Availability of Financing to Small Firms Using the Survey of Small Business Finances

by

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Raleigh, NC

for

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Purpose

The small business sector is of interest to policymakers not only because of the important role it plays in the U.S. economy, but also because of the avenue to advancement small business ownership represents, in particular for ethnic minorities and women. Critical to small businesses' success is the availability of financing for both capital acquisition and working capital purposes. Much of this financing takes the form of credit extended by commercial banks and nonbank lenders.

This study investigates possible restricted access to credit for minority- and women-owned businesses by focusing on two types of credit—"relationship loans" (lines of credit) and "transaction loans" (commercial mortgages, motor vehicle loans, equipment loans, capital leases, and other loans)—from two types of creditors: commercial banks and nonbank lenders. The disaggregated approach is feasible because of a rich new data set, the 1998 Survey of Small Business Finances

Overall Findings

The results imply that minority small business owners face some restrictions in access to credit. These restrictions do not appear to be uniform across loan or lender type.

Highlights

• By disaggregating outstanding loans by loan type and lender type, the research finds that ethnic minority firm owners are more likely to have transaction loans from nonbanks and less likely to have bank loans of any kind.

• Consistent with past studies, researchers found that African-American and Hispanic firm owners face significantly greater loan denial probabilities than white male firm owners on both relationship bank loans and transaction bank loans. New evidence in this study hints that discrimination may be specific to particular segments of the loan market rather than a general problem.

• Researchers found that lenders do not artificially restrict the credit-market access of female and Asian firm owners.

• This study breaks new ground by suggesting that preferential lending practices characterize the granting of transaction loans to a significantly greater degree than the granting of relationship loans.

Methodology

The researchers postulated that evidence of preferential lending practices, if any, may be discernible in the patterns of outstanding loans and of loan application denials; and in the average characteristics of firm owners whose loan applications are approved. Econometric models used by previous researchers were adapted to study patterns in outstanding loans and loan application denials and to investigate the possibility of preferential lending practices in the granting of relationship and transaction loans by commercial bank and nonbank lenders. The researchers developed five testable hypotheses for outstanding loans and four for loan application denials.

To test the possibility that preferential lending may take the form of lenders requiring women and minority firm owners to meet a higher standard to

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obtain a loan, they developed a testable hypothesis concerning the average characteristics of white male, women, and minority firm owners whose loan applications lenders had accepted.

Data from the 1998 Survey of Small Business Finances were used. The researchers examined the raw data on outstanding loans, loan applications, and loan denials for evidence of preferential lending. They identified variables to use in estimating the econometric models and examined the characteristics of these data.

They estimated probit models of the probability that a firm owner has an outstanding loan as well as models of the probability of having a loan application denied. Because firm owners must apply for loans before they can be approved or denied, they also presented loan denial models estimated jointly with loan application models, so as to reduce the possibility of "selection bias." They used both the probit and jointly estimated loan denial models to develop predicted loan denial probabilities for firm owners with given characteristics.

Finally, they used t-tests to compare the average characteristics of white male and minority firm owners whose loan applications were approved.

The final report was peer reviewed consistent with the Office of Advocacy's data quality guidelines. More information on this process can be obtained by contacting the director of economic research at advocacy@sba.gov or (202) 205-6533.

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Executive Summary

This research adds to the literature on discriminatory lending practices by banks and nonbanks in their lending to small US businesses. Although the existing research hints at discriminatory practices along ethnic and gender lines, shortcomings in the data have prevented researchers from drawing definite conclusions. Data limitations have also prevented them from seeking evidence of discriminatory practices beneath the aggregate level. This research seeks to overcome some of these limitations by using the relatively little-studied 1998 Survey of Small Business Finances (SSBF), a data set with more extensive coverage of ethnic minority and female small business owners than available to past researchers.

In this study we put all small business lenders into one of two groups – banks (commercial banks) and "nonbanks" (finance companies, mortgage banks, factors, other businesses, government agencies, family and friends) -- and put all small business loans into one of two categories: "relationship loans" (line-of-credit loans) and "transaction loans" (motor vehicle loans, mortgages, equipment loans, capital leases, and other loans). Many researchers regard line-of-credit loans as quintessential relationship loans. A lender that grants a credit line makes an up-front commitment to lend a pre-set maximum sum over a time horizon at dates selected by the borrower. Because such open-ended commitments expose lenders to additional risks, many researchers speculate that lenders will not grant credit lines to small business owners without prior, close relationships that enable lenders to learn "soft" information about owners and their firms. In contrast, "transaction loans" are one-shot injections of cash made shortly after loan approval and used to acquire tangible assets that can serve as loan collateral. Because transaction loans subject lenders to less risk than relationship loans, many researchers speculate that lenders require little or no soft information about owner-borrowers that relationships can provide.

We used the categorizations described above to test 10 hypotheses about lending practices on data from the 1998 SSBF. Hypotheses H1 – H5 test whether data on outstanding loans show evidence of discriminatory lending along ethnic and gender lines. We tested for evidence of discrimination in all outstanding loans and in outstanding loans of both types (relationship and transaction) from lenders of both types (banks and nonbanks). Hypotheses H 6 – H 9 test whether data pertaining to loan denial decisions by banks and nonbanks on applications for relationship and transaction loans show evidence of discriminatory lending along ethnic and gender lines. Investigating loan denial decisions required us to recognize that some small firm owners who need loans may nevertheless not apply for fear of having their applications denied, behavior that could potentially bias the statistical evidence. We adopted appropriate econometric techniques to address this potential "selection bias." Finally, we examined the subset of approved loan applications for evidence that lenders required owners of female- and ethnic minority-led firms to have attributes superior to those of white male-led firms in order to secure a loan. We formalized this test as hypothesis H10.

Our results show the merits of disaggregating loans by lender type and loan type when investigating possible discrimination in lending: we found that aggregate data could mask behavior that a disaggregated approach revealed. We found that for ethnic minorities as a group,

evidence of discriminatory lending exists in outstanding transaction loans from banks and nonbanks and in outstanding transaction loans from banks. We also uncovered evidence from all outstanding loans and from outstanding bank transaction loans that African-American and Hispanic firm owners are less preferred borrowers. We found no evidence in the pattern of outstanding loans that female- or Asian-led firms were less preferred borrowers.

Initially, we found from the pattern of loan denial decisions that African-American firm owners faced significantly higher loan denial probabilities than otherwise identical white male firm owners for transaction and relationship loans from banks; we found the same to be true for Hispanic firm owners and also found that Hispanic firm owners faced significantly higher loan denial probabilities for transaction loans from nonbanks. These findings were produced by estimating a loan denial model alone. However, it is well-known that if firm owners who did not apply for loans differ systematically from credit-seeking firm owners, the estimated loan denial probabilities are biased, and to remove the bias a loan application model must be estimated jointly with the loan denial model. Whether single or joint estimation is required is purely an empirical matter. When we recomputed loan denial probabilities based on a loan denial model jointly estimated with a loan application model, we found a somewhat different pattern: we found that both African-American and Hispanic firm owners faced significantly higher loan denial probabilities for transaction loans from both banks and nonbanks, but not relationship loans from either type of lender. Further investigation showed that this econometric evidence of discrimination is likely to be highly economically significant as well. Further, we found no evidence suggesting that female- or Asian-led firms faced loan denial probabilities different from those of firms led by white males.

When we examined whether lenders exercise preferential lending by requiring less preferred borrowers to have characteristics more desirable than otherwise identical preferred borrowers to be induced to lend, we found little evidence of this behavior in the data.

I. Introduction

This report addresses whether small firms' access to different types of loans and lenders is related to the ethnicity or gender of the firms' principal owners. Previous research has uncovered evidence consistent with discriminatory lending against ethnic minority-owned small firms (e.g., Cavalluzzo and Cavalluzzo (1998), Cavalluzzo, Cavalluzzo and Wolken (2002), Cavalluzzo and Wolken (2002), Blanchflower et al. (2003)). But prior research has been conducted at a high level of aggregation and, thus, overlooked heterogeneity among lenders and loan types, which has been an area of growing research interest (e.g., Petersen and Rajan (1994), Berger and Udell (1995, 2002), Boot and Thakor (2000), Cole, Goldberg and White (2004)). This paper reexamines the issue of differential credit market access by female and ethnic minority firm owners at a lower level of aggregation by addressing two research questions:

- Do lenders appear to deny loan applications of all kinds from female- and ethnic minority-owned small firms at greater rates than applications from otherwise identical firms owned by white males, or are elevated denial rates limited to certain types of loans?
- Do all lenders appear to deny loan applications from female- and ethnic minority-owned small firms at greater rates than applications from otherwise identical firms owned by white males, or are elevated denial rates limited to certain types of lenders?

This study uses the 1998 Survey of Small Business Finances to investigate ten hypotheses related to these two research questions. The rest of the paper is organized as follows. Section II presents a selected literature review. Section III presents the hypotheses to be tested and the models to test them. Section IV discusses the data. Section V presents the empirical results. Section VI summarizes and concludes the report.

II. Literature Review

Until the 1988-1989 National Survey of Small Business Finances (NSSBF) became available the question of whether racial, ethnic, and gender discrimination pervades the market for small business loans was largely unstudied by research economists. Since the 1988-1989 NSSBF and with the help of the 1993 NSSBF and the 1998 Survey of Small Business Finances (SSBF) researchers have made good progress in adducing evidence on the extent and degree of credit market discrimination.

Cavalluzzo and Cavalluzzo (1998) used the 1988-1989 NSSBF to investigate whether lenders appear to discriminate along ethnic and gender lines in lending to small businesses. They proposed an econometric model relating a dependent variable (probability of having a loan, probability of loan denial, interest rate charged) to a set of explanatory variables relevant to lenders plus a set of indicator variables representing firm owner gender and ethnicity. Cavalluzzo and Cavalluzzo observed that statistically significant estimated coefficients on the indicator variables could be evidence of prejudicial discrimination; however, significant coefficients could also be evidence of statistical discrimination, an association between the indicator and dependent variables resulting from omitted factors. To help distinguish between statistical and prejudicial discrimination, Cavalluzzo and Cavalluzzo turned to a theoretical work by Becker (1957), who hypothesized that prejudicial discrimination by some lenders creates an exploitable opportunity that should quickly disappear in competitive markets but that might linger in concentrated markets, where lenders have a degree of market power. Cavalluzzo and Cavalluzzo incorporated Becker's observation into their work by augmenting their econometric model. Specifically, they interacted each gender/ethnicity indicator with the Hirschman-Herfindal index for banking

market concentration.[1] Cavalluzzo and Cavalluzzo reasoned that if lenders practice prejudicial discrimination, the estimated coefficients of the interaction terms should be positive and statistically significant: lenders successfully discriminate in markets where they have market power. When Cavalluzzo and Cavalluzzo estimated their model they found some evidence consistent with both types of discrimination. Specifically they found that in comparison to white firm owners, African-American firm owners had less total debt outstanding and were more likely to have had their most recent loan application denied; both effects were unrelated to the degree of banking market concentration. In addition, Cavalluzzo and Cavalluzzo found that Hispanic firm owners were less likely to have an outstanding loan, more likely to have had their most recent loan application denied, and more likely to have paid an interest rate premium compared with identical white firm owners. The first and last effects were related to the degree of banking market concentration. Cavalluzzo and Cavalluzzo also found that Asian firm owners paid interest rate premiums related to banking market concentration. Although their results were consistent with discriminatory behavior by lenders, Cavalluzzo and Cavalluzzo did not claim their results proved discrimination because they lacked the data with which to control fully for differences in wealth and creditworthiness between white and minority firm owners.

Cavalluzzo, Cavalluzzo and Wolken (2002) re-estimated the models of Cavalluzzo and Cavalluzzo (1998) using the 1993 NSSBF together with supplementary data from the Federal Reserve System. They found evidence consistent with statistical and prejudicial discrimination against Hispanic firm owners in interest rates charged on credit lines. In addition, they found some evidence consistent with statistical and prejudicial discrimination against African-

[1] The Herfindahl-Hirschman index is a measure of the degree of market concentration and, thus, a measure of the power producers have. The index is computed by squaring producers' percentage market shares and summing. Thus a market with a single producer has a Herfindahl-Hirschman index of (100^2 =) 10,000 whereas a market with 100 equal-sized producers has an index of (100 x 1^2 =) 100.

American and Asian firm owners in the denial of loan applications. But as was true in the earlier study, the authors again tempered their conclusions and did not claim evidence of discrimination owing to a lack of data with which to control for wealth differences among firm owners.

Cavalluzzo and Wolken (2002) re-estimated the models of Cavalluzzo and Cavalluzzo (1998) using the 1998 SSBF, which includes variables on the wealth of small business owners. The estimated models show some evidence consistent with prejudicial discrimination against ethnic minority firm owners. Specifically, in models of loan denials, the estimated coefficient of the interaction between the African-American indicator variable and the Herfindahl-Hirschman index is positive and statistically significant at the 10 percent level, suggesting that the probability of an African-American firm owner being denied a loan is greater in markets where lenders have greater market power, consistent with Becker's theory (1957). Estimated coefficients of the Hispanic indicator variable and the Hispanic Herfindahl-Hirschman index interaction are also statistically significant, but with algebraic signs suggesting discrimination that decreases with the market power of the lender, contrary to Becker. Cavalluzzo and Wolken used their most complete model to investigate whether lenders denied loan applications from ethnic minority small business owners at greater rates due to poorer wealth endowments rather than prejudicial discrimination. They used their estimated loan denial model for white males to predict loan denial rates for firm owners with minority demographic characteristics. Cavalluzzo and Wolken concluded that endowment effects explain about one-fourth to one-third of the difference in loan denial rates between whites and ethnic minorities; this leaves three-fourths to two-thirds of the difference unexplained and potentially due to prejudicial discrimination.

Other researchers have used different approaches with the 1988-1989 NSSBF, the 1993 NSSBF, and the 1998 SSBF to find evidence on discrimination. Cohn and Coleman (2001)

investigated discriminatory behavior by commercial banks using the 1993 NSSBF. They found that banks were more likely to deny African-American firm owners' loans and require them to pay higher interest rates. Bostic and Lampani (1999) examined whether demographic and economic characteristics of a firm owner's locale affect the probability that the owner obtains a loan. The authors augmented the 1993 NSSBF data with Census data on local demographic and economic characteristics of the area in which a small business is headquartered. They found that when local demographic and economic variables are controlled for, differences in loan denial rates between Hispanic and white male business owners disappear. However, African-American business owners still face significantly greater chances of business loan denial. Blanchflower, Levine, and Zimmerman (2003) estimated loan denial models using data from both the 1993 NSSBF and the 1998 SSBF and concluded that African-American business-owners were overwhelmingly more likely to have unmet credit needs, suffer loan turndowns and pay higher interest rates. Coleman (2002, 2003) estimated loan denial models for African-American and Hispanic firm owners using the 1998 SSBF and found they are more likely to be denied loans by all types of lenders, but especially commercial banks.

While researchers in credit market discrimination have made admirable use of econometric tools to address equity issues, their approaches have been little influenced by the literature on the microeconomics of lending decisions, especially lending to small businesses. This latter literature focuses on how lenders cope with the opaque information related to small business borrowers to fashion loan contracts that overcome asymmetric information, moral hazard, agency problems, and other capital market imperfections and frictions. By bringing insights from the small business lending literature to bear on the investigation of discriminatory lending practices, we hope to uncover new evidence on preferential lending.

With few exceptions, researchers in the discrimination literature have aggregated together small business loans of all types made by all lenders. But as Berger and Udell (2002) observe, banks and nonbank intermediaries use at least four different lending technologies: financial statement lending, asset-based lending, credit scoring, and relationship lending. The first three technologies are perhaps most similar, being made chiefly on the basis of "hard" information and often for the purpose of financing specific transactions; hence these three technologies are sometimes referred to collectively as "transaction lending." Of the four technologies, financial statement lending is likely irrelevant to a discussion of small business lending because lenders use it chiefly for firms with audited financial statements and access to public capital markets. The remaining three technologies are relevant to smaller firms. With asset-based lending, creditors lend on the basis of collateral (usually accounts receivable or inventory) which they subsequently monitor closely. Credit scoring, which has been applied to small business loans under $100,000 only since the mid-1990s (Mester 1997), uses historical data about a business owner's credit history and wealth to generate a score that reflects the borrower's default probability. Relationship lending is lending chiefly on the basis of proprietary information an intermediary gathers over time about the firm and its owner.

Boot (2000) provides one description of how relationship lending might work.[2] Initially an intermediary denies a firm credit because the intermediary cannot overcome the firm's informational opacity and still lend at an interest rate that gives the intermediary a fair return. In time the intermediary gains proprietary information about the firm through repeated interactions as the intermediary sells the firm nonloan services. Eventually the intermediary goes from denying the firm credit to making a "relationship loan" at an interest rate less than the rate justified by all costs and risks. The intermediary offers a below-cost loan because the

[2] Greenbaum et al. (1989) and Sharp (1990) offer similar, alternative theories of relationship lending.

intermediary hopes to set the interest rate on the next loan at a premium, exploiting the intermediary's superior knowledge about the borrower; only gradually over time does the intermediary reduce the interest rate on new loans to the borrower, thus compensating the intermediary for its up-front risk exposure.

