LOAN SEARCH AND BANKING RELATIONSHIPS

William C. Dunkelberg
Department of Economics
Fox School of Business and Management
Temple University
Philadelphia, PA 19122

Michael A. Leeds
Department of Economics
Fox School of Business and Management
Temple University
Philadelphia, PA 19122

Jonathan A. Scott*
Department of Finance
Fox School of Business and Management
Temple University
Philadelphia, PA 19122

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*Corresponding author

Telephone: 215.204.7605
Fax: 215.204.1697
E-mail: scottjon@sbm.temple.edu

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Abstract

This paper examines the determinants of small firm search for business financing using survey data from a sample of over 2,700 firms. Twenty-five percent of the firms searched at more than one source before they were successful, turned down or gave up. We develop a model of loan search where the firm seeks another loan offer if the net gain from search exceeds the reservation profit level, which is a function of profit level without the loan, time preference of the firm, the expected cost of the loan, and the cost of search. Stronger banking relationships reduce the variance of the expected cost of the loan and thus reduce the chance of an additional search. Survey proxies for all of the key variables are significant in explaining the probability of searching at more than one source.

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1. Introduction

External capital, especially debt finance, is the lifeblood for many small, growing firms (Berger and Udell, 2002). The process of finding a lender that meets the desired terms of the borrower is costly, both in terms of search time and out-of-pocket costs. In this paper, a one-period model of the search for credit is developed that identifies the key variables affecting the reservation profit level for the firm owner. The decision reservation level of profit is shown to be a function of the firm's level of profits without the loan, the expected loan cost, the firm's time preference, and the cost of search. A key objective of the analysis is to determine how strength of banking relationships affect the reservation profit level.[1] While the effect of banking relationships on credit availability, loan terms, and number of financial institutions used has been well documented internationally (Berger and Udell 1995, Cole 1998), its effect on the first step in the capital acquisition process, searching for a lender before a credit granting decision is made, has not been addressed. In this paper, stronger banking relationship are posited to reduce the variance of the expected cost of the loan, thus decreasing the probability of an additional search.

This paper uses survey data from 3,600 small U.S. firms that are members of the National Federation of Independent Business (NFIB). The primary question of interest is the number of sources these firms contacted before they were successful in obtaining a loan or stopped trying. Although 75% of the firms attempting to borrow reported success in one try (perhaps directly reflecting the value of a bank relationship) or quit trying, the remaining 25% made two or more attempts. The survey provides information on firm demographics, market size and the strength of banking relationship.

The empirical tests focus on the probability that more than one search occurs or they quit trying. Proxies for all of the key elements of the model are significant as expected. Search increases with lower cost (e.g., more banks in a local market area), higher profits without a loan (firms with no need to borrow), greater variance in distribution of loan

[1] Banking relationships refer to the process of accumulating non-public information to allow the lender to better understand an informationally opaque firm, thus mitigating adverse selection in the credit granting process. See Boot (2000).

terms (younger firms and those with weaker banking relationships), and lower time preference for profits (firms that rank finding the lowest cost source of funds as an important element of their banking relationships). Although stronger relationships are found to reduce search, endogeneity between firms' seeking new lenders to improve their banking relationship and search, i.e., firms search more to obtain a better relationship, potentially confounds the interpretation of the results. Several different approaches to controlling for this endogeneity do not substantially change the original results.

2. A Model of Loan Search

In this section a simple model of a firm's search for a loan is developed. The model focuses on a profit-maximizing firm seeking a loan for an investment project that produces a known stream of revenue with present discounted value R. The cost of obtaining funds for the project depends on a variety of terms associated with the loan (e.g., the interest rate and other fees associated with the loan). For simplicity, we collapse the vector of characteristics of the loan into a single cost measure, *X*. In addition, the firm experiences a search cost attributable to the resources spent soliciting loan offers. These can include the resources spent seeking out a lender and providing it with the information the lender needs to make a loan offer.

We assume that the firm searches for one loan offer per period. If the firm's search is unsuccessful, meaning either no offer was made or it did not accept the offer, the firm pays search costs, c_t, and receives the default revenue R_0 (which need not be positive) in the next period. Thus, if the firm succeeds in finding a loan in its first attempt it enjoys profits:

$$p = R - X_1 - c_1 \tag{1}$$

If it searches unsuccessfully for *(t-1)* periods ($t>1$) but succeeds in obtaining a loan in the t^{th} period, its profits are

$$p = \sum_{s=1}^{t-1}(1+d)^{t-s} R_0 + R - X_t - \sum_{s=1}^{t}(1+d)^{t-s} c_s \tag{2}$$

The first term in Equation 1 reflects the fact that the firm receives the default income for *(t-1)* periods. If the firm has a constant time rate of discount equal to d, the summation $\sum_{s=1}^{t-1}(1+d)^{t-s}R_0$ yields the present value of past default revenue. The second and third terms on the right hand side of Equation 1 reflect the net revenue (R- X_t) of accepting the loan in period *t*. The final term represents the accumulated search costs. Profits can thus be decomposed into two parts. First is the profit from the project itself, which begins in period *t:*

$$p_t = R - X_t - c_t \tag{3a}$$

If the search for a lender is immediately successful ($t=1$), p_t is the total profit of the firm. If search lasts longer than one period, we must also include the net revenue (perhaps negative) from prior, unsuccessful, searches:

$$p_{(t-1)} = \sum_{s=1}^{t}(1+d)^{t-s}R_0 - \sum_{s=1}^{t-1}c_s \tag{3b}$$

It is trivial to show that Equation (2) is the sum of Equations (3a) and (3b). The benefit of this decomposition is that it separates out the "sunk costs" associated with earlier searches. On the margin, the sunk costs of Equation (3b) have no impact on the desirability of future search, so most of the analysis that follows focuses on Equation (3a). The decomposition also shows the difference between the cost of searching for a loan (c_s), which occurs every period in which search occurs and the cost of accepting a loan (X_t), which occurs only in period *t*.

