	49.0230	39.1204	11.8566
West S Central	48.4265	36.9079	14.6656	41.4449	38.4734	20.0817
Mountain	47.9734	36.8183	15.2083	43.2818	40.2948	16.4234
Pacific	48.1263	37.1256	14.7480	45.9584	36.8323	17.2093
Construction	47.3873	36.3854	16.2273	50.3204	42.4284	7.2512
Manufacturing	47.4783	36.4976	16.0241	50.0107	41.7653	8.2241
Communication/transportation	48.1062	36.9338	14.9599	36.3931	40.3497	23.2573
Wholesale	47.2816	37.2887	15.4297	52.6802	34.0817	13.2381
Retail	46.1258	37.6228	16.2515	53.7265	34.4647	11.8088
Finance	47.7276	38.0012	14.2712	46.4627	22.9315	30.6058
Services	45.9520	39.1521	14.8959	50.2204	34.1102	15.6694
N	1307	1046	389	1307	1046	389