Although researchers generally agree that lenders grant small business loans using different lending technologies, questions remain about the relative use of the technologies. Several studies have investigated the importance of relationship lending (see Elyasiani and Goldberg (2004) for a more complete review). Petersen and Rajan (1994) analyzed data on small business loans of all types from bank and nonbank lenders drawn from the 1988-1989 NSSBF; they found that longer-standing relationships between lenders and borrowers increased the availability of credit, but did not decrease the interest rate on loans. Berger and Udell (1995) estimated models of the interest rate and collateral requirements on data for bank lines of credit from the 1988-1989 NSSBF data; they found that longer-standing relationships reduced interest rates and collateral requirements for small firm owners with assets exceeding $500,000 but not for smaller firms. Cole (1998) estimated models of loan denial using data on all loan types and lender types from the 1993 NSSBF; he found that simply having a pre-existing relationship with a lender significantly reduced the probability of loan application denial. Cole, Goldberg and White (1999) used the 1993 NSSBF to investigate whether small and large banks employ different lending technologies. They stratified data on bank loan applications of all kinds into subsamples of loans made by banks having assets of more than $1 billion and $1 billion or less. Then they estimated separate probit models of the probability of loan approval for small and large banks and compared the estimated models for evidence of differences in the determinants of loan approvals. Cole, Goldberg and White concluded that small banks appear to put greater

weight on pre-existing relationships in approving loan applications, whereas large banks give greater weight to the purely financial characteristics of borrowers.

Most of the studies cited above focus either on bank loans or on total loans; however nonbank lenders are also an important source of funds for small business firms. Cole, Wolken and Woodburn (1996) documented the growing importance of finance companies as a source of funds to small businesses. A study by Haynes and Watts (1996) using the 1988-1989 NSSBF addressed differences in the attributes of small business customers of banks and finance companies and whether finance companies lend at competitive rates; they found no differences in customer attributes and competitive rates offered by finance companies. In a study of corporate firms, Carey, Post and Sharpe (1998) found significant differences between commercial banks and finance companies, both in clients and lending behaviors. They found that while banks and finance companies were similar in the extent to which they were asymmetrically informed about their customers, customers of finance companies were riskier. Carey, Post and Sharpe also speculated that finance companies deal with their customers differently than banks.

Empirical researchers have tended to regard lenders as making either relationship loans or transaction loans; however theoretical researchers recognize that the same lenders may use both technologies. Boot and Thakor (2000) regard relationship lending as a niche form of lending that requires the acquisition of sector-specific knowledge, whereas transaction lending resembles arm's length lending of the type that occurs in bond markets.[3] They suggest that lenders make a strategic choice about the relative amounts of relationship and transaction lending to perform based on the differing costs of producing each loan type, the bank's competitive advantage in

[3] The terms "transaction lending" and "transaction loans" are subtly different as used by Berger and Udell (2002) as compared with Boot and Thakor (2000). Boot and Thakor envision transaction loans as standardized products, similar to mortgages and motor vehicle loans, whereas Berger and Udell's use of the term is broader, sometimes seeming to imply the ready existence of collateral.

lending, and the differing competitive conditions in the markets for both loans types. Boot and Thakor develop a theoretical model to analyze how lenders alter the mix of relationship versus transaction lending as competition among lenders increases. They argue that increasing competition could encourage banks to shift from cheaper-to-produce transaction lending toward relationship lending, whose costs of knowledge acquisition create barriers to entry that are less easily competed away. However, they find that the effect of increased competition on the relative amounts of relationship and transaction lending produced by the banking sector depends on whether the initial increase in competition comes from the market for relationship loans or transaction loans. Boot and Thakor show that banks with market power make only transaction loans, and that increasing inter-bank competition leads banks to insulate themselves from price competition by substituting away from transaction loans towards relationship loans.

The literature on the microeconomics of lending provides interesting insights that inform investigations of prejudicial lending. A key problem for researchers investigating prejudicial lending is distinguishing statistical discrimination, which reflects measurement problems, from prejudicial discrimination, which reflects unjust lending practices. Following Becker's (1957) suggestion that prejudicial discrimination is inconsistent with fully competitive markets, Cavalluzzo and Cavalluzzo (1998) used the Herfindahl-Hirschman index, which measures the degree of banking market competition, to help distinguish prejudicial from statistical discrimination. To do this, i.e., to distinguish prejudicial from statistical discrimination, we propose following Boot and Thakor's (2000) observations about lenders being producers of relationship and transaction loans and about differing degrees of competition in the markets for relationship and transaction loans. Specifically, we propose using loan type and lender type

indicators in much the same way Cavalluzzo and Cavalluzo used the Herfindahl-Hirschman index to distinguish statistical and discriminatory lending.

III. Models, Hypotheses and Methodology

Prejudicial lending to small business owners may take different forms. It may take the form of creditors charging different interest rates to owners with identical firms and credit records but with different personal characteristics unrelated to creditworthiness. If prejudicial lending takes this form, direct evidence of discrimination could potentially be discerned using interest rate data.

Indirect evidence of interest rate discrimination could also potentially be discerned from data on outstanding loans, on loan default probabilities, and on the characteristics of less preferred borrowers whose loan applications were approved. Charging higher interest rates to less preferred borrowers should tend to reduce the number of wealth-enhancing projects they undertake and, over time, reduce their share of outstanding loans relative to more preferred borrowers. For interest rate discrimination to have this effect, the practice would have to be widespread and investment opportunities of more and less preferred borrowers similar. Interest rate discrimination could also produce lower default rates on loans to less preferred borrowers, as only higher quality projects could be justified at the higher interest rates, raising the average loan quality. For interest rate discrimination to produce lower default rates, the investment opportunities of all borrowers would have to be similar. Finally, since lower default rates are by-products of superior project quality, indirect evidence of discrimination could be manifested in superior characteristics of less preferred borrowers who obtain loans. For interest rate discrimination to lead to successful borrowers from the less preferred group with superior

characteristics, the distributions of characteristics among more and less preferred borrowers would need to be similar.

If, as is often suggested, creditors lack the flexibility in setting interest rates or have other reasons for not adjusting rates (cf. Stiglitz and Weiss (1981)), prejudicial lending may take the form of nonprice rationing, whereby a lender accepts a loan application from one firm owner but denies an application from another who differs from the first only in personal characteristics irrelevant to creditworthiness. For the lender to be induced to lend to a firm owner from the less preferred group, the lender requires the owner to exhibit characteristics that would cause the owner to be classified as intramarginal were it not for group affiliation. If prejudicial lending takes the form of nonprice rationing, direct evidence could potentially be discerned from data on loan application denials.

If prejudicial lending takes the form of nonprice rationing, indirect evidence of rationing is again potentially discernible from data on outstanding loans, loan default probabilities, and the characteristics of less preferred borrowers whose loan applications are approved. Requiring less preferred borrowers to meet a higher standard should mean that fewer borrowers meet the standard, reducing over time the stock of outstanding loans to less preferred borrowers. For rationing to reduce outstanding loans, the practice would have to be widespread and borrowers of all types would have to have similar investment opportunities. Requiring less preferred borrowers to meet a higher standard should also produce lower default rates on loans made to them, since lenders would be financing projects of higher average quality. For rationing to produce lower default rates, all borrowers would have to face similar investment opportunities. Finally, if lenders require borrowers to meet a higher standard, indirect evidence of this could potentially be manifested in superior characteristics of less preferred borrowers who obtain

loans. For this effect to be discernible statistically, the overall distributions of characteristics among all borrowers would have to be similar.

We take the approach of looking for evidence of discriminatory lending practices by investigating possible nonprice rationing rather than interest rate discrimination. While we recognize that discriminatory lending practices may take either form, we are convinced by the equilibrium credit-rationing arguments of Stigliz and Weiss (1981), which suggest that interest rates may not be fully flexible. In addition to looking for direct evidence of discriminatory lending using data on loan denial decisions, we look for indirect evidence in the pattern of outstanding loans and in the characteristics of firm owners whose loan applications are accepted. We do not attempt to investigate differentials in default rates due both to data considerations and to the likelihood that loan defaults, which come after the lending decision (often long after), may be influenced by extraneous and unforeseen events, causing the signal-to-noise ratio to be low.

To produce evidence on preferential lending we begin with the basic model of Cavalluzzo and Cavalluzo (1998):

$$Y_i = \alpha + \gamma' D_i + \beta' X_i + \varepsilon_i \qquad (1)$$

where Y_i is the probability that the i^{th} firm either has an outstanding loan or is denied a loan, D_i is a vector of indicator variables for ethnicity and gender, X_i is a vector of additional explanatory variables, ε_i is a random disturbance term, and γ and β are coefficient vectors.

To adduce indirect evidence of discriminatory lending, we estimate probit versions of (1) in which the dependent variable, Y_i , is defined as the probability that the i^{th} firm has an outstanding loan. Initially we estimate (1) using data on all outstanding small business loans. Then we stratify the data, categorizing loans as to loan type – either relationship loan or transaction loan – and lender type – either commercial bank or nonbank lender. We re-estimate

(1) on each of the four subsamples: transaction loans from nonbanks, relationship loans from nonbanks, transaction loans from banks, and line-of-credit loans from banks. Finally, we use the estimated coefficients of the ethnicity/gender indicator variables from the five estimated models to test the following five hypotheses regarding discriminatory lending:

H 1: All else equal, the probability of having at least one outstanding loan is identical for ethnic/gender minority-owned firms and firms owned by white males.

H 2: All else equal, the probability of having at least one outstanding transaction loan from a nonbank lender is identical for ethnic/gender minority-owned firms and firms owned by white males.

H 3: All else equal, the probability of having at least one outstanding relationship loan from a nonbank lender is identical for ethnic/gender minority-owned firms and firms owned by white males.

H 4: All else equal, the probability of having at least one outstanding transaction loan from a bank lender is identical for ethnic/gender minority-owned firms and firms owned by white males.

H 5: All else equal, the probability of having at least one outstanding relationship loan from a bank lender is identical for ethnic/gender minority-owned firms and firms owned by white males.

Provided the vector of explanatory variables, X, includes proxies for all the criteria on which lending decisions may legally be based, the finding of any statistically significant elements of γ in any of the estimated models constitutes evidence consistent with discriminatory lending.

To produce direct evidence of possible discrimination in the pattern of loan denials we modify equation (1) as follows:[4]

$$Y_i = \alpha + \delta\, LOC_i + \zeta\, BANK_i + \gamma'\, D_i + \eta'\, (D_i * LOC_i) + \theta'\, (D_i * BANK_i) + \beta'\, X_i + \varepsilon_i$$

[4] We might have employed the strategy of estimating equation (1) with the dependent variable defined as the probability that the loan application of the i^{th} firm is denied on subsamples of applications for transaction loans to nonbanks, relationship loans to nonbanks, transaction loans to banks, and relationship loans to banks. However we rejected this approach because only a fraction of the firms in the 1998 SSBF applied for new loans in the five years preceding the survey, making our sample of loan applications substantially smaller than our sample of outstanding loans. To conserve degrees of freedom and maintain the power of our statistical tests we instead follow the approach described above.

(2)

where Y_i is the probability that a lender denies the loan application of the i^{th} firm, LOC_i is an indicator variable for a relationship loan, $BANK_i$ is an indicator variable for a bank loan, and δ and ζ are coefficients and η and θ are vectors of coefficients. Coefficient estimates of equation (2) permit us to test for evidence of discrimination in the loan approval process. In particular for each ethnic or gender group represented by an indicator in the D vector we test the following four hypotheses (illustrated below for the j^{th} ethnic or gender group):

H 6: All else equal, nonbank lenders deny transaction loan applications at identical rates for ethnic/gender minority-owned firms and firms owned by white males.

$$\gamma_j = 0$$

H 7: All else equal, nonbank lenders deny relationship loan applications at identical rates for ethnic/gender minority-owned firms and firms owned by white males.

$$\gamma_j + \eta_j = 0$$

H 8: All else equal, bank lenders deny transaction loan applications at identical rates for ethnic/gender minority-owned firms owned by white males.

$$\gamma_j + \theta_j = 0$$

H 9: All else equal, bank lenders deny relationship loan applications at identical rates for ethnic/gender minority-owned firms and firms owned by white males.

$$\gamma_j + \eta_j + \theta_j = 0$$

Provided the vector X includes proxies for all the criteria on which lending decisions may legally be based, the finding that any of the elements of γ, η and θ are statistically significant constitutes evidence consistent with discriminatory lending decisions.

As is well-known by researchers in the credit-market discrimination and relationship lending literatures, estimating equation (2) as a single equation on a data sample of firm owners who applied for loans treats the firm owners' decisions to apply for loans as given. In this situation, hypothesis tests using coefficient estimates from (2) reveal unbiased evidence on discriminatory lending provided that firm owners who did not apply for loans are in every other

respect identical to those who did. However if nonapplicant firm owners are systematically different from credit-seeking firm owners – and whether this is so is purely an empirical matter – then estimating equation (2) alone on data for credit-seeking firms introduces omitted variable bias which potentially understates the degree of discriminatory lending. This problem, known as the sample selection problem, may be overcome by estimating the loan denial model, equation (2), jointly with a model of a firm owner's decision to apply for a loan:

$$S_i = \alpha + \gamma' D_i + \kappa' Z_i + \xi_i \qquad (3)$$

where S_i is the probability that the i^{th} firm owner applies for a loan, Z_i is a vector of additional explanatory variables, ξ_i is a random disturbance term, and γ and κ are coefficient vectors. By assuming that the error terms ε and ξ share a joint distribution, estimating (2) and (3) jointly permits the properties of the error terms to be exploited so as to correct the omitted variable bias introduced by estimating equation (2) alone. Again, whether joint estimation of (2) and (3) is necessary or if estimation of (2) alone is appropriate is purely an empirical matter. In Section V we present estimates of equation (2) produced by both estimation techniques.

To discern indirect evidence of discriminatory lending in the characteristics of less preferred borrowers who received loans, we proceed as follows. We take data on the approved loan applications and stratify them by loan type and lender type; we further stratify the approved applications by ethnicity and gender of the applicants. Then for each subgroup we compute the group means of the proxies that appear in the X vector in equation (2), the variables that represent the criteria on which lending decisions may legally be made. Finally, for each of the proxies in the X vector we test the following hypothesis:

H 10: Lenders require ethnic/gender minority loan applicants to have characteristics no more preferred than white males to be induced to accept their applications.

Hypothesis H 10 is supported by the finding that for characteristics in the X vector, t-tests fail to reject the null hypothesis of identical group means for white male firm owners and for owners affiliated with less preferred ethnic and gender groups; evidence against the hypothesis takes the form of t-tests that reject the null of identical group means.

IV. Data and Descriptive Statistics

Data

To test the hypotheses presented in Section III. we use data drawn from the 1998 Survey of Small Business Finances (SSBF). This survey, conducted at five-year intervals for the Federal Reserve, collects extensive financial and nonfinancial information on the surveyed firms. The 1998 survey was conducted during 1999 and 2000 and queried a nationally representative sample of small businesses in operation during December 1998. The survey defines a small business as a nonfarm, nonfinancial business having fewer than 500 full-time employees. The 1998 sample surveyed 3,561 firms representative of the 5.3 million small businesses then operating nationwide. Of these 3,561 firms, 962 applied for loans sometime between 1996 and 2000; owners of these firms answered a more extensive set of questions about their firms' most recent borrowing experiences.[5]

Data considerations led us to winnow the sample slightly. Of the 3,561 firms surveyed, 76 firms were excluded from further analysis because they appeared to be unviable, having zero or negative assets; this left 3,485 firms, of which 952 applied for loans. Data on the 3,485 viable firms were used to estimate equation (1) and to test hypotheses H 1 – H 5. To estimate equation

[5] The 1998 SSBF deliberately oversampled certain types of firms that have been underrepresented in other data bases, including firms headed by African-American, Asian and Hispanic owners. Oversampling causes summary statistics such as means and medians to be biased with respect to the population. By weighting all observations by weights from the 1998 SSBF we are able to make population inferences.

(2) we used data on firms that applied for loans. Of the 952 viable firms that applied, 64 firms lacked data on the type of loan applied for or the type of lender applied to, and another 18 firms reported applying for credit and having the application both denied and approved. We excluded these observations from the analysis of loan denials, leaving 870 firms that applied for loans.

The samples used to estimate equations (1) and (2) are both dominated by firms owned by white males. Of the 3,485 firms used to estimate equation (1), 2,579 were male-owned and 906 were female-owned. Male- and female-owned firms account for 662 and 208, respectively, of the 870 firms initially selected to estimate equation (2). The 1998 SSBF also identifies whether a sampled firm's principal owners are African-American, Asian, Hispanic, or some other ethnic minority. Of the 3,485 firms used to estimate equation (1) the numbers owned by African Americans, Asians, Hispanic, "Other," and white males are 259, 199, 260, 41 and 2,751, respectively. These numbers sum to more than 3,485 due to joint ownership of a few firms by individuals in different ethnic groups. Firms owned by African Americans, Asians, Hispanic, "Other," and white males in the 870-firm sample of loan applications number 68, 43, 70, 7 and 688, respectively. As before, these numbers sum to more than 870 because some firms have owners in different ethnic categories. Due to the small size of the "Other" category – only 7 loan applications – these observations were dropped when estimating equation (2). This left 863 firms on which to estimate equation (2) and to test hypotheses H 6 – H 10.[6]

[6] Below is a tabulation of the racial composition of the 3,485 firms used to compute equation (1) and the 863 firms used to compute equation (2).