The firm does not know, ex ante, what X will be for any given lender. It does, however, have an expectation of what its loan costs will be for each *lender*:

$$m_t = \int_{-\infty}^{\infty} x dF_t(x) \qquad (4)$$

where $F_t(x)$ is the subjective cumulative distribution function of the cost of the loan that the firm anticipates receiving from lender *t*.

The firm begins the search process by ordering the *T* potential lenders according to the expected profit of borrowing from them. Because the revenue that the project generates is independent of the source of the loan, the firm's expected profits from a given search depends solely upon the costs of obtaining the loan, c_t, and the costs of the loan itself, X_i. Hence the firm will order its search according to the inequalities:

$$m_1 + c_1 < m_2 + c_2 < ... < m_T + c_T \qquad (5)$$

This inequality tells us that the firm seeks a loan first from lender #1, second from lender #2, and so on until it reaches the least attractive lender, ex ante, lender *N*.

The firm does not search for any loans at all if the expected value of Equation (1a) for lender #1 is less than the default revenue:

$$R_0 > R - (m_1 + c_1) \qquad (6)$$

In other words, the firm does not search for a loan if its profits from seeking no loan at all exceed the highest expected profits of search.

If the firm's expected profit from seeking a loan exceeds the profit from not searching at all, it seeks a loan from the lender from whom it expects the most favorable terms. When lender #1 announces the terms (e.g., interest rate, collateral, compensating balances, requirements for other business) of its loan, the firm knows with certainty the value of the stream of profits it would enjoy from accepting the loan offer, $R - X_1$ (c_1 is a sunk cost at this point).[2] It then decides whether to conduct further search by comparing

[2] We can account for the case that the lender refuses to offer a loan by calling this a loan with infinite costs ($X_i = \infty$).

the known profit of accepting the loan offer from lender #1 with the expected profit from seeking a loan from lender #2. While the *expected* profit of obtaining a loan from lender #1 was greater than the expected profit of obtaining a loan from lender #2, the actual cost of the loan may be greater than expected, so the firm may find it profitable to turn down lender #1's terms and seek a loan from lender #2.

More generally, the firm conducts and additional search for a loan if the expected net gain from another search exceeds the cost of search. The net gain is the difference between the expected profits of borrowing from lender *t* and the certain profits of borrowing from lender *t-1*. The known profits from borrowing from lender *t-1* are given by Equation (2). The prospective profits for one more period of search are also given by Equation (2) but discounted by the factor $\frac{1}{(1+d)}$. When the terms are rearranged slightly, the difference between the two is:

$$\Delta = \left[R_0 + \frac{1}{(1+d)}\left(R - \left(m_t + c_t\right)\right)\right] - \left(R - X_{t-1}\right) \qquad (7)$$

The intuition behind Equation (7) is straightforward. The term in brackets is the firm's expected profit if it opts not to accept the first loan and receives the default revenue, R_0. The firm then searches for a loan at cost c_t and expects to receive a loan offer at cost m_2. The difference between this profit and the sure profit from accepting lender *(t-1)'s* offer is the net gain from one more search. If this difference is positive, that is, if $\Delta>0$, then the firm makes one more search.

Two points related to Equation (7) bear noting. First, none of the costs or returns from previous searches appears in Equation (7). That is because they are effectively "sunk" as far as the firm is concerned and do not bear on the current search decision. This factor gives rise to the second point, that the overall profits given by Equation (1) may be negative.

We can express the loan offer that just induces the firm to stop its search as the reservation loan offer. The reservation offer, X^{R}_{t-1}, sets the gain from taking the loan

from the lender *(t-1)* equal to the expected net gain from one more search. This effectively sets $D = 0$ in Equation (7) and solves for X_{t-1}:

$$X_{t-1}^{R} = \frac{m_t + c_t}{1+d} + \left(R - \left(R_0 + \frac{R}{1+d} \right) \right) \qquad (8)$$

The intuition behind equation (8) is quite simple. If there were no search costs or sacrificed earnings, the reservation cost of borrowing from lender *t-1* is the (discounted) expected cost of borrowing from lender *t*. Because an additional search involves additional search costs, the reservation costs from lender *t-1* rise above the expected terms from lender *t* (again, recall that the of earlier searches costs f are sunk costs). Finally, the reservation costs reflect the effect of waiting one more period for the revenue stream to begin.

If the firm decides to seek a loan from the *ex-ante* next-best lender, it then formulates another reservation profit level and continues to seek loans until it generates a loan whose profit level exceeds the reservation profit level or until the expected profit from seeking another loan is less than R_0.

There are two reasons why the a lender might fail to provide terms that are less profitable than the firm's reservation profit level, thereby preventing further search. First, the firm's subjective cdf for the first lender, $F_{t-1}(x)$ may be mistaken. In fact, the true cdf for lender *t-1*may be less than the true cdf for lender *t*.[3] In other words, the firm may have ranked the lenders incorrectly. Alternatively, the firm may have correctly specified the cdf, but it may simply have received a bad draw from this distribution.

Several factors in the lending and firm environment increase the reservation cost level, X_{t-1}^{R}, thereby increasing the likelihood of a bad draw. For example, it is easy to show by differentiating Equation 8 that the reservation level of cost falls with R_0 but rises with c_t and *d*. Intuitively, a firm with a higher default revenue stream, R_0, faces less pressure to obtain a loan immediately. It is, therefore likely to be more selective about the loan it selects and more likely to undertake additional search. For example, a firm

[3] For simplicity, we ignore the possibility that the firm updates its cdf for other lenders in light of its offer from the first lender.

that needs seasonal working capital will have lower profits without the loan than a firm that is shopping to refinance an existing loan or considering capital expansion.

The opposite occurs as the firm becomes more focused on profit in the current period, that is, as d rises. A firm that cannot wait for future profits will have a higher reservation cost level. For example, a firm that is willing to commit the time to finding the lowest cost source of funds is willing to wait longer for future profits than a firm that is not concerned about getting the lowest cost. Less immediacy makes it possible for the firm to set more favorable reservation costs and search more to meet these terms.