DATA SUMMARY – ETHNIC COMPOSITON OF FIRM OWNERSHIP
FULL SAMPLE OF 3,485 OBSERVATIONS

Like the 1988-1989 and 1993 NSSBFs, the 1998 SSBF collects detailed data on types of loans outstanding and applied for as well as types of lenders who made loans. The 1998 SSBF identifies six types of small business loans: lines of credit, commercial mortgages, motor vehicle loans, equipments loans, capital leases and other loans. Following Berger and Udell (1995) we categorize credit lines as relationship loans, and categorize the remaining loans as transaction loans. The 1998 SSBF also classifies small business lenders into 21 different categories which include commercial banks, a variety of nonbank financial intermediaries, and nonfinancial intermediary lenders.[7] We group small business lenders into two categories: banks, which are commercial bank lenders, and nonbanks, which are all other lenders. We justify this grouping on

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	AFROAM	ASIAN	HISPANIC	OTHER	WHITE
AFROAM	250	0	9	0	0
ASIAN	0	189	6	0	4
HISPANIC	9	6	241	2	2
OTHER	0	0	2	37	2
WHITE	0	4	2	2	2743
	259	199	260	41	2751

DATA SUMMARY – ETHNIC COMPOSITON OF FIRM OWNERSHIP
APPROVED+DENIED LOAN APPLICATIONS: 870 OBSERVATIONS

	AFROAM	ASIAN	HISPANIC	OTHER	WHITE
AFROAM	65	0	3	0	0
ASIAN	0	40	1	0	2
HISPANIC	3	1	66	0	0
OTHER	0	0	0	7	0
WHITE	0	2	0	0	686
	68	43	70	7	688

[7] Lenders who are financial intermediaries include savings banks, S&Ls, credit unions, finance companies, insurance companies, mutual funds, leasing companies, mortgage companies, factors, and venture capital firms. Lenders who are not financial intermediaries include the firm owners themselves, their firms' retirement funds, other individuals, suppliers, unrelated nonfinancial businesses, check-clearing companies, credit-card processing companies, governments, and two additional categories of miscellaneous lenders. Loans from lenders who are financial intermediaries dwarf loans from lenders who are not financial intermediaries.

grounds that commercial banks differ qualitatively from other lenders in being much more highly regulated.

Descriptive Statistics

Before testing our 10 hypotheses we look at the data. Data on outstanding loans, loan applications and loan denials are summarized in the three panels of Table 1. In addition to showing aggregate data, Table 1 shows loan data disaggregated by loan type and lender type and by the demographic affiliation of the main owner(s) of each sampled firm. Asterisks and daggers denote statistics for ethnic minority and female firm owners whose statistics differ significantly from those of white male and male firm owners.

Panel A shows proportions of firms in the 3,485-firm sample having at least one outstanding loan. Over half of all firms (56 percent) have at least one loan outstanding and about one quarter of all firms have outstanding at least one bank credit line, at least one transaction loan from a bank, and at least one transaction loan from a nonbank lender (25 percent, 25 percent and 29 percent, respectively). About 5 percent of all firms have an outstanding line of credit from a nonbank lender. Disaggregating the data by owner ethnicity shows a different picture: compared with white male--owned firms, a significantly smaller proportion of minority-owned firms have outstanding at least one loan (51 percent vs. 57 percent), at least one bank line of credit (18 percent vs. 26 percent), or at least one transaction loan from a bank (16 percent vs. 27 percent), but a significantly larger proportion of minority-owned firms have outstanding at least one transaction loan from a nonbank lender (33 percent vs. 28 percent). This same basic pattern holds for firms owned by African Americans and Hispanics but not for firms owned by Asians or members of other ethnic groups: the prevalence and composition of their outstanding loans is

more similar to that of white male firm owners. Disaggregating the data by firm-owner gender shows a different picture again: compared with male-owned firms, a significantly smaller proportion of female-owned firms have outstanding at least one loan of any kind (51 percent vs. 58 percent), at least one bank line of credit (18 percent vs. 27 percent), at least one transaction loan from a bank (20 percent vs. 27 percent), or at least one transaction loan from a nonbank lender (26 percent vs. 30 percent). We conclude from Panel A that smaller proportions of ethnic minority- and female-owned firms have at least one outstanding loan, smaller proportions of firms owned by African Americans and Hispanics have at least one bank loan of any kind, but larger proportions of African-American- and Hispanic-owned firms have transaction loans from nonbanks.

Panel B shows proportions of firms in the 3,485-firm sample that applied for new loans between 1996 and 2000 and for which complete data on the most recent loan application are available (870 firms). About 22 percent of firms applied for a loan, with the modal application being for a transaction loan from a bank (9 percent); nearly equal proportions of firms applied for bank lines of credit and for transaction loans from nonbanks (6 percent and 5 percent respectively) while the remaining firms applied for credit lines from nonbanks (2 percent).[8] Essentially this same pattern describes the proportions of loan applications both of firms owned both by ethnic minorities and firms owned by white males, except that a significantly larger proportion of minority firm owners applied for bank lines of credit (8 percent vs 6 percent). This difference is due entirely to the behavior of African-American firm owners, for whom applications for bank credit lines composed nearly half of all loan applications. The proportions

[8] Table 1 Panel B shows that 22 percent of all sample firms applied for loans even though the numbers of observations in the 3,485- and 870-firm samples suggest that (870/3,485 =) 25 percent of sample firms applied for loans. As noted earlier, the 1998 SSBF oversamples certain types of firms but provides weights that can be applied to the observations so that inferences about the population of small firms may be drawn. In all the empirical work we present, the observations have been weighted.

of male- and female-owned firms that applied for loans and the distribution of applications among loan and lender types essentially mimics that of all firms. We conclude from Panel B that the credit-seeking behavior of small firm owners is quite homogeneous except for a larger propensity of African-American firm owners to apply for bank lines of credit.

Panel C shows proportions of firms denied loans in the 870-firm sample of loan applications. Lenders denied about 21 percent of all loan applications. Not surprisingly, lenders denied larger proportions of credit line applications than transaction loan applications (banks and nonbanks denied 36 percent and 32 percent of credit line applications, respectively, compared with 14 percent and 13 percent of transaction loan applications, respectively). Disaggregating the data by firm-owner ethnicity produces a substantially different picture. Lenders denied 17 percent of all loan applications from white male firm owners compared with 47 percent of all applications from minority firm owners. Whereas bank and nonbank lenders denied less than one-third of credit-line applications from white male firm owners (32 percent and 30 percent, respectively), these lenders denied over 50 percent of such applications from minority firm owners (52 percent and 56 percent, respectively). More surprising is lenders' behavior towards transaction loan applications: whereas banks and other lenders denied only about 10 percent of such applications from firms owned by white males (9 percent and 11 percent, respectively), they denied substantially higher proportions of transaction loan applications from minority-owned firms (52 percent and 25 percent, respectively). Lenders denied applications from African-American-owned firms in about the same proportions that they denied applications from all minority-owned firms. African-American- and Hispanic-owned firms had about half of all loan applications denied (53 percent and 47 percent, respectively) and about 60 percent of transaction loan applications to banks denied (56 percent and 63 percent, respectively). Disaggregating the

data by firm-owner gender produces a different picture again: lenders denied more than one-quarter of all loan applications from female-owned firms compared with one-fifth of all applications from male-owned firms. The higher proportion of denials for female-owned firms is due entirely to bank denials of credit line applications. We conclude from Panel C that lenders denied higher proportions of applications from firms owned by ethnic minorities and females; bank lenders denied transaction loan applications from African-American and Hispanic-owned firms at rates 6 to 7 times greater than for firms owned by white males, and denied credit-line applications from female-owned firms at rates nearly 1.5 times greater than for male-owned firms.

The descriptive statistics in Table 1 point towards several conclusions. First, in all three panels disaggregating the data by loan type and lender type reveals significant patterns not apparent from the aggregate data. Second, the statistics in Panels A and C present a broadly consistent picture: Panel C implies that some lenders deny relatively more of some types of loan applications from minority- and female-led firms, and Panel A hints that these loan denial decisions may be pervasive enough to yield fewer outstanding loans for minority- and female-led firms. Finally, the statistics in Panel B suggest that lower levels of outstanding loans at minority- and female-led firms are not chiefly a reflection of lower proclivities to apply for new loans: white male-, minority-, male- and female-led firms applied for new loans in roughly the same proportions. However, the Table 1 descriptive statistics cannot be said to prove the existence of discriminatory lending practices since the characteristics of the borrowing firms and firm owners are not controlled; this must be accomplished with econometric modeling.

Table 2 defines the variables used in the operational counterparts of equations (1) through (3). The first five variables, in turn, define the dependent variable in equation (1). Each is a

binary variable coded 1 if a surveyed firm has at least one outstanding loan of a given type, and zero otherwise. The types are any loan (HAVELOAN), a transaction loan from a nonbank lender (HAVEOLOAN_OLENDER), a line of credit from a nonbank lender (HAVELOC_OLENDER), a transaction loan from a bank (HAVEOLOAN_BANK), and a bank line of credit (HAVELOC_BANK). The variable DENIED, which defines the dependent variable in equation (2), is a binary variable coded 1 if a firm's loan application was denied and zero otherwise. Initially we estimate equation (2) alone using probit estimation; but to control for possible sample selection problems we subsequently re-estimate equation (2) jointly with equation (3) using APPLIED to define the dependent variable, which is coded 1 if a firm applied for a loan and zero otherwise. The remaining variables in Table 2 appear as explanatory variables in the operational counterparts of equations (1), (2) and (3). They include binary variables controlling for the intensity of competition in banking markets (HHI_MED and HHI_HI), binary variables indicating ethnicity and gender (MINORITY, AFROAM, ASIAN, HISPANIC, OTHER and FEMALE), measures of owner characteristics, measures of firm characteristics, and controls for region, industry, and year of loan application.

Table 3 presents mean values of the independent variables presented in Table 2 for firm owners in different ethnic and gender categories. Table 3 shows that minority- and female-owned firms differ from their white male- and male-owned counterparts in many respects. Compared with white male firm owners, minority firm owners more often conduct business in urban settings, have less business experience, and run smaller, younger businesses with attributes of "lifestyle" entities (more family controlled businesses, less diffuse ownership, fewer C-corporations, less owner net worth). Minority firm owners are less creditworthy than their white male counterparts (more recent bankruptcies, judgments against owners, owners who pay late,

low credit ratings and trade credit denials) but in absolute terms the differences in creditworthiness are small. Minority firm owners also have weaker financial relationships with other business entities and with lenders (shorter average relationships with their oldest financing sources and with their primary financial institutions, lesser use of trade credit and business credit cards, shorter average relationships with the lenders applied to for loans, and greater incidence of no prior relationship with this lender).

African-American and Hispanic firm owners exhibit most of the characteristics of minority firm owners, but Asian firm owners are strikingly different. Asian firm owners are better educated than white male firm owners, have a lower incidence of negative equity, and own a higher fraction of firms with a national scope. Other characteristics of Asian-owned firms do not differ statistically from those of white male-owned firms except that Asian firm owners, like other ethnic minorities, own younger businesses having shorter financial relationships with other institutions, including their primary financial institutions.

Many of the differences between white male and minority firm owners also exist between male and female firm owners. Compared with male firm owners, female firm owners are less educated and have less business experience; they also control smaller shares in their own businesses, which are smaller, younger and more often family-owned. Female-owned businesses have substantially weaker financial relationships with financial service providers and funding sources, although female-owned businesses do not differ significantly from male-owned firms in their relationships to the loan sources they applied to for loans.

V. Results

Outstanding Loans: Hypotheses H1 – H5

Table 4 reports probit estimates of equation (1) and tests of hypotheses H1 – H5. In all, 10 estimated models appear in Panel A, two for each of the five dependent variables used to estimate equation (1). The estimated models represent the probabilities of a firm having outstanding, respectively, a loan of any kind (equations 4.1 and 4.2), a transaction loan from a nonbank lender (equations 4.3 and 4.4), a line-of-credit loan from a nonbank lender (equations 4.5 and 4.6), a transaction loan from a bank (equations 4.7 and 4.8), and a line-of-credit loan from a bank (equations 4.9 and 4.10). In each pair of estimated models the first model uses the binary variable MINORITY to distinguish minority-owned firms while the second model uses the binary variables AFROAM, ASIAN, HISPANIC and OTHER. Panel B reports results of tests of hypotheses H1 – H5.

Before addressing the evidence on discriminatory lending it should be noted that the nonethnicity, nongender explanatory variables in all 10 estimated models generally have the anticipated signs and magnitudes. Firms are more likely to have an outstanding loan the larger their asset bases, the greater their returns on assets, the more business relationships they have with financial institutions, and the longer lived these relationships. Firms are generally less likely to have outstanding loans the longer the relationships with their primary financial institutions. Also, firms that use business credit cards are more likely to have a loan of some kind, and firms that use trade credit are more likely to have bank lines of credit but less likely to have transaction loans from nonbank lenders.

The econometric evidence fails to reject the hypothesis that female-led firms do not differ from otherwise identical male-led firms in their likelihood of having an outstanding loan. In Panel A, none of the 10 estimated coefficients of FEMALE differ statistically from zero; nor do

any of the estimated coefficients of the interactive terms FEMALE * HHI_MED and FEMALE * HHI_HIGH. Thus the econometric evidence rejects hypotheses H1 – H5 for female-led firms.

Though the econometric evidence disputes claims of discriminatory lending against female firm owners, evidence of discrimination against minority firm owners is more compelling. The estimated coefficient of MINORITY is statistically insignificant in the model for the probability of having an outstanding loan of any kind (equation (4.1)), but in the four disaggregated models the estimated coefficient of MINORITY is statistically significant in three of the four cases. Interestingly, the estimated coefficient of MINORITY is significantly *positive* in the model for the probability of having a transaction loan from a nonbank (equation (4.3)) but significantly *negative* in the models for the probability of having a transaction bank loan and a bank line of credit (equations (4.7) and (4.9), respectively). Thus minority firm owners are more likely than white male firm owners to have at least one transaction loan from a nonbank but less likely to have a bank loan of any kind. These results hold regardless of the degree of banking market concentration (the coefficients of MINORITY * HHI_MED and MINORITY * HHI_HIGH are all statistically insignificant).

Use of MINORITY to indicate firm-owner ethnicity restricts loan probabilities of all minority ethnic groups to be equal in each model; but replacing MINORITY with the separate ethnicity indicators AFROAM, ASIAN, HISPANIC and OTHER allows loan probabilities to differ. The estimated coefficients of the ethnicity indicators show evidence of differing loan probabilities for African-American and Hispanic firm owners compared with Asian firm owners. In the model for the probability of having at least one loan outstanding (equation (4.2)) the estimated coefficients of AFROAM and HISPANIC are both negative and significant, whereas the estimated coefficient of ASIAN is insignificant. A similar pattern appears in the models for

the probability of having a transaction bank loan and a bank credit line (equations (4.8) and (4.10), respectively), although in the latter equation the estimated coefficients of AFROAM and HISPANIC are statistically insignificant. In the remaining two equations the estimated coefficients of AFROAM, ASIAN, and HISPANIC are all statistically insignificant, but only in the equation for the probability of having a transaction loan from a nonbank lender do the estimated coefficients of AFROAM, ASIAN, and HISPANIC have the same algebraic sign and magnitude (equation (4.4)).

Further evidence of differences in credit-market access for African-American and Hispanic firm owners compared with Asian firm owners comes from the estimated coefficients of the interactions between the ethnicity and banking market concentration variables. In the model for the probability of having an outstanding loan (equation (4.2)) African-American and Hispanic firm owners are more likely to have outstanding loans in markets with moderate concentration, whereas Asian firm owners are less likely to have outstanding loans, the greater the degree of banking market concentration. For Hispanic firm owners this pattern appears to derive chiefly from transaction loans from banks, whereas for Asian firm owners it derives from transaction loans from nonbank lenders (equations (4.8) and (4.4), respectively).

Panel B of Table 4 reports test statistics for hypotheses H1 – H5 for firms owned by females and ethnic minorities. Using MINORITY to indicate firm-owner ethnicity, t-statistics fail to reject hypothesis H1, that the probability of having an outstanding loan is identical for minority and white male firm owners; but t-statistics do reject hypotheses H2 – H5, that the probability of having a nonbank transaction loan, a nonbank credit line, a bank transaction loan, or a bank credit line is identical between minority and white-male-owned firms. The failure to reject H1 coupled with the rejection of H2 – H5 attests to the importance of disaggregating by

loan type and lender type. In addition, using AFROAM, ASIAN, HISPANIC and OTHER to indicate firm-owner ethnicity leads to the rejection of hypotheses H1 and H4 for African-American and Hispanic firm owners and the rejection of H2 for owners in the OTHER ethnic category. We conclude that the empirical evidence on outstanding loans hints at discriminatory lending practices against African-American, Hispanic, and other ethnic minority firm owners which vary by loan type and lender type.

Loan Denials: Hypotheses H6 – H9

Tables 5 and 6 report estimates of equation (2) and tests of hypotheses H6 – H9 produced using different estimation techniques, which influence the interpretation of the estimated models. Table 5 reports estimates of equation (2) produced using probit estimation. Because a firm owner must apply for a loan before a lender can approve or deny the application, predicted loan denial probabilities from estimated loan denial models that ignore the application process must be interpreted as conditional estimates, conditional on a firm owner's decision to apply for a loan. This is the case for the estimated models reported in Table 5. Table 6 reports estimates of equation (2) generated by estimating equations (2) and (3) jointly using maximum likelihood estimation. The predicted loan denial probabilities from this latter model may be interpreted as unconditional estimates. The magnitude of the gain from joint estimation is purely an empirical matter; hence we estimate equation (2) using both techniques. Both Tables 5 and 6 report estimates of equation (2) in Panel A and report tests of hypotheses H6 – H9 in Panel B.

In the probit model estimates of equation (2) reported in Table 5, Panel A, the estimated coefficients for the nonethnicity, nongender independent variables accord well with intuition. The estimates imply that lenders are significantly more likely to deny loan applications when

they enjoy a measure of market power – in medium- and high-concentration banking markets – than when they have none – in low-concentration markets. Lenders are less likely to deny applications when lenders themselves are the applicants' primary financial institutions, and more likely to deny loans to applicants with whom they have no prior relationship. Prior relationships between lenders and applicants do not guarantee loans, however: lenders are more likely to deny an application the longer the relationship between lender and applicant, a result consistent with the information capture view of Greenbaum, et al. (1989) and Sharpe (1990). Not surprisingly, lenders are more likely to reject applications for credit lines than for transaction loans but, other things equal, banks are no more likely than nonbanks to reject a particular application. The estimated coefficients show that lenders are sensitive to agency problems and firm governance issues: lenders are less likely to deny applications from firm owners who manage their own firms and who own greater shares of their own businesses. Lenders are also highly sensitive to firm owners' creditworthiness: lenders are less likely to deny applications from owners with greater net worth, no recent bankruptcies, no judgments against them, no delinquencies on personal or business obligations, and no previous denials of trade credit.

Just as the evidence in Table 4 failed to show differences between otherwise identical female- and male-owned firms in the probabilities of having outstanding loans, the evidence in Table 5 fails to show differences between female- and male-owned firms in the probability of being denied loans. Only one of the 10 estimated coefficients of a variable that includes FEMALE achieves statistical significance at conventional levels: the estimated coefficient of FEMALE * BANK in equation (5.2), which is positively signed. This estimated coefficient implies that the *marginal effect* of being female when applying for any kind of bank loan is to raise the probability of loan denial. But the *total effect* of being female is found by combining the

estimated coefficient of FEMALE * BANK with other estimated coefficients; when this is done, the total effect of being female when applying for a transaction loan from a bank or bank credit line is zero; that is, H8 and H9 are not rejected (Table 5, Panel B). Indeed, none of the F-statistics in Panel B reject the hypothesis of identical loan denial probabilities for otherwise identical female- and male-owned firms.

Regarding discriminatory lending practices against ethnic minority firm owners, the evidence on outstanding loans and loan denials is consistent. When MINORITY is used to represent firm-owner ethnicity, four of the five estimated coefficients of variables that include MINORITY achieve statistical significance (equation (5.1)). Interestingly, the estimated coefficient of MINORITY * HHI_MED is statistically significant and negatively signed, suggesting that lenders in moderately concentrated banking markets are less likely to deny minority firm owners' loan applications than lenders in low-concentration markets, a counter-intuitive result. When the estimated coefficients of MINORITY, MINORITY * LOC and MINORITY * BANK are combined to estimate the total effect of minority ethnicity on denial decisions for the four loan type/lender type combinations, F-statistics reject the hypothesis of no ethnicity effect for nonbank transaction loans (hypothesis H6), bank transaction loans (H8) and bank lines of credit (H9), favoring instead the alternative hypothesis of greater denial probabilities for minority-owned firms.

A similar but more complex picture emerges when the ethnicity indicators AFROAM, ASIAN, and HISPANIC replace MINORITY (equation (5.2)). Only variables involving HISPANIC have statistically significant estimated coefficients; but when the estimated coefficients of variables with AFROAM, ASIAN, and HISPANIC are combined to estimate the total effects of firm-owner ethnicity on loan denial probabilities, F-statistics show some evidence

of discriminatory practices against African-American and Hispanic firm owners (Panel B). In particular, while nonbank lenders are no more likely to deny applications from African-American firm owners than from otherwise identical white male firm owners, bank lenders are more likely to deny African-American firm owners' applications for both transaction loans and lines of credit (i.e, H6 and H7 cannot be rejected but H8 and H9 can), with the evidence of discrimination being stronger for transaction loans than lines of credit. The F-statistics suggest, too, that bank lenders deny with greater probability any loan applications from Hispanic firm owners compared with otherwise identical firm-owner loan applicants who are white males, and that, in addition, nonbank lenders deny with greater probability transaction loan applications from Hispanic firm owners (i.e., H7 cannot be rejected but H6, H8 and H9 can). Only Asian firm owners face loan denial probabilities identical to those of white male firm owners on all four loan type/lender type combinations: F-statistics for Asian firm owners fail to reject H6 – H9.

The results in Table 5 are conditioned upon firm owners' decisions to apply for loans; but if fear of denial deters firm owners from applying to lenders, the evidence in Table 5 could understate or misrepresent the amount of discriminatory lending. To investigate this possibility we re-estimate our loan denial models (equation (2)) jointly with models of the decision to apply for loans (equation (3)). Table 6 reports the jointly estimated models and associated test statistics. Panel A reports both estimated loan application models (equations (6.1a) and (6.2a)) and loan denial models (equations (6.1b) and (6.2b)). F-statistics testing restrictions on the coefficients of the estimated loan denial models consistent with hypotheses H6 – H9 are reported in Panel B.

The estimated loan denial equations reported in Table 6, Panel A are qualitatively similar to those reported in Table 5, Panel A. The effect of joint estimation is to reduce slightly most

estimated coefficients' absolute values without changing their algebraic signs. The nongender, nonethnicity explanatory variables continue to influence loan denial probabilities as described earlier, with a few exceptions. Joint estimation causes the estimated relationship between asset size and loan denial probability to gain statistical significance, with larger firms being both more likely to apply for loans and less likely to be denied them. Joint estimation has a similar effect on the coefficient estimates of the relationship variables NUMRELATIONS and USEBUSCC: the coefficients now suggest that firm owners having more numerous financial relationships and using business credit cards are less likely to be denied loans. With joint estimation firms in metropolitan statistical areas are estimated to be less likely to apply for loans and more likely to be denied them. Joint estimation also reduces to statistical insignificance the estimated effect of firm age on loan denial, and reduces the significance of the estimated effect of several credit-quality proxies on loan denial, especially in equation (6.2b).

Joint estimation corroborates previous findings on discrimination against female firm owners. In both loan application equations the estimated coefficients of terms with FEMALE are statistically insignificant, implying equal probabilities of applying for loans by female and male firm owners identical in all other respects (equations (6.1a) and 6.2a)); analogous statements apply to the loan denial equations (equations (6.1b) and (6.2b)). As a result, F-statistics in Panel B fail to reject any of the hypotheses concerning equality of loan denial rates between female- and male-owned firms. Hence the data fail to reject hypotheses H6 – H9 for female firm owners.

When MINORITY proxies firm-owner ethnicity (equations (6.1a) and (6.1b)), the jointly estimated loan denial equation shows evidence of discriminatory lending that is weaker but qualitatively similar to the evidence shown by the singly estimated equation (equation (5.1)). In the estimated application model, the statistically insignificant estimated coefficients of terms

including MINORITY imply equal loan application probabilities by minority and white male firm owners of otherwise identical firms. In the estimated loan denial model, the estimated coefficients of terms with MINORITY are smaller in absolute value and less statistically significant than those reported for the singly estimated equation. Nevertheless, the F-statistics in Panel B show that minority firm owners are less likely than white male firm owners to get transaction loans from nonbanks or banks, or bank lines of credit (i.e., the F-statistics reject hypotheses H6, H8 and H9).

When AFROAM, ASIAN, and HISPANIC are used in place of MINORITY to indicate firm-owner ethnicity (equations (6.2a) & (6.2b)), the jointly estimated loan denial equation shows evidence of discriminatory lending practices against African-American and Hispanic firm owners but not Asian firm owners. In the loan application equation none of the estimated coefficients of terms with AFROAM, ASIAN or HISPANIC achieves statistical significance, implying no difference from white male firm owners in loan application probabilities. In the loan denial equation the estimated coefficients of terms with AFROAM, ASIAN, and HISPANIC are smaller in absolute value and generally less statistically significant than their counterparts in the singly estimated model. None of the estimated coefficients of terms with ASIAN are statistically significant, but the estimated coefficient of AFROAM achieves statistical significance at the 10 percent level, and four of the five estimated coefficients of terms with HISPANIC achieve significance at the 10 percent level or better. In tests of linear restrictions on the coefficient estimates (Panel B), F-statistics fail to reject the hypothesis of identical loan denial probabilities for Asian and white male firm owners for all four loan type and lender type combinations (i.e., the F-statistics fail to reject hypotheses H6 – H9). F-statistics also fail to reject the hypothesis of identical loan denial probabilities for Hispanic and white male firm owners applying for credit

lines from banks and nonbanks, but not for Hispanic and white male firm owners applying for transaction loans from banks and nonbanks (i.e., the F-statistics fail to reject hypotheses H7 and H9 but do reject hypotheses H6 and H8). Analogous statements apply to African-American firm owners, although admittedly the F-statistics reject the restrictions at lower significance levels for African-American firm owners compared with Hispanic firm owners. We conclude that the jointly estimated loan denial equation points towards discriminatory lending practices by bank and nonbank lenders against African-American and Hispanic firm owners in granting transaction loans but not line-of-credit loans. In addition, we find no evidence of discriminatory lending practices against Asian firm owners.

While both singly and jointly estimated loan denial models with individual ethnicity indicators show evidence of discriminatory lending practices against African-American and Hispanic firm owners, the pattern is slightly different. The estimated coefficients of the terms involving AFROAM and HISPANIC from single-equation estimation (equation (5.2)) produce test statistics yielding little evidence of discriminatory lending practices by nonbank lenders towards African-American firm owners or towards Hispanic firm owners seeking line-of-credit loans, but some evidence of such practices by nonbank lenders toward Hispanic firm owners seeking transaction loans as well as by banks towards both African-American and Hispanic firm owners seeking loans of any kind. In contrast, the estimated coefficients of the AFROAM and HISPANIC terms from the jointly estimated loan denial model produce test statistics yielding little evidence of discriminatory lending practices by banks or nonbanks towards African-American or Hispanic firm owners seeking credit lines but some evidence of such practices by banks and nonbanks towards African-American and Hispanic firm owners seeking transaction loans. In other words, whereas the singly estimated loan denial model implies that the main

source of loan-market discrimination towards African-American and Hispanic firm owners is banks in their lending decisions about transaction and line-of-credit loans (with a secondary culprit being nonbank lenders in lending decisions to Hispanic firm owners seeking transaction loans), the jointly estimated loan denial model finds the main source of loan-market discrimination to be both bank and nonbank lenders in their lending decisions about transaction loans. It should be noted, too, that the singly and jointly estimated loan denial equations both produce evidence that banks reject transaction loan applications from African-American and Hispanic firm owners at greater rates than otherwise identical white male firm owners.

Economic Significance of Loan Denial Probabilities

The econometric evidence presented in Tables 5 and 6 points towards statistically greater loan denial probabilities for African-American and Hispanic firm owners; but the nonlinear nature of the loan denial model obscures how much loan denial probabilities increase due to ethnic affiliation and, with it, any sense of the economic significance of discrimination. To assess the economic impact of firm-owner ethnicity on loan denial probabilities we use the estimated models reported as equations (5.2) in Table 5 and (6.2b) in Table 6 to predict the probability of loan denial for different combinations of owner and firm characteristics.

Using estimated models to predict loan denial probabilities by ethnic affiliation requires us to select values for all the remaining independent variables. We set the continuous independent variables equal to their medians for the subsample of firms that applied for loans, and do likewise for the binary variables, with the exceptions of the loan application terms LOC and BANK, the banking market concentration variables HHI_MED and HHI_HIGH, and the credit record indicators BANKRUPT, JUDGMENT and BUSPAYLATE. By setting LOC and

BANK to zero or one we can predict the denial probability of an application for a transaction loan (LOC =0) or line-of-credit loan (LOC=1) made to a bank (BANK=1) or a nonbank (BANK=0). We examine the degree of banking market concentration because of the attention this variable has received in previous theoretical and empirical research. Setting both HHI_MED and HHI_HIGH to zero allows us to predict loan denial probabilities for markets with the lowest degree of banking market concentration, while setting to one, in turn, HHI_MED and HHI_HIGH allows us to predict denial probabilities in markets having either medium or high concentration. We study the impact on loan denial probabilities of firm or principal owner bankruptcy within the past seven years (BANKRUPT =1), judgments against the principal owner within the past three years (JUDGMENT =1), and late payments on business accounts, including trade credit (BUSPAYLATE = 1), because preliminary investigations indicated these variables had disproportionately large impacts on the predicted loan denial probabilities.

Table 7 presents predicted loan denial probabilities for firms with different combinations of owner characteristics. Panel A shows predicted probabilities based on equation (5.2), the estimated loan denial equation produced by single-equation estimation; Panel B reports analogous information based on equation (6.2b), the estimated denial equation produced by joint estimation. Both panels show in bold type the predicted loan denial probabilities for African-American and Hispanic firm owners statistically different from the probabilities for white male firm owners, as determined by F-statistics in Tables 5 and 6. Both panels in Table 7 show four sets of predicted probabilities, denoted as Cases 1- 4. Most firm owners of all ethnicities fit the characteristics of Case 1: no recent prior legal judgments against them, no delinquencies on business payments, and no recent prior filings for bankruptcy. Predicted loan denial probabilities are shown for white male, African-American, and Hispanic firm owners applying for transaction

and line-of-credit loans to banks and nonbanks in markets having low, medium and high market concentration. Predicted denial probabilities are also shown for firm owners having a recent prior legal judgment against them (Case 2), owners whose firms have been delinquent on one or more business payments (Case 3), and owners who have filed for bankruptcy in the recent past (Case 4).

The loan denial probabilities reported in Panel A are generally small, except in instances where a firm owner has had a recent prior bankruptcy. The probabilities reported for Case 1, the case that describes the vast majority of firms, suggest that discrimination may have minimal economic impacts. For majority firm owners the predicted loan denial probabilities are miniscule – less than 1 percent – on applications for any loan type to any lender type. African-American firm owners face higher loan denial probabilities on bank loans than white male firm owners, but the highest computed denial probability – the denial probability for bank lines of credit in high-concentration banking markets – is still less than 14 percent. Compared with African-American firm owners, Hispanic firm owners face predicted loan denial probabilities higher in some instances and lower in others, but at worst less than 12 percent.

African-American and Hispanic firm owners with prior judgments against them (Case 2) and delinquent business payments (Case 3) may suffer some significant impacts of discrimination, judging from the predicted loan denial probabilities. Judgments and delinquencies scarcely increase the predicted loan denial probabilities for white male firm owners (the greatest predicted denial probability is still less than 7 percent), and the same is often true for African-American and Hispanic firm owners. But for African-American firm owners in high-concentration banking markets, judgments and delinquencies push predicted denial probabilities on bank loan applications to between 27 percent and 41 percent. And for Hispanic

firm owners seeking transaction loans from banks in low- or high-concentration banking markets, judgments and delinquencies push predicted denial probabilities from 11 percent or 12 percent to between 31 percent and 37 percent.

The loan denial probabilities suggest that prior bankruptcies (Case 4) by white male firm owners raise loan denial probabilities on line-of-credit loans relative to transaction loans, and raise loan denial probabilities in medium- and high-concentration banking markets relative to low-concentration markets. For a white male firm owner applying for a transaction loan in a low-concentration market, a prior bankruptcy raises from 0 percent to around 9 percent the predicted denial probability; this compares with an increase from 0 percent to between 30 percent and 33 percent in a medium- or high-concentration market. For a white male firm owner applying for a line-of-credit loan, a prior bankruptcy increases the predicted loan denial probability from less than 1 percent to a probability 2 to 3¾ times greater than for a transaction loan: to about 34 percent in low-concentration banking markets and between 66 percent and 69 percent in medium- and high-concentration markets.