Search is also less likely when c_t, the cost of seeking a loan from the second lender, rises. As c_t rises, the net expected value of the second loan offer falls, reducing the right-hand side of equation (4). This, in turn, reduces the reservation profit level, which makes a second search less likely.

Search cost should be a function of market structure. Banks should find it easier to locate alternative lenders in metropolitan markets with a greater density of banks (and lower deposit concentration) than in rural markets with fewer banks that may be further apart. Although non-metropolitan, rural markets have higher deposit concentration ratios, the distance between lenders may be further than in metropolitan markets.[4] Lending institutions in more concentrated markets are also more likely to exercise monopoly power, which may raise the cost to the applicant of processing their loan application. The cost of search may also be a function of the relationship between the firm and the financial institutions. A *de novo* search will be much more expensive than a search at the current bank, where banking relationships are already established. Thus, if the firm has multiple relationships with a number of lenders, then, other things equal, it should search more.[5]

Finally, the firm's uncertainty regarding the cost of the loan it will obtain from the lender t-1 affects the reservation cost level for the first (or k^{th}) lender. The distribution

[4] Technology may allow search outside of local markets, but this issue is outside the scope of the paper and was not a substantially important search alternative in the 1990-1995 period covered by the survey.

[5] The banking relationship literature (e.g., Cole 1998, Petersen and Rajan 1995) argues that an increased number of lenders create a free rider situation where no bank wants to invest in the production of private information if the benefits may inure to the other lenders. As a result, the use of an increased number of lenders creates adverse credit market outcomes, resulting in more search to obtain their desired funding. The empirical challenge is to discriminate between the competing explanations.

$F_t(x)$ can affect X^R_{t-1} in either of two ways. First, the more optimistic the firm is about the costs of the loan from lender t, m_t will be lower. As seen in Equation (8), the lower m_t is, the lower X^R_{t-1} is, and the more selective the firm is. Second, while the mean values of expected costs, m_{t-1} and m_t, , set the order of search, a higher variance in the cdf increases the probability of a draw from either extreme of the distribution. This increases the probability that the realized cost of the loan, X_{t-1} is far lower than expectations, but it also increases the probability of a bad draw so that $X_{t-1} > X^R_{t-1}$.

The properties of the cdf reflect both demand and supply side properties and attitudes. Firms are likely to be more optimistic about the terms they will receive from lenders with whom they have established a long-term relationship. They are, moreover, likely to have a clearer expectation of the terms they will receive, leading to a more concentrated distribution function, $F_{t-1}(x)$. The narrower the distribution function, the lower the likelihood of an unusually good or unusually bad draw from the distribution. Because the probability of a bad draw from lender *t-1*rises as $F_{t-1}(x)$ becomes more diffuse, the likelihood of additional searches rises. Similarly, the more diffuse $F_t(x)$ is, the likelihood of a particularly good draw and the greater the chance of additional searches. This implies that close relationships with many banks, which presumably lead to less diffuse distributions, will lead to fewer searches while the lack of relationships will lead to more searches. The effect here is in the opposite direction of search costs. Which effect dominates is an empirical question that only our estimation can answer.

3. Data Description

3.1 Survey description

The data in this study come from the 1995 Credit, Banks and Small Business Survey conducted by the National Federation of Independent Business (NFIB), the fifth in a series that extends back to 1980.[6] The purpose of the study is to collect information about the credit market experiences of a random sample of the NFIB's 500,000 members. Along with basic demographic information, the survey asks about problems with financial institutions (including their experience with recent mergers), sources of funding,

[6] A brief description of the survey is presented in Dunkelberg (1998).

current bank funding, the outcome of most recent loan search, attributes of most recent loan received, an assessment of bank competition for their business and a ranking of characteristics of bank service performance. Eighteen thousand surveys were sent initially, and after two mailings, 3,642 completed surveys were available.[7] To improve the response rate, the questionnaire was mailed twice within a two-week interval to the random sample of members selected and duplicate responses were eliminated.

3.2 Comparison to NSSBF Data

Unlike the National Survey of Small Business Finance (NSSBF) conducted by the Federal Reserve Board, the NFIB Credit, Banks and Small Business Surveys do not ask for detailed balance sheet and profit/loss information. No attempt is made to empirically estimate 'no answer' responses, unlike the NSSBF. Thus, in the multivariate empirical analysis, dummy variables are created for no answer categories when used as independent variables. When used as dependent variables, the 'no answer' responses are omitted from the analysis.

Table 1 compares the distribution of the 1995 NFIB sample to the distribution of the 1993 NSSBF. This comparison shows that the firms in the NFIB sample tend to be slightly larger than those in the NSSBF survey in terms of employees, sales, and assets. For example, 58% of the firms in the NSSBF sample, compared to 28% of the firms in the NFIB sample, have four or fewer employees. Similarly, in the NSSBF sample, 59% of the firms have less than $100,000 in assets, and 33% have less than $100,000 in sales, while in the NFIB sample, only 28% of the firms have less than $100,000 in assets, and 10% have less than $100,000 in sales. In addition, the firms in the NFIB sample tend to be slightly older than those in the NSSBF survey. Thirty percent of the firms in the NFIB sample have been in business over 20 years, while only 24% of the firms in the NSSBF sample had been in business that long.

3.3 Sample Definition

Although the survey has 3,642 usable responses, the sample is restricted to those firms reporting that gave a response to the question: 'From how many financial institutions in total did you TRY to get a loan before you were successful or stopped

[7] Historically, there has been little survey response bias with respect to number of employees, sales, industry and region. The representativeness of the NFIB membership relative to the small business sector has been documented for the Small Business Administration and is available upon request from the authors.

trying?' This restriction reduces the sample to about 2,800 observations. The definition and summary statistics of the key variables used in this study are shown in Table 2.