The predicted loan denial probabilities imply that for African-American firm owners with prior bankruptcies, discrimination takes the form of making bank loans essentially unavailable. In low- and medium-concentration banking markets the predicted loan denial probabilities for an African-American firm owner range from 68 percent to 79 percent, compared with a range of 9 percent to 66 percent for an otherwise identical white male firm owner. The discrepancy is worse in high-concentration banking markets: predicted loan denial probabilities range from 94 percent to 96 percent for an African-American firm owner compared with a range of 31 percent to 67 percent for an otherwise identical white male majority firm owner. Thus for African-American

firm owners with a recent prior bankruptcy, the predicted loan denial probabilities suggest economically severe discrimination.

For Hispanic firm owners with a prior recent bankruptcy, the predicted loan denial probabilities imply discrimination having negative and generally severe economic effects. The most severe effects are felt by Hispanic firm owners seeking transaction bank loans in low- and high-concentration banking markets, where the predicted loan denial probabilities of about 95 percent are 64 to 86 percentage points more than for otherwise identical white male firm owners. Slightly less severe are the effects on Hispanic firm owners seeking transaction loans from nonbanks and credit lines from banks in low- and high-concentration markets: the predicted loan denial probabilities of about 58 percent (transaction loans from nonbanks) and 73 percent (bank lines of credit) are from 26 to 48 percentage points more and from 7 to 40 percentage points more, respectively, than for otherwise identical white male firm owners. In medium-concentration banking markets a prior bankruptcy raises a Hispanic firm owner's predicted loan denial probability on a transaction loan from a bank to over 76 percent, 46 percentage points more than for an otherwise identical white male firm owner. However, for bank lines of credit and for transaction loans from nonbanks, a prior bankruptcy increases Hispanic firm owners' predicted loan denial probabilities but leaves them below the predicted denial probabilities for comparable white male firm owners.

The predicted loan denial probabilities reported in Panel B based on the jointly estimated loan denial model (equation (6.2b)) both corroborate and challenge the findings from Panel A. A comparison of the predicted probabilities in the two panels shows similarities as well as differences. In both panels predicted loan denial probabilities for white male firm owners with no prior judgments, delinquent payments, or bankruptcies (Case 1) are generally quite low: 0

percent to 23 percent. In both panels, adverse legal judgments and late payments by white male firm owners (Cases 2 and 3, respectively) raise but slightly the predicted denial probabilities. In both panels, too, the predicted denial probabilities tend to increase with the degree of banking market concentration, a tendency predicted by economic theory (e.g., Becker (1957)). The greatest difference between the two panels is the level of predicted denial probabilities: the predicted probabilities reported in Panel B are consistently higher than their counterparts in Panel A.

The predicted loan denial probabilities in Panel B consistently imply greater economic impacts from discrimination than the probabilities reported in Panel A. African-American firm owners with no judgments, delinquencies, or prior bankruptcies (Case 1) face predicted loan denial probabilities on transaction loans 16 to 49 percentage points greater than white male firm owners with identical characteristics. Prior negative judgments (Case 2) or delinquent payments (Case 3) widen this difference. A prior recent bankruptcy by an African-American firm owner raises the predicted loan denial probability on transaction loans to 93 percent or more regardless of market concentration; this compares with denial probabilities for majority firm owners of just over 50 percent in low-concentration banking markets and 75 percent to 78 percent in medium- and high-concentration markets.

For Hispanic firm owners, the predicted loan denial probabilities imply smaller economic consequences of discrimination by nonbank lenders than by bank lenders. Hispanic firm owners with no negative judgments, late payments, or bankruptcies (i.e., Case 1) who apply to nonbank lenders for transaction loans face predicted loan denial probabilities slightly higher or lower than otherwise identical white male firm owners, depending on banking market concentration. But when the same Hispanic firm owners apply to banks, the predicted probability of loan denial is

19 to 47 percentage points greater than for otherwise identical white male firm owners, depending upon banking market concentration. The predicted loan denial probabilities show similar disparities between banks and nonbanks for Hispanic firm owners with prior judgments (Case 2), late business payments (Case 3) and prior bankruptcies (Case 4): nonbank lenders are consistently less likely than banks to deny transaction loan applications in markets of similar concentration. The economic effects of nonbank discrimination are predicted to be lowest in medium-concentration banking markets -- where they are effectively nil -- and highest in low-concentration banking markets, where the predicted probability of a nonbank lender denying an application for a transaction loan from a Hispanic firm owner with a prior judgment, payment delinquencies, or past bankruptcies is 20 to 34 percentage points greater than for an otherwise identical white male firm owner. The economic effects of discrimination by banks are also predicted to be lowest in medium-concentration markets and greatest in low-concentration markets but are greater than for nonbanks: banks in medium-concentration markets are predicted to deny applications for transaction loans from Hispanic firm owners having judgments, payment delinquencies, or bankruptcies with probabilities 17 to 28 percentage points more than for white male firm owners, while banks in low-concentration markets deny such applications with probabilities 47 to 64 percentage points greater than for white male firm owners.

Higher Requirements: Hypothesis H 10

Table 8 reports the results of tests of hypothesis H10. To test the hypothesis we started with all sample firms whose loan applications were accepted; for these firms we assembled data on the explanatory variables that appeared in the regression models, defined in Table 2. We then grouped the observations by loan type applied for and lender type applied to. Within each loan-

type/lender-type category we stratified the observations by ethnic group affiliation of the firm owners. For each ethnic group we then found the group means of the explanatory variables. Finally, within each loan-type/lender-type category we compared the means of the explanatory variables for each ethnic group to the means for white male firm owners and computed t-statistics to test the hypothesis of no difference between the group means. Table 8 reports the outcome of this investigation for white-male-, African-American- and Hispanic-owned firms.[9] Table 8 reports group means of the explanatory variables for all white male-, African-American- and Hispanic firm owners whose loan applications were accepted; for owners whose applications for line-of-credit loans to banks and to other lenders were accepted, respectively; and for owners whose loan applications for transaction loans to banks and to other lenders were accepted, respectively. For each loan type and lender type combination, asterisks denote the African-American and Hispanic group means that differ significantly from the group means for white male-owned firms at the 1 percent, 5 percent and 10 percent significance levels, as judged by t-statistics.

The preponderance of evidence fails to reject hypothesis H10 for African-American and Hispanic firm owners. Very few of the group-mean characteristics for African-American and Hispanic firm owners differ statistically from the characteristics for white male firm owners at the 10 percent level or better: only 60 of the possible 306 group means, or 20 percent. Of these 60, only 14 group means represent characteristics that significantly reduce the probability of loan denial, as determined by the coefficient estimates in Tables 5 and 6; the remaining 46 group means represent characteristics that either have no statistically discernible effect on loan denial

[9] A similar investigation for Asian- and female-owned firms failed to reject hypothesis H 10.

probabilities or represent characteristics that increase the probability of loan denial.[10] Hence we fail to reject hypothesis H10 and conclude that lenders do not appear to require superior attributes from ethnic minority firm owners to be induced to lend.

VI. Summary and Conclusion

Researchers have long been concerned about potentially discriminatory lending practices in the market for small business loans. Previous researchers have sought to confirm or deny the existence of discriminatory practices by using econometric tools to analyze outstanding loans, interest rates on new loans, and loan denial decisions. Although researchers have generally found evidence consistent with statistical discrimination, they have been hesitant to declare this evidence consistent with prejudicial discrimination due to limitations in their data. Specifically, researchers have found evidence in the pattern of outstanding loans suggesting discrimination against African-American and Hispanic firm owners (Cavalluzzo and Cavalluzzo (1998)). Researchers have also found some evidence that African-American, Hispanic, and Asian firm owners pay higher interest rates on small business loans, although the evidence is conflicting (Cavalluzo and Cavalluzo (1998), Cavalluzo, Cavalluzo and Wolken (2002), and Blanchflower, Levine and Zimmerman (2003)). Moreover, researchers have found that lenders are less likely to

[10] Eight of these 14 group means represent superior characteristics exhibited by African-American firm owners: a greater ownership share among firms applying for bank lines of credit (OWNSHR); a lower fraction of family-owned businesses among firms applying for transaction loans from banks and credit lines from nonbank lenders (FAMILY); greater average use of business credit cards among firms applying for nonbank credit lines (USEBUSCC); and greater average return on equity (ROA) and numbers of financial relationship (NUMRELATIONS) among firms applying for both credit lines and transaction loans from nonbanks. The 6 superior characteristics of Hispanic firm owners include a lower fraction of delinquent business payments among all successful loan applicants and among applicants for transaction loans from banks (BUSPAYLATE); and significantly shorter-lived relationships with the lenders applied to for all loans, bank credit lines, transaction loans to banks, and transaction loans to nonbanks.

approve new loans to African-American firm owners, Hispanic firm owners and, sometimes, Asian firm owners.

This study has sought to contribute to the literature on discriminatory lending practices by proposing a different econometric approach. Specifically, we proposed models of the probability that small business owners have outstanding loans and have applications for new loans denied, disaggregated by loan type (relationship loan versus transaction loan) and by lender type (banks and nonbanks). Our approach is inspired by the literature on the microeconomics of lending decisions. We explore the possibility that testing for evidence of discrimination at the aggregate level may fail to provide useful information because loans are dissimilar, being subject to different degrees of competitive market forces, and the lenders themselves differ in their ability and willingness to produce loans of different types. We estimated our models on data from a newer, more powerful data set, the 1998 SSBF.

Our results point towards several conclusions.

First, our results show the merits of disaggregating by loan type and lender type. No previous researchers of which we are aware have disaggregated their data or introduced variables that provide insights beneath the aggregate level, due to small sample sizes.[11] When we estimate a model of the probability of having an outstanding loan on aggregate data and use MINORITY as our indicator of ethnicity, we find that its estimated coefficient is statistically insignificant; but when we disaggregate outstanding loans by loan type and lender type and re-estimate, we find that ethnic minority firm owners are *more* likely to have transaction loans from nonbanks and *less* likely to have bank loans of any kind (Table 4, Panel B). When we replace MINORITY with individual ethnicity indicators and estimate the model of outstanding loans on loans for each loan

[11] Cavalluzzo, Cavalluzzo and Wolken (2002) come closest to disaggregating the data: in investigating possibly higher interest rates charged to female- and minority firm owners they estimate interest rate models on data for line-of-credit loans.

type and lender type combination, we find that the evidence of discrimination is not uniform across loan type and lender type. Similar statements apply when we estimate models of loan denial but allow the coefficient estimates of the ethnicity indicators to vary with loan type and lender type: we find the evidence of discrimination is not uniform (Tables 5 and 6). While one could argue that the results from the models of loan denials are weak because they reflect small sample sizes, the samples involving outstanding loans are not particularly small, having 3,485 observations.

Second, our results show that for our loan denial models estimated on the 1998 SSBF, the sample selection problem is present; hence joint estimation of a loan denial model with a loan application model is warranted. Cavalluzzo, Cavalluzzo, and Wolken (2002) also estimated loan denial models singly and jointly, but did not find much difference between the estimated coefficients of the two models.[12] When we estimated our loan denial model singly, we found that African-American and Hispanic firm owners face significantly greater loan denial probabilities than white male firm owners on both kinds of bank loans, and that Hispanic firm owners face greater loan denial probabilities on transaction loans from nonbanks. But when we estimated the loan denial equation jointly with the loan application equation, we found greater loan denial probabilities for African-American and Hispanic firm owners on transaction loans from both types of lenders. We also found that the joint estimation procedure produced substantially higher estimates of the economic impacts of statistical discrimination than did the single equation procedure.

Third, the preponderance of our evidence suggests that lenders do not artificially restrict the credit-market access of female and Asian firm owners: we could not reject any of the

[12] Cavalluzzo and Cavalluzzo (1998) and Cavalluzzo and Wolken (2002) also estimate their loan denial models jointly.

hypotheses H1 through H10 for females or Asians. This result is consistent with the findings of past research, which found little evidence of discrimination against female firm owners and inconsistent, weak evidence of discrimination against Asian firm owners. Our results solidify the earlier conclusions by verifying that the lack of evidence of discrimination against female and Asian firm owners at the aggregate level is not masking offsetting effects of discrimination at the disaggregate level.

Fourth, the preponderance of our evidence is consistent with prejudicial discrimination against African-American and Hispanic firm owners. While virtually all past research has likewise found evidence consistent with discriminatory lending practices against African-American and Hispanic firm owners, our contribution is to hint that discrimination may be specific to particular segments of the loan market rather than a general problem. In the case of outstanding loans, we show that African-American firm owners are less likely to have an outstanding loan of any kind (that is, we reject hypothesis H1, as have other researchers), but we also reject hypothesis H4 (not tested by other researchers), indicating that African-American firm owners are less likely to have an outstanding transaction loan from a bank. Consistent with this finding, our estimated loan denial models reject hypothesis H8 for African-American firm owners, indicating that banks are more likely to deny applications for transaction loans from African-American firm owners. Analogous statements apply to Hispanic firm owners. In addition, we find that nonbank lenders are more likely to deny applications for transaction loans from both African-American and Hispanic firm owners, a result not found in previous research.

Fifth, we find little evidence to suggest that discriminatory lending takes the form of lenders requiring firm owners in less preferred borrowers groups to exhibit superior owner and firm characteristics to secure a loan; that is, we fail to reject hypothesis H 10, that ethnic

minority firm owners whose loans are accepted have characteristics no more preferred than those of white male applicants. Our failure to reject hypothesis H 10 may be interpreted as evidence refuting discriminatory lending practices. Alternatively, our tests could fail to reject hypothesis H10 even with discrimination in lending if the distribution of the characteristics of owner and firm characteristics in the general population differs between majority firm owners and ethnic minority firm owners.

Finally, our empirical results suggest that preferential lending practices characterize the granting of transaction loans – especially transaction loans by banks – to a significantly greater degree than the granting of relationship loans. This is a curious and potentially important result. The received wisdom is that lenders make transaction loans on the basis of objective information but make relationship loans on the basis of soft information about informationally opaque firms that can only be gleaned through lenders' repeated interactions with their clients. A priori reasoning suggests that lenders should make decisions about transaction loans more impartially than decisions about relationship loans, and that greater competition in the market for transaction loans should eliminate discriminatory practices; yet the empirical evidence suggests that exactly the reverse is true. This finding has an interesting policy implication: that the efforts of larger banking institutions to economize on the costs of small business lending by moving toward transaction lending that uses cheaper-to-produce "hard" information could potentially lead to greater discrimination in lending, not less.

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Table 1. Borrowing Experiences of the Surveyed Firms by Demographic Group

Panel A: Outstanding Loans

These tables show the prevelance of loans at firms classified by the owner(s')'s demographic group. In each table the number in the lower right-hand cell is the fraction of firms having at least one outstanding loan of some kind. Loans are dichotomized by loan type (line-of-credit loan or other loan) and by lender type (bank lender or other lender). Among all the surveyed firms, for example, 56% had at least one outstanding loan in 1998 and 25% had a line-of-credit loan from a bank. Because firms may have several loans outstanding the sum of the four numbers in the upper left-hand portion of each table exceeds the number in the lower right-hand corner.

	All Firms (3,485 firms)			**Majority-Owned** (2,751 firms)			**Minority-Owned** (742 firms)		
Loan Type:	Line of Credit	Other Loan	Total	Line of Credit	Other Loan	Total	Line of Credit	Other Loan	Total
Loan Source:									
Bank	25%	25%		26%	27%		18% ***	16% ***	
Other Lender	5%	29%		5%	28%		4%	33% **	
Total			56%			57%			51% ***

	African-American-Owned (259 firms)			**Asian-Owned** (199 firms)			**Hispanic-Owned** (260 firms)			**Other Firms** (41 firms)		
Loan Type:	Line of Credit	Other Loan	Total	Line of Credit	Other Loan	Total	Line of Credit	Other Loan	Total	Line of Credit	Other Loan	Total
Loan Source:												
Bank	16% ***	14% ***		21%	16% ***		18% **	14% ***		18%	35%	
Other Lender	6%	36% **		2% *	27%		5%	36% **		2%	27%	
Total			49% *			47% ***			54%			56%

	Male-Owned (2,579 firms)			**Female-Owned** (906 firms)		
Loan Type:	Line of Credit	Other Loan	Total	Line of Credit	Other Loan	Total
Loan Source:						
Bank	27%	27%		19% †††	20% †††	
Other Lender	5%	30%		4%	26% ††	
Total			58%			51% †††

*** Statistically different from the percentage at majority-owned firms at the 1% level.
** Statistically different from the percentage at majority-owned firms at the 5% level.
* Statistically different from the percentage at majority-owned firms at the 10% level.

††† Statistically different from the percentage at male-owned firms at the 1% level.
†† Statistically different from the percentage at male-owned firms at the 5% level.

Table 1. Borrowing Experiences by Demographic Group, continued

Panel B: Most Recent Loan Applications of the Surveyed Firms

These tables show credit-seeking behavior of the surveyed firms, classified by the firm owner(s')'s demographic group. In each table the lower right-hand cell shows the fraction of firms that applied for a loan in 1998 which was subseqently either approved or denied. The remaining cells show the type of loan applied for and the lender applied to in the most recent loan application. Loans are dichotomized by loan type (line-of-credit loan or other loan) and by lender type (bank lender or other lender). For all firms, for example, 22% applied for some kind of loan and 6% applied to a bank for a line-of-credit loan. Because each firm reported applying for just one loan the four percentages in the upper left-hand portion of each table sum to the percentage in the lower right-hand corner. (Numbers may not add exactly due to rounding.)

	All Firms (3,485 firms)			**Majority-Owned** (2,751 firms)			**Minority-Owned** (742 firms)		
Loan Type: / Loan Source:	Line of Credit	Other Loan	Total	Line of Credit	Other Loan	Total	Line of Credit	Other Loan	Total
Bank	6%	9%		6%	9%		8% ***	8%	
Other Lender	2%	5%		2%	5%		1%	5%	
Total			22%			22%			22%

	African-American-Owned (259 firms)			**Asian-Owned** (199 firms)			**Hispanic-Owned** (260 firms)			**Other Firms** (41 firms)		
Loan Type: / Loan Source:	Line of Credit	Other Loan	Total	Line of Credit	Other Loan	Total	Line of Credit	Other Loan	Total	Line of Credit	Other Loan	Total
Bank	11% ***	8%		8%	5% **		7%	12%		5%	7%	
Other Lender	2%	4%		1%	6%		0% **	6%		2%	0%	
Total			23%			19%			25%			14%

	Male-Owned (2,579 firms)			**Female-Owned** (906 firms)		
Loan Type: / Loan Source:	Line of Credit	Other Loan	Total	Line of Credit	Other Loan	Total
Bank	6%	9%		7%	8%	
Other Lender	2%	5%		2%	4% †	
Total			22%			21%

*** Statistically different from the percentage at majority-owned firms at the 1% level.

** Statistically different from the percentage at majority-owned firms at the 5% level.

† Statistically different from the percentage at male-owned firms at the 10% level.

Table 1. Borrowing Experiences by Demographic Group, continued

Panel C: Loan Denial Rates of the Surveyed Firms

These tables show loan denial rates for surveyed firms that applied for credit in 1998, classified by the firm owner(s')'s demographic group. In each table the lower right-hand cell shows the fraction of all loan applications denied. The remaining cells show the fraction of denied loan applications in each category. For all firms, for example, 21% of all loan applications were denied and 36% of all applications to banks for line-of-credit loans were denied. Because each cell in a table represents a different number of approved and denied loans the four numbers in the upper left-hand portion of the table do not sum to the number in the lower right-hand corner.

	All Firms (870 firms)			**Majority-Owned** (688 firms)			**Minority-Owned** (184 firms)		
Loan Type:	Line of Credit	Other Loan	Total	Line of Credit	Other Loan	Total	Line of Credit	Other Loan	Total
Loan Source:									
Bank	36%	14%		32%	9%		52% ***	52% ***	
Other Lender	32%	13%		30%	11%		56% ***	25% **	
Total			21%			17%			47% ***

	African-American-Owned (68 firms)			**Asian-Owned** (43 firms)			**Hispanic-Owned** (70 firms)			**Other Firms** (7 firms)		
Loan Type:	Line of Credit	Other Loan	Total	Line of Credit	Other Loan	Total	Line of Credit	Other Loan	Total	Line of Credit	Other Loan	Total
Loan Source:												
Bank	48%	56% ***		61% **	10%		39%	63% ***		100% **	0%	
Other Lender	89% *	47% **		45%	14%		NA	24%		0%	NA	
Total			53% ***			36% ***			47% ***			36%

	Male-Owned (662 firms)			**Female-Owned** (208 firms)		
Loan Type:	Line of Credit	Other Loan	Total	Line of Credit	Other Loan	Total
Loan Source:						
Bank	32%	13%		45% ††	17%	
Other Lender	32%	15%		33%	4% †	
Total			20%			26% †

*** Statistically different from the percentage at majority-owned firms at the 1% level.
** Statistically different from the percentage at majority-owned firms at the 5% level.
* Statistically different from the percentage at majority-owned firms at the 10% level.

†† Statistically different from the percentage at male-owned firms at the 5% le
† Statistically different from the percentage at male-owned firms at the 10% le

Table 2. Variable Definitions

This table defines the variables shown in Tables 3-8. All the independent variables listed were used to estimate the regressions models reported in Tables 4-6 except for LOC, BANK, LNLENGTH, NORELATION, PRIMARY, and APPLY_N, which appear in the models having DENIED as the dependent variable.

Variable Type	Variable Name	Variable description
DEPENDENT VARIABLES	HAVELOAN	= 1 if firm has an outstanding loan
	HAVEOLOAN_OLENDER	= 1 if firm has a non-line-of-credit loan from a non-bank lender
	HAVELOC_OLENDER	= 1 if firm has a line-of-credit loan from a non-bank lender
	HAVEOLOAN_BANK	= 1 if firm has a non-line-of-credit loan from a bank lender
	HAVELOC_BANK	= 1 if firm has a line-of-credit loan from a bank lender
	APPLIED	= 1 if firm applied for a loan
	DENIED	= 1 if firm's most recent loan application was denied
INDEPENDENT VARIABLES		
Market Characteristics	HHI_MED	= 1 if the bank + S&L Herfindahl index for the firm's location ranges from 1000 to1799
	HHI_HIGH	= 1 if the bank + S&L Herfindahl index for the firm's location is 1800 or more
Owner Characteristics		
Race / Gender	MINORITY	= 1 if AFROAM, ASIAN, HISPANIC or OTHER =1
	AFROAM	= 1 if firm is at least 50% owned by African-Americans
	ASIAN	= 1 if firm is at least 50% owned by Asian-Americans
	HISPANIC	= 1 if firm is at least 50% owned by Hispanic-Americans
	OTHER	= 1 if firm is at least 50% owned by native Hawaiians, Alaskans, or Americans
	FEMALE	= 1 if firm is at least 50% owned by females
Education / Experience	POST_HS	= 1 if principal owner received some education beyond high school
	COLLEGE	= 1 if principal owner holds a college degree
	LNEXPER	= log of 1 + principal owner's years of business experience
Control / Wealth	OWNSHR	= percent of firm owned by principal owner
	OWNMGR	= 1 if principal owner manages the firm
	LNNETW	= log of principal owner's net worth
	FAMILY	= 1 if firm is more than 50% owned by a single family
Firm Characteristics		
Financial	LNASSETS	= log of firm's 1998 total assets
	LNSALES	= log of firm's 1998 sales revenue
	ROA	= firm's 1998 pre-tax profits / firm's 1998 total assets
	LNEQUITY	= log of firm's 1998 equity
	NEGEQ	= 1 if firm's 1998 equity is negative
Credit Record	BANKRUPT	= 1 if firm or principal owner declared bankruptcy in the last 7 years
	JUDGMENT	= 1 if legal judgement was made against principal owner in the last 3 years
	OWNPAYLATE	= 1 if principal owner of a proprietorship or partnership was delinquent on a financial obligation
	BUSPAYLATE	= 1 if firm was delinquent on a financial obligation, including trade credit
	HIGHRISK	= 1 if firm's Dun & Bradstreet credit rating is 4 or 5, the riskiest categories
	DENIEDTRCR	= 1 if firm was ever denied trade credit
Relationships	NUMRELATIONS	= number of sources of financial services used by firm
	LNLONGESTREL	= log of 1 + number of months in the firm's longest lived relationship with a financial institution
	LNPRIMARYREL	= log of 1 + number of months in the firm's relationship with its primary financial institution
	USETRCR	= 1 if firm used trade credit during fiscal year 1998
	USEOWNCC	= 1 if firm used owners' personal credit card for businesses expenses in 1998
	USEBUSCC	= 1 if firm used business or corporate credit cards for businesses expenses in 1998
Non-Financial	LNAGE	= log of 1 + firm's age, in years
	LNEMPLOYEES	= log of number of employees, including working owners
	LNLOCATIONS	= log of number of firm's locations
	CCORP	= 1 if firm is a C-corporation
	SCORP	= 1 if firm is an S-corporation
	NATIONAL	= 1 if firm's market is national or international
	MSA	= 1 if firm is located in a metropolitan area
Loan Application	LOC	= 1 if firm's most recent loan application was for a line-of-credit loan
	BANK	= 1 if firm's most recent loan application was to a commercial bank
	LNLENGTH	= log of 1 + number of months firm has had a relationship with the loan source applied to
	NORELATION	= 1 if the firm had no relationship with the loan source prior to the loan application
	PRIMARY	= 1 if loan source applied to is the firm's primary financial institution
Control Variables	APPLY_N	= 1 if loan was applied for in year N; N = 97, 98, 99 or 00
	REGION_N	= 1 if firm is headquartered in geographical region N; N = 1-9
	INDUSTRY_N	= 1 if firm is in industry N, based on its 2-digit SIC code; N = 1-9

Table 3. Univariate Statistics and T tests

This table presents mean values of the independent variables defined in Table 2 and used in the analyses reported in Tat 4 - 8. Means are reported for the entire sample and for firms classified by the owners(s')'s demographic group. Means were computed after first weighting the observations to correct for over-sampling of firms with selected characteristics in the 1998 SSBF. Asterisks and bold type denote means that differ from the means for majority-owned firms or male-owned firms at the 5% level or better as determined by t-tests.

Firms, by Owner Type:	All	Majority	Minority [1]	Afroam [1]	Asian [1]	Hispanic [1]	Other [1]	Male	Female [2]
Independent Variables:									
Market Characteristics									
HHI_MED	0.47	0.47	**0.43** *	0.46	**0.36** *	0.48	0.33	0.48	0.44
HHI_HI	0.35	0.36	**0.29** *	0.34	**0.24** *	**0.25** *	0.49	0.34	0.38
Owner Characteristics									
Education / Experience									
POST_HS	0.28	0.28	0.28	**0.34** *	**0.16** *	0.28	**0.52** *	0.27	**0.31** *
COLLEGE	0.49	0.49	0.48	0.44	**0.69** *	**0.39** *	**0.30** *	0.50	**0.44** *
EXPER	18.21	18.76	**15.02** *	**14.86** *	**13.65** *	**15.80** *	16.60	19.37	**15.17** *
Control / Wealth									
OWNSHR [3]	0.85	0.84	**0.88** *	**0.94** *	0.83	0.86	0.86	0.86	**0.81** *
OWNMGR	0.92	0.92	0.94	0.94	0.91	0.94	1.00	0.92	0.93
NETW [4]	6.14	6.62	**3.33** *	**2.37** *	4.51	**2.80** *	4.60	6.29	5.73
FAMILY	0.89	0.88	**0.91** *	**0.93** *	0.86	**0.94** *	0.87	0.88	**0.91** *
Firm Characteristics									
Financial									
ASSETS [4]	4.25	4.63	**2.01** *	**1.19** *	3.19	**1.69** *	2.08	4.88	**2.60** *
SALES [4]	10.06	10.95	**4.85** *	2.94	7.20	4.34	5.24	11.51	**6.23** *
ROA	46.38	52.32	11.47	2.82	2.62	24.05	8.67	57.24	17.74
EQUITY [4]	1.72	1.92	**0.54** *	0.38	0.96	0.30	0.31	1.98	1.03
NEGEQ	0.22	0.22	0.21	0.23	**0.16** *	0.23	0.21	0.22	0.23
Credit Record									
BANKRUPT	0.02	0.02	**0.04** *	**0.06** *	0.01	**0.05** *	0.04	0.02	0.03
JUDGMENT	0.04	0.03	**0.06** *	**0.09** *	0.03	0.05	**0.14** *	0.04	0.03
OWNPAYLATE	0.08	0.07	**0.13** *	**0.21** *	0.08	**0.12** *	0.10	0.08	0.08
BUSPAYLATE	0.31	0.31	0.32	**0.38** *	0.28	0.30	0.35	0.32	0.29
HIGHRISK	0.29	0.27	**0.37** *	**0.44** *	0.31	**0.38** *	0.33	0.29	0.30
DENIEDTRCR	0.05	0.05	**0.08** *	**0.11** *	0.04	0.08	**0.12** *	0.05	0.06
Relationships									
NUMRELATIONS	2.06	2.08	2.00	2.06	2.06	1.96	1.87	2.11	**1.96** *
LONGESTREL [5]	9.29	9.58	**7.59** *	**7.75** *	**7.52** *	**7.46** *	8.24	9.78	**7.98** *
PRIMARYREL [5]	7.64	7.89	**6.19** *	**5.84** *	**6.44** *	**5.96** *	7.59	7.99	**6.73** *
USETRCR	0.63	0.65	**0.54** *	**0.49** *	0.59	**0.49** *	0.72	0.65	**0.57** *
USEOWNCC	0.46	0.46	0.46	0.45	0.52	0.43	0.48	0.46	0.48
USEBUSCC	0.34	0.35	**0.30** *	0.30	0.31	0.30	0.19	0.36	**0.31** *
Non-Financial									
AGE [5]	13.39	13.85	**10.77** *	**11.20** *	**9.83** *	**11.05** *	11.05	14.17	**11.34** *
EMPLOYEES	8.72	9.15	**6.20** *	**5.22** *	6.94	6.22	6.60	9.49	**6.68** *
LOCATIONS	1.38	1.41	1.21	1.30	1.22	1.13	1.25	1.46	1.17
CCORP	0.20	0.21	**0.15** *	**0.13** *	0.17	**0.16** *	0.09	0.20	0.19
SCORP	0.24	0.24	0.23	0.24	0.24	0.21	0.30	0.25	0.24
NATIONAL	0.14	0.14	0.16	0.13	**0.21** *	0.14	0.16	0.14	0.13
MSA	0.80	0.78	**0.89** *	**0.88** *	**0.93** *	**0.92** *	**0.65** *	0.80	0.80
Loan Application									
LENGTH [5]	5.24	5.53	**3.53** *	5.06	3.64	**2.50** *	3.85	5.40	4.81
NORELATION	0.27	0.25	**0.35** *	0.33	0.34	**0.38** *	0.00	0.26	0.29
PRIMARY	0.51	0.52	0.46	0.51	0.45	0.43	0.65	0.51	0.51
Number of Observations									
Characteristics	3485	2751	742	259	199	260	41	2579	906
Loan Application	870	688	184	68	43	70	7	662	208

Notes:

[1] Asterisk denotes a mean statistically different from the mean for majority-owned firms at the 5% level or better.

[2] Asterisk denotes a mean statistically different from the mean for all male-owned firms at the 5% level or better.

[3] Percent, in decmial form.

[4] Expressed in hundreds of thousands of dollars.

[5] Expressed in years.

Table 4. Probability of Having an Outstanding Loa

This table presents econometric evidence on the probability that a firm-owner has an outstanding loan. Panel A presents estimated probit models. In all ten estimated models are presented. The dependent variables are the probability that a firm-owner has any kind of loan outstanding (equations 4.1 and 4.2), has a traditional loan from a non-bank lender (equations 4.3 and 4.4), has a line of credit from a non-bank lender (equations 4.5 and 4.6), has a traditional loan from a bank (equations 4.7 and 4.8), and has a line of credit from a bank (equations 4.9 and 4.10). The independent variables are defined in Table 2. Estimated coefficients are presented along with standard errors, which appear in parentheses beneath the coefficient estimates. In addition to the independent variables listed below both models include 8 binary variables to control for the geographical location of a firm's headquarters and 8 binary variables to control for the firm's industry grouping. Panel B presents F tests of restrictions on the estimated coefficients in Panel A.