3.4 Loan search

Almost 80% of those obtaining a loan on their most recent request (and 75% of all respondents) reported searching at one institution. Of those that searched 2 or more times, 12% applied at 2 institutions, 5% at three and 4% at four or more (Table 3, Panel A). Not surprisingly, of those firms that were turned down, only 43% searched at one institution and 30% at three or more. The average number of sources approached was 1.4 for firms that were not successful and 2.1 for those that were.

Over 85% of the firms with successful searches obtained funding from commercial banks (Table 3, Panel B). These firms also were the least likely to search at multiple sources, with only 15% reporting more than one search, with a mean number of searches equal to 1.3. Over one-third of the firms that obtained the funding from other financial institutions (e.g., credit union, finance company) reported searching at more than one source, with the mean number of searches between 1.5 and 1.6. And finally, almost two-thirds of those firms that ultimately received their funding from private sources (e.g., friend, other private individual) searched at multiple sources, with a mean number of searches exceeding 2.0.

Another perspective on the pattern of multiple searches is shown in Panel C of Table 3, which is based on the number of sources approached. Those searching at more than one institution frequently diversified their searches across risk specialists (e.g., applying at a bank and a finance company) rather than at two institutions in the same risk specialty class. For example, for those firms contacting three or more institutions, 34% of the institutions contacted were not banks. This searching over a spectrum of financial institutions would be consistent with these firms having a higher variance of expected loan terms across this spectrum.

4. Empirical specification

The empirical approach taken is to estimate the probability of a search at more than one lender using probit regression. MSEARCH, the dependent variable, takes a value of 1 for those firms approaching more than one source for funding and 0 if they approach

only one source. In the context of the model, MSEARCH takes a value of 1 if the net gain from an additional search exceeds the cost as shown in equation (8). As such, MSEARCH should vary positively with R_0, negatively with δ, positively with $F_2(x)$, and negatively with c_2.

The survey proxies for each of these independent variables are presented below.

4.1 Profit without loan, R_0

A firm that seeks a loan to invest in seasonal inventory will have a lower profit if they do not get the loan, especially if they have to rely on trade credit finance or finance companies in lieu of bank loans. Loans for fixed asset acquisition or refinancing of existing loans, on the other hand, would have less of an effect on a because they can be postponed until the owner obtains the desired set of terms. Thus, R_0 should be higher for these loans and lower for working capital loans. PURPFIX takes a value of 1 if the intended loan purpose was for acquisition of fixed assets and PURPREFI takes value of 1 for the refinancing of existing debt. The omitted category is PURPWC, working capital financing. Thus, PURPFIX and PURPREFI should vary positively with MSEARCH.

4.2 Time preference rate, d

The survey includes a set of characteristics that the owners rate as important in the conduct of their firm's financial affairs, one of which is "Offers the cheapest money available."[8] ICHEAP is the ranking of the offers the cheapest money available on a 5-point scale from "1" (not important) to "5" (very important). This variable is a proxy for the owner's time preference rate such that the more important cheap money is, the lower d and the more likely the owner will undertake multiple searches (i.e., the more likely MSEARCH=1). All else equal, a firm that places a high value on obtaining cheapest credit makes it less urgent to obtain the loan, thereby allowing the firm to seek a more favorable reservation term and search more to meet these terms.

4.3 Distribution of loan terms, $F_i(x)$

Two sets of variables are used here. Years in business (AGE) are an important firm characteristic that should be correlated with the firm's uncertainty about its distribution of loan terms. Younger firms are more likely to have a less clear expectation of the terms

[8] Some of the other characteristics include 'knows you and your business', 'convenient location', 'reliable source of credit', 'offers a wide range of services', and 'provides helpful suggestions.'

that they will receive, resulting in a higher variance of $F_i(x)$ compared to older firms, but this effect should diminish as firms "age" and learn about their business and their bank's expectations. Thus, the natural log of years in business, LNAGE, is used in the estimation and should be negatively related to MSEARCH, i.e., the younger the firm, the higher chance of a multiple search.

The second set includes two banking relationship proxies that are hypothesized to affect the variance of $F_i(x)$. Stronger relationships should reduce the variance of $F_i(x)$ because the owner is more confident about the range of loan terms that would be offered. The length of time the firm has been with its principal financial institution, LENGTH, represents the hard, private information that can be accumulated by a bank, should vary negatively with MSEARCH (e.g., see Berger and Udell, 1995). The number of account managers the firm has had in the past 3 years, TURNOVER, is a proxy for activities that can generate the soft, private information used by banks in lending decisions (Scott, 2004). TURNOVER should vary positively with MSEARCH since turnover depreciates the value of private information and the value of the relationship. The relationship variables create a potential endogeneity problem that is addressed below in the robustness tests. For example, firms that engage in multiple searches may do so because they are unhappy with their current bank and are seeking a better relationship.

The survey also asks if firms were able to satisfy their borrowing needs at all times over the previous three years, which presumably includes all loan applications made and any shortfall in funds received versus the amount requested. Firms that were successful in their most recent loan attempt but did not have all needs met, NEEDS NOT MET, must have had a bad draw from $F_1(x)$, which suggests a higher variance for both $F_1(x)$ and $F_2(x)$. As such, the reservation offer should be higher, resulting in additional search. NEEDS NOT MET and should vary positively with MSEARCH.

4.4 Cost of search, c_2

METRO is a 1/0 variable, which takes a value of 1 if the firm is located in a market with a population of 1 million or more. In large markets, a larger number of potential lenders can be identified and contacted at a relatively lower cost. The other proxy for cost of search is the number of financial institutions used by the firm to conduct normal business, FIUSED. The more banks a firm currently uses, the less costly an additional

contact to obtain the loan, thus resulting in a higher probability of multiple searches.[9] FIUSED, however, may also reflect the strength of banking relationships. Elsewhere in the literature (e.g., Petersen and Rajan, 1995 and Cole, 1998), it has been shown that banks are reluctant to invest in the production of private information if other banks can be free riders, thus creating the need for more applications by informationally opaque firms. For small firms, then, FIUSED should vary positively with MSEARCH, but the empirical challenge is to discriminate between the competing explanations for this relationship.