Panel A: Regression Model Estimates

DEPENDENT VARIABLE	Probability (HAVELOAN = 1)		Probability (HAVEOLOAN_OLENDER = 1)		Probability (HAVELOC_OLENDER = 1)	
(Equation number)	(4.1)	(4.2)	(4.3)	(4.4)	(4.5)	(4.6)
INDEPENDENT VARIABLES						
Market Characteristics						
HHI_MED	0.099	0.094	0.258 **	0.246 **	0.050	0.060
	(0.116)	(0.116)	(0.118)	(0.118)	(0.124)	(0.124)
HHI_HIGH	-0.059	-0.068	0.067	0.051	0.048	0.053
	(0.125)	(0.126)	(0.131)	(0.130)	(0.138)	(0.139)
Owner Characteristics						
Race / Gender						
FEMALE	-0.128	-0.128	-0.165	-0.160	0.088	0.086
	(0.178)	(0.180)	(0.187)	(0.187)	(0.211)	(0.213)
FEMALE * HHI_MED	-0.110	-0.119	0.086	0.080	-0.379	-0.376
	(0.209)	(0.211)	(0.220)	(0.220)	(0.254)	(0.256)
FEMALE * HHI_HIGH	0.124	0.132	0.001	0.004	-0.330	-0.322
	(0.211)	(0.213)	(0.226)	(0.227)	(0.256)	(0.257)
MINORITY	-0.044		0.416 **		-0.097	
	(0.156)		(0.165)		(0.174)	
MINORITY * HHI_MED	0.127		-0.290		0.142	
	(0.190)		(0.195)		(0.210)	
MINORITY * HHI_HIGH	-0.079		-0.165		-0.023	
	(0.200)		(0.211)		(0.241)	
AFROAM		-0.629 **		0.407		0.172
		(0.287)		(0.253)		(0.276)
AFROAM * HHI_MED		0.945 ***		-0.167		-0.249
		(0.350)		(0.302)		(0.332)
AFROAM * HHI_HIGH		0.497		-0.044		-0.321
		(0.335)		(0.313)		(0.383)
ASIAN		0.331		0.414		-0.306
		(0.223)		(0.254)		(0.248)
ASIAN * HHI_MED		-1.174 ***		-0.759 **		0.140
		(0.296)		(0.325)		(0.317)
ASIAN * HHI_HIGH		-0.808 **		-0.575 *		0.192
		(0.353)		(0.348)		(0.365)
HISPANIC		-0.313 *		0.318		0.082
		(0.190)		(0.245)		(0.259)
HISPANIC * HHI_MED		0.594 **		-0.157		0.069
		(0.242)		(0.286)		(0.310)
HISPANIC * HHI_HIGH		0.500 *		0.228		-0.016
		(0.276)		(0.306)		(0.376)
OTHER		0.213		-1.156 **		-0.481
		(0.650)		(0.579)		(0.496)
OTHER * HHI_MED		0.801		1.754 **		0.875
		(0.800)		(0.710)		(0.649)
OTHER * HHI_HIGH		-0.286		1.003		0.132
		(0.712)		(0.777)		(0.753)
Education / Experience						
POST_HS	-0.001	-0.001	-0.110	-0.113	0.002	0.000
	(0.087)	(0.088)	(0.091)	(0.091)	(0.105)	(0.105)
COLLEGE	-0.162 *	-0.158 *	-0.277 ***	-0.270 ***	-0.137	-0.126
	(0.085)	(0.086)	(0.091)	(0.092)	(0.099)	(0.100)
LNEXPER	-0.043	-0.049	0.066	0.066	-0.058	-0.060
	(0.060)	(0.060)	(0.059)	(0.059)	(0.068)	(0.068)
Control / Wealth						
OWNSHR	-0.003	-0.003	0.000	0.000	-0.002	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
OWNMGR	-0.087	-0.091	0.196	0.197	0.177	0.180
	(0.126)	(0.125)	(0.126)	(0.127)	(0.117)	(0.117)
LNNETW	0.002	0.000	-0.039 ***	-0.040 ***	0.024	0.025
	(0.015)	(0.016)	(0.015)	(0.015)	(0.018)	(0.018)
FAMILY	0.138	0.132	0.201 *	0.193	0.178	0.170
	(0.130)	(0.132)	(0.119)	(0.119)	(0.119)	(0.120)

Table 4. Probability of Having an Outstanding Loan, continue

Panel A: Regression Model Estimates, continued

DEPENDENT VARIABLE	Probability (HAVE_LOAN = 1)		Probability (HAVE_OLOAN_OLENDER = 1)		Probability (HAVE_LOC_OLENDER = 1)	
(Equation number)	(4.1)	(4.2)	(4.3)	(4.4)	(4.5)	(4.6)
INDEPENDENT VARIABLES						
Firm Characteristics						
Financial						
LNASSETS	0.232 ***	0.238 ***	0.097 ***	0.102 ***	0.121 ***	0.123 ***
	(0.038)	(0.039)	(0.031)	(0.031)	(0.040)	(0.040)
LNSALES	0.012	0.015	-0.031 *	-0.029	-0.033	-0.034
	(0.020)	(0.020)	(0.018)	(0.018)	(0.023)	(0.024)
ROA	0.000	0.000 **	0.000 ***	0.000 ***	0.000 ***	0.000 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LNEQUITY	-0.099 ***	-0.106 ***	-0.021	-0.028	-0.063 *	-0.063 *
	(0.037)	(0.038)	(0.030)	(0.030)	(0.035)	(0.035)
NEGEQ	-0.144	-0.216	0.275	0.205	-0.404	-0.405
	(0.365)	(0.372)	(0.307)	(0.310)	(0.387)	(0.389)
Credit Record						
BANKRUPT	-0.326	-0.362 *	-0.039	-0.076	-1.000 ***	-1.028 ***
	(0.205)	(0.210)	(0.230)	(0.230)	(0.336)	(0.326)
JUDGMENT	-0.232	-0.246	-0.329 *	-0.339 *	-0.031	-0.033
	(0.171)	(0.172)	(0.194)	(0.195)	(0.191)	(0.192)
OWNPAYLATE	0.089	0.082	0.009	0.007	-0.029	-0.030
	(0.131)	(0.132)	(0.128)	(0.129)	(0.165)	(0.166)
BUSPAYLATE	-0.086	-0.092	-0.022	-0.028	0.074	0.071
	(0.080)	(0.081)	(0.078)	(0.078)	(0.083)	(0.083)
HIGHRISK	0.096	0.090	0.108	0.098	0.044	0.039
	(0.072)	(0.072)	(0.073)	(0.073)	(0.079)	(0.079)
DENIEDTRCR	0.019	0.025	0.225	0.240 *	0.138	0.142
	(0.148)	(0.150)	(0.142)	(0.143)	(0.149)	(0.150)
Relationships						
NUMRELATIONS	0.740 ***	0.750 ***	0.759 ***	0.759 ***	0.352 ***	0.353 ***
	(0.046)	(0.047)	(0.037)	(0.037)	(0.033)	(0.033)
LNLONGESTREL	0.237 ***	0.225 ***	0.204 ***	0.202 ***	0.116 *	0.118 *
	(0.068)	(0.068)	(0.065)	(0.065)	(0.061)	(0.061)
LNPRIMARYREL	-0.191 ***	-0.178 ***	-0.126 **	-0.119 **	-0.085 *	-0.085 *
	(0.062)	(0.062)	(0.056)	(0.056)	(0.051)	(0.051)
USETRCR	0.090	0.086	-0.138 *	-0.139 *	0.129	0.135
	(0.076)	(0.077)	(0.081)	(0.081)	(0.095)	(0.095)
USEOWNCC	-0.013	-0.007	0.080	0.081	0.029	0.031
	(0.068)	(0.068)	(0.068)	(0.068)	(0.077)	(0.077)
USEBUSCC	0.312 ***	0.325 ***	0.200 ***	0.199 ***	0.356 ***	0.353 ***
	(0.074)	(0.074)	(0.072)	(0.072)	(0.074)	(0.074)
Non-Financial						
LNAGE	-0.064	-0.062	-0.250 ***	-0.257 ***	-0.020	-0.022
	(0.050)	(0.050)	(0.050)	(0.050)	(0.057)	(0.057)
LNEMPLOYEES	0.149 ***	0.155 ***	0.048	0.048	0.125 ***	0.124 ***
	(0.040)	(0.041)	(0.040)	(0.040)	(0.042)	(0.043)
LNLOCATIONS	-0.168	-0.163	-0.163 *	-0.159 *	-0.240 ***	-0.238 ***
	(0.105)	(0.106)	(0.093)	(0.093)	(0.089)	(0.089)
CCORP	-0.358 ***	-0.368 ***	-0.103	-0.100	-0.245 **	-0.244 **
	(0.103)	(0.103)	(0.100)	(0.100)	(0.102)	(0.102)
SCORP	-0.227 **	-0.241 ***	-0.096	-0.098	-0.026	-0.027
	(0.091)	(0.092)	(0.091)	(0.092)	(0.098)	(0.098)
NATIONAL	-0.034	-0.040	-0.147	-0.151	-0.007	-0.005
	(0.099)	(0.100)	(0.096)	(0.096)	(0.111)	(0.111)
MSA	-0.241 ***	-0.242 ***	0.019	0.015	-0.095	-0.098
	(0.086)	(0.086)	(0.092)	(0.092)	(0.102)	(0.102)
CONSTANT	-2.953 ***	-2.925 ***	-2.608 ***	-2.564 ***	-2.797 ***	-2.840 ***
	(0.420)	(0.423)	(0.390)	(0.391)	(0.424)	(0.426)
Number of observations	3485	3485	3485	3485	3485	3485

*** Statistically different from zero at the 1% level for a two-tailed test.
** Statistically different from zero at the 5% level for a two-tailed test.
* Statistically different from zero at the 10% level for a two-tailed test.

Table 4. Probability of Having an Outstanding Loan, continuec

Panel A: Regression Model Estimates, continued

	DEPENDENT VARIABLE	Probability (HAVEOLOAN_BANK = 1)		Probability (HAVELOC_BANK = 1)	
	(Equation number)	(4.7)	(4.8)	(4.9)	(4.10)
INDEPENDENT VARIABLES					
Market Characteristics					
	HHI_MED	-0.127 (0.104)	-0.127 (0.104)	0.053 (0.102)	0.058 (0.102)
	HHI_HIGH	-0.131 (0.116)	-0.129 (0.116)	-0.069 (0.115)	-0.066 (0.115)
Owner Characteristics					
Race / Gender					
	FEMALE	-0.304 (0.192)	-0.303 (0.193)	-0.240 (0.168)	-0.241 (0.168)
	FEMALE * HHI_MED	0.090 (0.220)	0.090 (0.221)	-0.061 (0.204)	-0.058 (0.204)
	FEMALE * HHI_HIGH	0.286 (0.224)	0.281 (0.226)	0.098 (0.204)	0.101 (0.204)
	MINORITY	-0.281 * (0.162)		-0.244 * (0.147)	
	MINORITY * HHI_MED	0.276 (0.194)		0.220 (0.184)	
	MINORITY * HHI_HIGH	0.116 (0.208)		0.088 (0.197)	
	AFROAM		-0.607 ** (0.291)		-0.300 (0.273)
	AFROAM * HHI_MED		0.310 (0.334)		0.369 (0.336)
	AFROAM * HHI_HIGH		0.100 (0.358)		0.004 (0.352)
	ASIAN		-0.041 (0.217)		-0.071 (0.210)
	ASIAN * HHI_MED		-0.238 (0.293)		-0.211 (0.294)
	ASIAN * HHI_HIGH		0.081 (0.328)		0.094 (0.312)
	HISPANIC		-0.549 ** (0.245)		-0.311 (0.229)
	HISPANIC * HHI_MED		0.677 ** (0.287)		0.371 (0.277)
	HISPANIC * HHI_HIGH		0.399 (0.330)		0.223 (0.313)
	OTHER		0.467 (0.642)		-0.378 (0.457)
	OTHER * HHI_MED		0.541 (0.816)		0.400 (0.610)
	OTHER * HHI_HIGH		-0.228 (0.707)		0.166 (0.560)
Education / Experience					
	POST_HS	-0.094 (0.086)	-0.100 (0.087)	0.139 (0.090)	0.140 (0.090)
	COLLEGE	-0.215 ** (0.084)	-0.219 *** (0.085)	-0.054 (0.085)	-0.053 (0.086)
	LNEXPER	-0.044 (0.058)	-0.049 (0.058)	-0.117 ** (0.058)	-0.116 ** (0.058)
Control / Wealth					
	OWNSHR	-0.002 (0.002)	-0.002 (0.002)	-0.001 (0.002)	-0.001 (0.002)
	OWNMGR	-0.072 (0.110)	-0.079 (0.111)	0.117 (0.107)	0.114 (0.107)
	LNNETW	0.002 (0.014)	0.003 (0.014)	0.062 *** (0.017)	0.062 *** (0.017)
	FAMILY	-0.053 (0.110)	-0.054 (0.110)	0.119 (0.109)	0.111 (0.110)

Table 4. Probability of Having an Outstanding Loan, continuec

Panel A: Regression Model Estimates, continued

DEPENDENT VARIABLE	Probability (HAVE_OLOAN_BANK = 1)		Probability (HAVE_LOC_BANK = 1)	
(Equation number)	(4.7)	(4.8)	(4.9)	(4.10)
INDEPENDENT VARIABLES				
Firm Characteristics				
Financial				
LNASSETS	0.286 ***	0.290 ***	0.178 ***	0.179 ***
	(0.041)	(0.041)	(0.036)	(0.036)
LNSALES	0.025	0.024	0.049 *	0.049 *
	(0.022)	(0.022)	(0.028)	(0.027)
ROA	0.000 **	0.000 **	0.000 ***	0.000 ***
	(0.000)	(0.000)	(0.000)	(0.000)
LNEQUITY	-0.139 ***	-0.141 ***	-0.072 **	-0.072 **
	(0.035)	(0.035)	(0.032)	(0.032)
NEGEQ	-0.934 **	-0.956 ***	-0.464	-0.465
	(0.373)	(0.371)	(0.349)	(0.349)
Credit Record				
BANKRUPT	-0.332	-0.351	-0.776 ***	-0.784 ***
	(0.224)	(0.231)	(0.277)	(0.277)
JUDGMENT	-0.153	-0.175	0.203	0.208
	(0.162)	(0.160)	(0.160)	(0.161)
OWNPAYLATE	0.022	0.025	-0.051	-0.054
	(0.133)	(0.134)	(0.143)	(0.144)
BUSPAYLATE	0.155 **	0.159 ***	-0.004	-0.006
	(0.073)	(0.073)	(0.072)	(0.072)
HIGHRISK	0.080	0.082	-0.014	-0.015
	(0.068)	(0.068)	(0.069)	(0.069)
DENIEDTRCR	-0.074	-0.071	0.039	0.034
	(0.132)	(0.133)	(0.132)	(0.133)
Financial				
NUMRELATIONS	0.308 ***	0.311 ***	0.055 **	0.056 **
	(0.029)	(0.029)	(0.024)	(0.025)
LNLONGESTREL	0.105 *	0.106 *	0.174 ***	0.171 ***
	(0.057)	(0.058)	(0.056)	(0.056)
LNPRIMARYREL	-0.053	-0.053	-0.099 **	-0.095 **
	(0.049)	(0.049)	(0.047)	(0.047)
USETRCR	0.124	0.111	0.208 ***	0.211 ***
	(0.077)	(0.077)	(0.076)	(0.076)
USEOWNCC	-0.066	-0.068	0.095	0.097
	(0.063)	(0.063)	(0.064)	(0.064)
USEBUSCC	0.108	0.111 *	0.373 ***	0.370 ***
	(0.066)	(0.067)	(0.066)	(0.066)
Non-Financial				
LNAGE	-0.008	-0.006	0.067	0.066
	(0.045)	(0.045)	(0.047)	(0.047)
LNEMPLOYEES	0.050	0.054	0.126 ***	0.127 ***
	(0.038)	(0.038)	(0.039)	(0.039)
LNLOCATIONS	-0.221 ***	-0.221 ***	-0.105	-0.105
	(0.083)	(0.083)	(0.079)	(0.079)
CCORP	-0.259 ***	-0.253 ***	0.017	0.017
	(0.090)	(0.090)	(0.093)	(0.093)
SCORP	-0.144 *	-0.146 *	0.020	0.019
	(0.085)	(0.085)	(0.087)	(0.087)
NATIONAL	-0.124	-0.134	0.086	0.081
	(0.092)	(0.092)	(0.091)	(0.091)
MSA	-0.336 ***	-0.336 ***	-0.023	-0.024
	(0.082)	(0.083)	(0.086)	(0.086)
CONSTANT	-2.971 ***	-2.984 ***	-4.188 ***	-4.199 ***
	(0.389)	(0.390)	(0.429)	(0.429)
Number of observations	3485	3485	3485	3485

*** Statistically different from zero at the 1% level for a two-tailed test.
** Statistically different from zero at the 5% level for a two-tailed test.
* Statistically different from zero at the 10% level for a two-tailed test.

Table 4. Probability of Having an Outstanding Loan, continued

Panel B: Hypothesis Tests

	T STATISTIC t (1, 3484)									
(Equation number)	(4.1)	(4.2)	(4.3)	(4.4)	(4.5)	(4.6)	(4.7)	(4.8)	(4.9)	(4.10)
HYPOTHESIS :	H 1: All else equal, the probability of having at least one outstanding loan is identical for race/gender minority-owned firms and majority-owned firms.		H 2: All else equal, the probability of having an outstanding non-line-of-credit loan from a non-bank lender is identical for race/gender minority-owned firms and majority-owned firms.		H 3: All else equal, the probability of having an outstanding line-of-credit loan from a non-bank lender is identical for race/gender minority-owned firms and majority-owned firms.		H 4: All else equal, the probability of having an outstanding non-line-of-credit loan from a bank lender is identical for race/gender minority-owned firms and majority-owned firms.		H 5: All else equal, the probability of having an outstanding line-of-credit loan from a bank lender is identical for race/gender minority-owned firms and majority-owned firms.	
FEMALE = 0	-0.72	-0.71	-0.88	-0.85	0.42	0.40	-1.58	-1.57	-1.43	-1.43
MINORITY = 0	-0.28		2.52 **		-0.56		-1.74 *		-1.66 *	
AFROAM = 0		-2.19 **		1.60		0.62		-2.08 **		-1.10
ASIAN = 0		1.48		1.63		-1.23		-0.19		-0.34
HISPANIC = 0		-1.65 *		1.30		0.32		-2.24 **		-1.36
OTHER = 0		0.33		-2.00 **		-0.97		0.73		-0.83

*** The t-statistic rejects the restriction at the 1% level.
** The t-statistic rejects the retsriction at the 5% level.
* The t-statistic rejects the restriction at the 10% level.