4.5 Other control variables

A set of 1/0 variables for the date of the loan search is also included in the model (see Table 2). Because 22% of the respondents reported their last loan attempt in 1991 or earlier, there is a chance that they may have experienced more difficulty obtaining financing because of the widely documented credit 'crunch' at that time (Hancock and Wilcox, 1998). By omitting the 1991 or earlier dummy variable, the signs on the other dummy variables are expected to be negative if there was a pervasive credit crunch at that time.

Another important control variable is whether the firm's primary bank experienced a merger or acquisition. Prior research (Scott and Dunkelberg, 2003) has shown that mergers are associated with increased dissatisfaction with bank service delivery and an increased tendency to shop for a new bank. Thus, if a merger occurs, it disrupts the relationship between a bank and its customer, potentially eroding the value of the private information that had been gathered over time thus increasing the variance of $F(X)$. MERGED is a 1/0 variable that takes a value of 1 if the firm reports a recent merger or acquisition of its primary financial institution. If MERGED = 1, the probability of multiple searches is expected to increase.

[9] The idea is that if a firm currently uses one bank, then they can call the existing loan office (or arrange a meeting) to discuss a new loan request. If they aren't happy, they will have to call a new bank and incur the costs of bringing this loan officer up to speed on their business (above and beyond the basic information that may have been communicated in a 'cold call' by the loan officer at an earlier time). If the firm currently uses two banks, then it can place a call to both. It may be the case that the agreement the firm has with one bank, may preclude borrowing from another. If the latter circumstance dominates the former, then we would expect to see no relationship.

5. Empirical results

5.1 Baseline estimates

The baseline model coefficients from the probit regression estimates are presented in column (1) of Table 4 for all observations. Almost all of the variables are significant as expected. Search also increases with loan purpose (PURPFIX, PURPREFI), the proxy for R_0. The proxy for the time preference of the firm, d, ICHEAP, varies positively as expected. That is, the more important finding the cheapest money is to the owner, the more likely it is that an additional search takes place.

The proxies for the distribution of future profits are also significant. The more seasoned or older a firm becomes, the less likely it is to engage in multiple searches. The two bank relationship proxies are significant with the correct sign. The quantitative information created by longer relationships (LENGTH) reduces the probability of multiple searches, while an increase in account manager turnover (TURNOVER) results in a higher probability of multiple searches.

The probability of a multiple search increase as the cost of search declines. METRO has a positive and significant coefficient as expected, which suggests that market size may be a somewhat useful proxy for the spatial density of banks, an important determinant of the cost of search. Whether such a relationships would be maintained with the increasing availability of telephone applications or the Internet remains to be seen.[10] The odds of searching are positively related to the number of financial institutions used, FIUSED, as expected, but this could reflect weaker banking relationships as well as somewhat lower application costs, an issue that will be addressed below.

A recent merger (MERGED) has a positive, but insignificant effect on the probability of multiple searches. Finally, firms that searched in 1994 and 1995 report significantly fewer multiple searches than those in 1993 or earlier, which would be consistent with the story about a credit crunch in the early 1990s.

[10] For example, Petersen and Rajan (2002) argue that technology has made distance less important in making credit availability from banks to informationally opaque firms.

5.2. Robustness tests

5.2.1 Differential Effects for Successful and Unsuccessful Firms

One concern about the estimates in Table 4 is that the coefficients may differ between those firms that were denied credit (or gave up) and those that were successful. Table 2 also reports summary statistics for firms that were successful and unsuccessful in their last loan application. With the exception of the ranking of the importance of obtaining the cheapest money (ICHEAP) and the number of financial institutions used (FIUSED), all of the mean differences are significant. To investigate the possibility that the coefficients on the independent variables in column (1) of Table 4 differ depending on whether the firms were successful in their last loan application, a set of interactive variables are created with DENY for every variable. These estimates are shown in column (2) of Table 4. If the coefficients on the interaction terms are significantly different, the set of coefficients are shaded.

Despite the ostensibly large difference in the coefficients between successful and unsuccessful firms, only the differences for AGE, NEEDS NOT MET, and MERGED are significant. Surprisingly, years in business (LNAGE) is positively related to multiple searches for those unsuccessful in their most recent request but negatively related for those firms that were successful. MERGED only has a significant positive effect for successful firms. The effect of higher variance for expected loan term distribution, NEEDS NOT MET is greater for firms successful on their most recent attempt versus those turned down. The most important conclusion from this analysis is that the primary results in column (1) are not due to firms turned down on their most recent loan. For most of the variables in the model, the coefficients in column (1) somewhat understate the effect by including the firms unsuccessful in their most recent loan request.

5.2.2 Endogeneity of Banking Relationship Strength

Firms could be engaging in multiple searches because they are unhappy with their current bank and are seeking a better relationship. Thus, the error term in the model may be correlated with account manager turnover (TURNOVER) and length of time at the current bank (LENGTH), resulting in inconsistent coefficient estimates. One approach to controlling for this endogeneity is to find instruments for these variables. Finding an appropriate set of instruments within the survey variables is a challenge because most of

the variables that might serve as explanatory variables are already in the model (e.g., firm risk and market structure). Nevertheless, TURNOVER and LENGTH are estimated as a function of firm size (full-time equivalent employees), form of business, industry, incidence of recent merger, bank concentration (Herfindahl-Hirshmann index), current bank size, and market size.[11]

The instrumental variable regression results are shown in column (3) of Table 4 for the baseline model without the interactive variables. Overall, the use of the instruments has little effect on the coefficients of the model, except for account manager turnover, which is now negative and insignificant. In addition, length of time at the current bank is no longer significant although the coefficient is virtually unchanged from the baseline estimates. These results could suggest that the banking relationship proxies have no independent effect on the decision to search, but it could also be due to a poorly specified model for the instruments.[12]

One way to assess this problem is to estimate the model without those firms reporting a merger (MERGED), a variable that is highly correlated with account manager turnover and length of time at the current ban in the estimate of the instruments. These results are shown in Table 4, column (4). Again, with the exception of length of time at the current bank and account manager turnover, there is little change in the level or significance of the coefficients on the other variables. Account manager turnover remains positive, but has a much lower coefficient and is insignificant. Length of time at the current bank, however, has a coefficient that is over 50 percent higher and is significant. Thus, the instrumental variable approach provides some mild support for an independent effect of banking relationship strength on the search decision.

The second approach to control for endogeneity is to limit the sample to those firms that obtained their loan after 1993 and had not changed their bank since 1992. With this change, the sample excludes any firm that changed their bank one year before and subsequent to obtaining their last loan, thus minimizing the effect of firms that searched for a new bank to possibly establish a better relationship. This restriction

[11] Tobit analysis is used because of the censored characteristics of LENGTH and TURNOVER. The estimates are available from the authors upon request.
[12] However, the Hausman specification test based on this model rejects the null hypothesis in favor of the instrumental variable model that provides consistent, but not efficient coefficient estimates.

reduced the sample size to 1,010, but still left some variation in both account manager turnover and length of time at the current bank.[13] Both of these variables are still significant in the limited sample estimate, shown in column (3) of Table 4. The number of financial institutions used (FIUSED) is also still significant, which suggests that this variable better reflects a cost rather than strength of banking relationship effect. If this variable was reflecting banking relationship strength, then it is more likely that it would be insignificant.

5.2.3 Number of Applications as the Dependent Variable

An alternative way to estimate the model is to use the actual number of loan attempts reported by each firm, NSEARCH. The estimation challenge is that NSEARCH is highly skewed, with 75 percent of the firms reporting one search. One approach to this problem is the use of Poisson regression because the reporting of one search is not a censoring but a conscious choice of the firm. These results are presented in Table 5, where column (1) shows the base model without instrumental variables and column (2) uses the instrumental variables for length of time at the current bank and account manager turnover.

The Poisson results continue to provide empirical support for the theoretical model with some exceptions. While the signs are all correct in column (1), neither PURPFIX nor ICHEAP is significant using this approach. The use of instrumental variables without MERGED has little effect on the other coefficients of the model, except that ICHEAP is now significant. Although LENGTH and TURNOVER have the correct signs, neither variable is significant.

6. Summary and conclusions

How important is a strong banking relationship to the intensity of search for small firms seeking financing? Using survey data from a sample of small U.S. firms and a simple search model, the results of this study suggest that banking relationship strength is associated with the determination the number of loan applications made. Small, informationally opaque firms face more uncertainty about the probability distribution of loan terms and will search more, the greater that uncertainty. Strong banking

[13] LENGTH takes a value of 4 through 6 in this specification.

relationships, as represented by longer time with the bank and less account manager turnover, lead to a lower probability of searching at multiple sources. Even after controlling for endogeneity between the relationship proxies and the decision to search, length of the relationship remained negatively related to the probability of searching at multiple sources.

The cost of search is also significant. Firms in more densely populated markets are more likely to search when the transactions costs are low, compared to those firms in rural markets, as are firms that already have relationships with multiple lenders. The degree of search is also a function of the level of profits without the loan, where the proxy for this term, loan purpose varies as expected, with firms requiring working capital financing searching less. The owner's time preference for future profits is also important in the search decision as reflected in the importance they assign to obtaining the cheapest cost of funds. Higher rankings of this characteristic, which is consistent with a willingness to accept higher profits later, results in more search.

From a policy perspective, these results add to the understanding of how banking relationships affect small firms' interaction with capital market lenders. Not only do stronger relationships affect access to credit and loan terms, but they also affect the first step in the capital acquisition process. These results provide a potentially interesting benchmark for evaluating the effect of technology and changing market structure on small firm access to credit. The consolidation of the banking system has potentially weakened banking relationships, leading small firms to seek alternative lenders. Combined with the potential effect of new lending technologies on the value of relationships, the amount of searching required to obtain financing in the current market environment is less clear. Credit scoring, for example, may be detrimental to the value of bank relationships, but may not necessarily increase search activity. If these channels become more important, the effect of relationships or market density of financial institutions may become less important in reducing the search cost for credit.

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Table 1
Selected Demographic Characteristics of National Federation of Independent Business (NFIB) versus National Survey of Small Business Finance (NSSBF) Respondents[a]

Form of Business	NFIB	NSSBF
Proprietorship	31%	44%
Partnership	6%	8%
Corporation	42%	28%
S-Corporation	21%	20%
No answer	1%	

Full Time Equivalent Employees	NFIB	NSSBF
One	7%	39%
2-4	31%	29%
5-9	27%	16%
10-19	17%	8%
20-49	11%	5%
50-99	3%	1%
100-499	2%	1%
500 or more	0%	
No answer	1%	

Gross sales ($000)	NFIB	NSSBF
Under 25	2%	13%
25-49	2%	8%
50-99	6%	12%
100-249	18%	24%
250-499	18%	15%
500-999	16%	11%
1,000-2,499	15%	9%
2,500-4,999	7%	4%
5,000-9,999	5%	2%
10,000 or more	4%	2%
No answer	8%	

Years in Business	NFIB	NSSBF
0-4	15%	15%
5-9	21%	27%
10-14	19%	19%
15-19	14%	14%
20-24	11%	9%
25 or more	19%	15%
No answer	1%	

Total Asset Value ($000)	NFIB	NSSBF
Under 80	14%	
80-99	14%	59%
100-199	16%	
200-499	24%	28%
500-999	13%	6%
1,000-1,999	8%	
2,000-4,999	4%	6%
5,000 or more	2%	2%
No answer	4%	

Industry	NFIB	NSSBF
Construction	13%	12%
Manufacturing	13%	12%
Transportation	3%	4%
Wholesale	6%	9%
Retail	21%	22%
Agriculture	8%	
Finance	7%	7%
Service	21%	20%
Professional	5%	14%
No answer	4%	

[a]There were 3,642 respondents to the over 18,000 surveys that were mailed to a sample of the 500,000 members of the NFIB for a 24% response rate. The row sums may not add to 100% due to rounding. Comparable information for the 1993 Board of Governors National Survey of Small Business Finance (NSSBF) is presented where applicable.

Table 2

Definition and Summary Statistics[a]

Variable Name	Definition	Total Sample[b] Mean	Total Sample[b] Std. Dev.	Total Sample[b] Obs.	Successful Search[c] Mean	Successful Search[c] Std. Dev.	Successful Search[c] Obs.	Unsuccessful Search[d] Mean	Unsuccessful Search[d] Std. Dev.	Unsuccessful Search[d] Obs.
NSEARCH =	Number of financial institutions approached on most recent loan attempt	1.44	0.96	2,786	1.34	0.86	2,425	2.27	1.37	485
MSEARCH =	1 if the number of financial institutions approached >1	0.25	0.43	2,786	0.20	0.40	2,425	0.67	0.47	485
PURPWC =	1 if loan purpose is for working capital needs	0.44	0.50	2,786	0.42	0.49	2,425	0.51	0.50	485
PURPFIX =	1 if loan purpose is to acquire fixed assets	0.45	0.50	2,786	0.48	0.50	2,425	0.30	0.46	485
PURPREFI =	1 if loan purpose is to refinance an existing loan	0.09	0.29	2,786	0.08	0.28	2,425	0.17	0.37	485
ICHEAP =	Ranking of how important 'cheapest money available is' in the conduct of the firm's financial affairs using a 5-point scales from 1 (not important) to 5 (very important)	4.13	1.03	2,727	4.14	1.02	2,374	4.06	1.09	476
AGE =	Years in business	15.9	13.1	2,767	16.3	13.1	2,407	12.7	13.0	480
DENY =	1 if the respondent reported that they did not get a loan the last time that they tried	0.12	0.32	2,683						
BNEEDNM=	1 if the respondent answered 'No' to the question "Over the last 3 years, was your firm able to satisfy its borrowing needs at all times"	0.22	0.42	2,764						
LENGTH =	"When was the last time you changed principal financial institutions?" '1' = within the last year; '2' = 1-2 years ago; '3' = 2-3 years ago; '4' = 3-4 years ago; '5' = 4-5 years ago; and '6' = more than 5 years ago	5.04	1.56	2,725	5.08	1.53	2,377	4.58	1.84	472
TURNOVER =	"Within the last 3 years, how many different account managers have you dealt with at your primary financial institution?" '1' = one; '2' = two' '3' = three; '4' = four; '5' = five or more	1.73	0.90	2,688	1.71	0.90	2,347	1.97	1.00	467
METRO=	1 if located in a metropolitan area	0.29	0.45	2,786	0.27	0.45	2,425	0.40	0.49	485
MERGED=	"During the last 3 years, was your principal financial institution bought out or absorbed by another? '1' = Yes	0.27	0.44	2,786	0.27	0.44	2,301	0.31	0.46	485
FIUSED =	Total financial institutions used to obtain financial services	1.89	1.17	2,737	1.89	1.16	2,386	1.98	1.27	470
D1995 =	1 if last application made in 1995	0.11	0.31	2,786	0.11	0.32	2,425	0.07	0.26	485
D1994 =	2 if last application made in 1994	0.44	0.50	2,786	0.45	0.50	2,425	0.41	0.49	485
D1993 =	3 if last application made in 1993	0.15	0.35	2,786	0.14	0.35	2,425	0.18	0.38	485
D1992 =	4 if last application made in 1992	0.07	0.26	2,786	0.07	0.26	2,425	0.09	0.29	485
D1991 =	5 if last application made in 1991 or earlier	0.22	0.42	2,786	0.22	0.41	2,425	0.24	0.43	485

[a] The data are obtained from the 1995 Credit Banks and Small Business survey of the membership of the National Federation of Independent Business. No answer responses are excluded from the summary statistic computations.

[b] The sample is restricted to all firms that reported searching for a loan

[c] The sample is restricted to all firms that reported searching for a loan and were approved.

[d] The sample is restricted to all firms that reported they were unsuccesful in searching for a loan.

Table 3
LOAN SEARCH DISTRIBUTIONAL DATA

A. Number of Institutions Searched Before Success or Termination

Institutions Searched	Total Responding	Successful	Turned Down
One	75%	79%	43%
Two	14%	12%	28%
Three	6%	5%	17%
Four or more	5%	4%	12%
No. of Observations	2,786	2,486	485
Average	1.4	1.4	2.3

B. Successful Searches by Loan Source

	No. of obs	1 Search	>1 Search	Avg. Searches
Bank	2,076	84%	16%	1.3
Credit Union	48	58%	42%	1.5
Finance Company	83	68%	32%	1.6
Other FI	55	67%	33%	1.5
Friend	69	33%	67%	2.2
Private individual	32	38%	62%	2.1
Other	62	66%	34%	1.6
Total	2,425	1,936	489	

C. Successful Searches by Source Approached [a]

Number of Searches	One	Two	3 or more
Bank	89%	72%	66%
Credit Union	3%	7%	4%
Finance Company	3%	5%	9%
Other Financial	2%	6%	7%
Friend, Relative	1%	5%	7%
Private Individual	0%	2%	4%
Other	2%	3%	4%

[a] Percentages are based on the number of credit sources contacted. For example, of those who contacted three or more sources, 66% of the contacts were at banks, 3% at credit unions, and so on.

Table 4
MULTIVARIATE RESULTS FOR SEARCH ACTIVITY

The dependent variable is MSEARCH, which takes a value of 1 if the firm reported more than one search before obtaining loan or quit trying and 0 otherwise. The definitions of the independent variables is given in Table 2. Probit analysis is used for all specifications. Column (1) presents the baseline estimate of the model, while in column (2) interactive variables are used for the key predictors in the model based on whether the firm was successful in their most recent loan request (NODENY) or not (DENY). DENY takes a value of 1 if not succesful and NODENY takes a value of 1 if they were successful or did not apply. The column (3) and (4) results use instrumental variables for LENGTH and TURNVOER. In column (3) all variables in the baseline model are included, while in column (4), MERGED is omitted. In column (5), the sample is limited to those firms that reported not changing their primary financial institution after 1993 and searched for a loan after 1993. *** indicates significance at the .01 level, ** at the .05 level and * at the .10 level. The shaded blocks in column (2) indicate significant differences between the interactive coefficients.

	(1)		(2)		(3)		(4)		(5)	
	MSEARCH: All		MSEARCH: Interactive		MSEARCH (IV)		MSEARCH (IV) without MERGE		MSEARCH: No bank change after 1993	
Variable	**b**	**S.E.**	**b**	**S.E.**	**b**	**S.E.**	**b**	**S.E.**	**b**	**S.E.**
PURPFIX	0.184	0.063 ***			0.172	0.062 ***	0.175	0.062 ***	0.197	0.099 **
PURPFIX x DENY			0.104	0.165						
PURPFIX x NODENY			0.198	0.068 ***						
PURPREFI	0.465	0.097 ***			0.506	0.096 ***	0.509	0.096 ***	0.391	0.148 ***
PURPREFI x DENY			0.474	0.216 **						
PURPREFI x NODENY			0.444	0.110 ***						
ICHEAP	0.082	0.029 ***			0.092	0.028 ***	0.092	0.028 ***	0.029	0.044
ICHEAP x DENY			0.026	0.052						
ICHEAP x NODENY			0.097	0.030 ***						
DENY	0.683	0.083 **			0.672	0.083 ***	0.672	0.083 ***	0.439	0.131 ***
LNAGE	-0.129	0.039 ***			-0.139	0.040 ***	-0.133	0.039 ***	-0.038	0.060
LNAGE x DENY			0.178	0.086 **						
LNAGE x NODENY			-0.199	0.042 ***						
NEEDS NOT MET	0.752	0.069 ***			0.823	0.068 ***	0.826	0.068 ***	0.834	0.101 ***
NEEDS x DENY			0.498	0.147 ***						
NEEDS x NODENY			0.821	0.077 ***						
LENGTH	-0.116	0.018 ***			-0.120	0.115	-0.209	0.088 **	-0.113	0.033 ***
LENGTH x DENY			-0.077	0.039 **						
LENGTH x NODENY			-0.127	0.019 ***						
TURNOVER	0.083	0.030 ***			-0.105	0.173	0.020	0.142	0.088	0.045 ***
TURNOVER x DENY			0.106	0.072						
TURNOVER x NODENY			0.069	0.034 *						
METRO	0.193	0.062 ***			0.210	0.066 ***	0.187	0.063 ***	0.263	0.094 ***
METRO x DENY			0.386	0.151 **						
METRO x NODENY			0.156	0.068 **						
FIUSED	0.144	0.024 ***			0.161	0.023 ***	0.161	0.023 ***	0.139	0.036 ***
FIUSED x DENY			0.121	0.059 **						
FIUSED x NODENY			0.147	0.026 ***						
MERGED	0.068	0.065			0.129	0.101			0.102	0.095
MERGED x DENY			-0.193	0.170						
MERGED x NODENY			0.119	0.070 *						
D1995	-0.484	0.111 ***	-0.489	0.112 ***	-0.413	0.110 ***	-0.422	0.110 ***	-0.770	0.155 ***
D1994	-0.320	0.076 ***	-0.327	0.077 ***	-0.263	0.075 ***	-0.269	0.075 ***	-0.286	0.098 ***
D1993	-0.115	0.095	-0.112	0.096	-0.099	0.094	-0.106	0.094		
D1992	0.023	0.117	0.039	0.117	0.019	0.117	0.016	0.116		
D1991e (omitted)										
CONSTANT	-0.877	0.207 ***	-0.712	0.206 ***	-0.664	0.614	-0.399	0.552	-0.902	0.304 ***
No. of observations	2,755		2,755		2,755		2,755		1,010	
Log likelihood function	-1258.8		-1246.2		-1283.9		-1284.3		-648.5	
Hausman specification	52.5									

Table 5
ESTIMATING THE NUMBER OF SEARCHES

The dependent variable is NSEARCH, which is the number of applications made before the firm was successful or quit trying. Poisson regression is used to estimate the parameters of the model. In column (1) the baseline estimates are presented, while in column (2), instrumental variables are used for LENGTH and TURNOVER. The definitions of the independent variables is given in Table 2. *** indicates significance at the .01 level, ** at the .05 level and * at the .10 level.

	(1)			(2)		
	NSEARCH			NSEARCH - IV		
Variable	**b**	**S.E.**		**b**	**S.E.**	
PURPFIX	0.049	0.035		0.046	0.035	
PURPREFI	0.165	0.054	***	0.182	0.054	***
ICHEAP	0.023	0.016		0.028	0.016	*
DENY	0.439	0.045	***	0.460	0.045	***
LNAGE	-0.063	0.022	***	-0.068	0.022	***
NEEDS NOT MET	0.336	0.044	***	0.378	0.043	***
LENGTH	-0.041	0.010	***	-0.045	0.050	
TURNOVER	0.042	0.018	**	0.036	0.081	
METRO	0.083	0.035	**	0.083	0.036	**
FIUSED	0.043	0.013	***	0.051	0.013	***
MERGED	0.015	0.037				
D1995	-0.166	0.062	***	-0.145	0.062	**
D1994	-0.097	0.043	**	-0.082	0.042	*
D1993	-0.017	0.053		-0.017	0.053	
D1992	0.062	0.066		0.059	0.066	
D1991e (omitted)						
CONSTANT	0.333	0.118	***	0.337	0.311	
Log likelihood function	-3657.1			-3656.0		