Table 5. Probability of Loan Denial Given Loan Application

This table presents econometric evidence on the probability that a firm-owner is denied a loan given that the owner applied for a loan. Panel A presents estimated probit models. The dependent variable is the probability the loan is denied. The independent variables are defined in Table 2. Estimated coefficients are presented along with standard errors, which appear in parentheses beneath the coefficient estimates. In addition to the independent variables listed below both models include 4 binary variables to control for the year in which the business owner applied, 8 binary variables to control for the geographical location of a firm's headquarters, and 8 binary variables to control for the firm's industry grouping. Panel B presents F tests of restrictions on the estimated coefficients in Panel A.

Panel A: Regression Model Estimates

		DEPENDENT VARIABLE	Probability (Denied = 1)	
		(Equation number)	(5.1)	(5.2)
INDEPENDENT VARIABLES				
Market Characteristics				
		HHI_MED	0.880 ***	0.850 ***
			(0.284)	(0.284)
		HHI_HIGH	0.876 ***	0.867 ***
			(0.297)	(0.296)
Loan Application				
		LNLENGTH	0.327 ***	0.306 ***
			(0.084)	(0.087)
		NORELATION	1.275 ***	1.204 ***
			(0.350)	(0.360)
		PRIMARY	-0.723 ***	-0.717 ***
			(0.199)	(0.204)
		LOC	0.940 ***	0.934 ***
			(0.192)	(0.195)
		BANK	-0.022	-0.046
			(0.245)	(0.250)
Owner Characteristics				
	Race / Gender			
		FEMALE	-0.377	-0.817
			(0.539)	(0.538)
		FEMALE * HHI_MED	-0.489	-0.262
			(0.522)	(0.545)
		FEMALE * HHI_HIGH	-0.146	0.068
			(0.482)	(0.495)
		FEMALE * LOC	0.431	0.455
			(0.358)	(0.362)
		FEMALE * BANK	0.497	0.802 **
			(0.405)	(0.401)
		MINORITY	0.864 **	
			(0.428)	
		MINORITY * HHI_MED	-0.767 *	
			(0.430)	
		MINORITY * HHI_HIGH	0.177	
			(0.430)	
		MINORITY * LOC	-1.214 ***	
			(0.336)	
		MINORITY * BANK	1.281 ***	
			(0.404)	
		AFROAM		1.704
				(1.061)
		AFROAM * HHI_MED		-0.957
				(0.791)
		AFROAM * HHI_HIGH		0.108
				(0.864)
		AFROAM * LOC		-0.703
				(0.620)
		AFROAM * BANK		0.225
				(0.828)
		ASIAN		-0.101
				(0.662)
		ASIAN * HHI_MED		1.149
				(0.959)
		ASIAN * HHI_HIGH		0.675
				(0.672)
		ASIAN * LOC		0.333
				(0.581)
		ASIAN * BANK		-0.328
				(0.829)
		HISPANIC		1.516 ***
				(0.508)
		HISPANIC * HHI_MED		-1.787 ***
				(0.503)
		HISPANIC * HHI_HIGH		-0.841
				(0.583)
		HISPANIC * LOC		-1.963 ***
				(0.503)
		HISPANIC * BANK		1.494 ***
				(0.554)

Table 5. Probability of Loan Denial Given Loan Application, continued

Panel A: Regression Model Estimates, continued

	DEPENDENT VARIABLE	Probability (Denied = 1)	
	(Equation number)	(1)	(2)
INDEPENDENT VARIABLES			
Education / Experience			
	POST_HS	-0.232 (0.206)	-0.253 (0.210)
	COLLEGE	-0.151 (0.202)	-0.146 (0.209)
	LNEXPER	0.024 (0.154)	0.121 (0.159)
Control / Wealth			
	OWNSHR	-0.007 (0.004)	-0.008 * (0.004)
	OWNMGR	-0.555 ** (0.243)	-0.638 *** (0.247)
	LNNETW	-0.110 *** (0.036)	-0.106 *** (0.036)
	FAMILY	0.728 ** (0.287)	0.865 *** (0.319)
Firm Characteristics			
Financial			
	LNASSETS	-0.070 (0.076)	-0.093 (0.080)
	LNSALES	-0.002 (0.044)	-0.007 (0.047)
	ROA	-0.030 *** (0.011)	-0.030 *** (0.010)
	LNEQUITY	0.006 (0.074)	0.021 (0.077)
	NEGEQ	0.085 (0.770)	0.190 (0.793)
Credit Record			
	BANKRUPT	2.841 *** (0.417)	2.859 *** (0.436)
	JUDGMENT	0.736 ** (0.319)	0.718 ** (0.324)
	OWNPAYLATE	1.449 *** (0.252)	1.495 *** (0.262)
	BUSPAYLATE	0.811 *** (0.179)	0.858 *** (0.188)
	HIGHRISK	-0.028 (0.167)	-0.036 (0.170)
	DENIEDTRCR	0.637 *** (0.234)	0.637 *** (0.241)
Relationships			
	NUMRELATIONS	-0.069 (0.063)	-0.086 (0.066)
	LNLONGESTREL	-0.145 (0.119)	-0.143 (0.121)
	LNPRIMARYREL	0.054 (0.095)	0.053 (0.098)
	USETRCR	-0.212 (0.196)	-0.174 (0.200)
	USEOWNCC	0.132 (0.161)	0.133 (0.165)
	USEBUSCC	-0.307 * (0.169)	-0.331 * (0.172)
Non-Financial			
	LNAGE	-0.249 ** (0.113)	-0.302 ** (0.118)
	LNEMPLOYEES	0.059 (0.102)	0.054 (0.104)
	LNLOCATIONS	0.138 (0.191)	0.191 (0.193)
	CCORP	-0.124 (0.240)	-0.166 (0.252)
	SCORP	0.084 (0.202)	0.042 (0.210)
	NATIONAL	0.456 ** (0.210)	0.470 ** (0.211)
	MSA	0.326 (0.210)	0.352 (0.215)
	CONSTANT	-0.355 (1.182)	0.205 (1.200)
	Number of observations	863	863

*** Statistically different from zero at the 1% level for a two-tailed test.
** Statistically different from zero at the 5% level for a two-tailed test.
* Statistically different from zero at the 10% level for a two-tailed test.

Table 5. Probability of Loan Denial Given Loan Application, continued

Panel B: Hypothesis Tests

HYPOTHESIS (Equation number)	F STATISTIC F (1, 862) (5.1)	(5.2)
H 6: All else equal, non-bank lenders deny non-line-of-credit loan applications at identical rates for race/gender minority-owned firms and majority-owned		
FEMALE = 0	0.49	2.31
MINORITY = 0	4.08 **	
AFROAM = 0		2.58
ASIAN = 0		0.02
HISPANIC = 0		8.91 ***
H 7: All else equal, non-bank lenders deny line-of-credit loan applications at identical rates for race/gender minority-owned firms and majority-owned		
FEMALE + FEMALE * LOC = 0	0.01	0.44
MINORITY+ MINORITY * LOC = 0	0.60	
AFROAM + AFROAM * LOC = 0		1.14
ASIAN + ASIAN * LOC = 0		0.12
HISPANIC + HISPANIC * LOC = 0		0.45
H 8: All else equal, bank lenders deny non-line-of-credit loan applications at identical rates for race/gender minority-owned firms and majority-owned		
FEMALE + FEMALE * BANK = 0	0.06	0.00
MINORITY+ MINORITY * BANK = 0	26.71 ***	
AFROAM + AFROAM * BANK = 0		4.45 **
ASIAN + ASIAN * BANK = 0		0.30
HISPANIC + HISPANIC * BANK = 0		36.82 ***
H 9: All else equal, bank lenders deny line-of-credit loan applications at identical rates for race/gender minority-owned firms and majority-owned firms.		
FEMALE + FEMALE * LOC + FEMALE * BANK = 0	1.32	0.81
MINORITY+ MINORITY * LOC + MINORITY * BANK = 0	6.70 ***	
AFROAM + AFROAM * LOC + AFROAM * BANK = 0		3.82 *
ASIAN + ASIAN * LOC + ASIAN * BANK = 0		0.02
HISPANIC + HISPANIC * LOC + HISPANIC * BANK = 0		5.28 **

*** The F-statistic rejects the restriction at the 1% level.
** The F-statistic rejects the restriction at the 5% level.
* The F-statistic rejects the restriction at the 10% level.

Table 6. Probability of Loan Application and Loan Denial

This table presents econometric evidence on the probability that a firm-owner applies for a loan and is denied a loan. Panel A presents two pairs of estimated probit models. For both pairs the dependent variable of the first equation (6.1a and 6.2a) is the probability that a firm-owner applies for a loan. The residuals from this equation were used in estimating the second equation (6.1b and 6.2b), whose dependent variable is the probability that the lender denies the loan. The independent variables are defined in Table 2. Estimated coefficients are presented along with standard errors, which appear in parentheses beneath the coefficient estimates. In addition to the independent variables listed all the models estimated include 8 binary variables to control for the geographical location of a firm's headquarters and 8 binary variables to control for the firm's industry grouping; the loan denial models also include 4 binary variables to control for the year in which the business owner applied for a loan. Panel B presents F tests of restrictions on estimated coefficients in the loan denial equations in Panel A.

Panel A: Regression Model Estimates

	DEPENDENT VARIABLE	Probability (Applied =1)	Probability (Denied =1)	Probability (Applied =1)	Probability (Denied =1)
	(Equation number)	(6.1a)	(6.1b)	(6.2a)	(6.2b)
INDEPENDENT VARIABLES					
Market Characteristics					
	HHI_MED	-0.124	0.780 ***	-0.138	0.716 ***
		(0.111)	(0.247)	(0.110)	(0.246)
	HHI_HIGH	0.045	0.698 ***	0.027	0.641 **
		(0.120)	(0.260)	(0.119)	(0.265)
Loan Application					
	LNLENGTH		0.264 ***		0.226 ***
			(0.082)		(0.087)
	NORELATION		1.030 ***		0.887 **
			(0.335)		(0.360)
	PRIMARY		-0.549 ***		-0.493 *
			(0.203)		(0.231)
	LOC		0.751 ***		0.679 ***
			(0.204)		(0.238)
	BANK		-0.016		-0.030
			(0.193)		(0.178)
Owner Characteristics					
Race / Gender					
	FEMALE	0.006	-0.233	0.007	-0.528
		(0.173)	(0.448)	(0.173)	(0.459)
	FEMALE * HHI_MED	-0.009	-0.430	-0.010	-0.235
		(0.201)	(0.428)	(0.200)	(0.404)
	FEMALE * HHI_HIGH	-0.101	-0.118	-0.098	0.038
		(0.207)	(0.396)	(0.207)	(0.387)
	FEMALE * LOC		0.311		0.288
			(0.308)		(0.305)
	FEMALE * BANK		0.395		0.600 *
			(0.327)		(0.317)
	MINORITY	0.131	0.658 *		
		(0.147)	(0.351)		
	MINORITY * HHI_MED	-0.114	-0.531		
		(0.182)	(0.371)		
	MINORITY * HHI_HIGH	-0.127	0.208		
		(0.191)	(0.352)		
	MINORITY * LOC		-1.002 ***		
			(0.300)		
	MINORITY * BANK		1.001 **		
			(0.403)		
	AFROAM			0.157	1.471 *
				(0.218)	(0.755)
	AFROAM * HHI_MED			-0.059	-0.709
				(0.265)	(0.580)
	AFROAM * HHI_HIGH			-0.202	0.169
				(0.282)	(0.625)
	AFROAM * LOC				-0.608
					(0.428)
	AFROAM * BANK				-0.043
					(0.654)
	ASIAN			0.005	-0.037
				(0.219)	(0.501)
	ASIAN * HHI_MED			-0.313	1.058
				(0.315)	(0.688)
	ASIAN * HHI_HIGH			-0.103	0.536
				(0.318)	(0.521)
	ASIAN * LOC				0.218
					(0.430)
	ASIAN * BANK				-0.288
					(0.589)
	HISPANIC			0.096	1.055 **
				(0.217)	(0.498)
	HISPANIC * HHI_MED			0.032	-1.303 *
				(0.267)	(0.507)
	HISPANIC * HHI_HIGH			0.095	-0.635
				(0.289)	(0.478)
	HISPANIC * LOC				-1.444 ***
					(0.511)
	HISPANIC * BANK				1.076 **
					(0.491)

Table 6. Probability of Loan Application and Loan Denial, continued

Panel A: Regression Model Estimates, continued

	DEPENDENT VARIABLE	Probability (Applied =1)	Probability (Denied =1)	Probability (Applied =1)	Probability (Denied =1)
	(Equation number)	(1a)	(1b)	(2a)	(2b)
INDEPENDENT VARIABLES					
Education / Experience					
	POST_HS	-0.175 **	-0.089	-0.176 **	-0.081
		(0.085)	(0.186)	(0.085)	(0.182)
	COLLEGE	-0.244 ***	-0.003	-0.235 ***	0.022
		(0.081)	(0.184)	(0.082)	(0.183)
	LNEXPER	-0.035	0.033	-0.038	0.104
		(0.056)	(0.125)	(0.056)	(0.122)
Control / Wealth					
	OWNSHR	0.001	-0.006	0.001	-0.006 *
		(0.002)	(0.004)	(0.002)	(0.004)
	OWNMGR	0.080	-0.458 **	0.082	-0.471 *
		(0.113)	(0.224)	(0.112)	(0.252)
	LNNETW	-0.008	-0.085 **	-0.008	-0.075 **
		(0.014)	(0.035)	(0.014)	(0.035)
	FAMILY	-0.281 **	0.724 ***	-0.291 ***	0.787 ***
		(0.114)	(0.241)	(0.114)	(0.284)
Firm Characteristics					
Financial					
	LNASSETS	0.121 ***	-0.114 *	0.123 ***	-0.133 **
		(0.032)	(0.063)	(0.032)	(0.062)
	LNSALES	0.017	-0.013	0.017	-0.018
		(0.019)	(0.038)	(0.019)	(0.037)
	ROA	0.000 ***	-0.024 **	0.000 ***	-0.021 **
		(0.000)	(0.010)	(0.000)	(0.010)
	LNEQUITY	-0.088 ***	0.042	-0.089 ***	0.058
		(0.030)	(0.060)	(0.030)	(0.057)
	NEGEQ	-0.744 **	0.388	-0.758 **	0.502
		(0.316)	(0.628)	(0.318)	(0.598)
Credit Record					
	BANKRUPT	-0.080	2.349 ***	-0.094	2.204 ***
		(0.197)	(0.478)	(0.198)	(0.577)
	JUDGMENT	0.180	0.494 *	0.179	0.419
		(0.160)	(0.300)	(0.160)	(0.310)
	OWNPAYLATE	0.271 **	1.016 ***	0.270 **	0.925 **
		(0.120)	(0.329)	(0.121)	(0.409)
	BUSPAYLATE	0.116	0.577 ***	0.114	0.543 *
		(0.073)	(0.217)	(0.073)	(0.275)
	HIGHRISK	-0.002	-0.014	-0.008	-0.026
		(0.067)	(0.138)	(0.067)	(0.131)
	DENIEDTRCR	0.139	0.442 **	0.134	0.397 *
		(0.136)	(0.218)	(0.135)	(0.233)
Relationships					
	NUMRELATIONS	0.270 ***	-0.173 ***	0.270 ***	-0.200 ***
		(0.027)	(0.057)	(0.027)	(0.056)
	LNLONGESTREL	0.000	-0.122	-0.002	-0.108
		(0.059)	(0.102)	(0.059)	(0.098)
	LNPRIMARYREL	-0.048	0.071	-0.045	0.069
		(0.052)	(0.081)	(0.052)	(0.079)
	USETRCR	0.039	-0.191	0.044	-0.144
		(0.075)	(0.164)	(0.075)	(0.163)
	USEOWNCC	0.080	0.071	0.081	0.053
		(0.064)	(0.133)	(0.064)	(0.127)
	USEBUSCC	0.141 **	-0.307 **	0.138 **	-0.317 **
		(0.067)	(0.140)	(0.067)	(0.141)
Non-Financial					
	LNAGE	-0.119 ***	-0.138	-0.119 ***	-0.146
		(0.045)	(0.111)	(0.045)	(0.130)
	LNEMPLOYEES	0.013	0.045	0.013	0.036
		(0.038)	(0.083)	(0.038)	(0.079)
	LNLOCATIONS	-0.033	0.131	-0.031	0.163
		(0.079)	(0.157)	(0.079)	(0.151)
	CCORP	-0.150	-0.021	-0.148	-0.027
		(0.095)	(0.197)	(0.095)	(0.194)
	SCORP	-0.001	0.052	0.002	0.020
		(0.087)	(0.171)	(0.087)	(0.162)
	NATIONAL	-0.023	0.392 **	-0.020	0.367 **
		(0.091)	(0.178)	(0.091)	(0.182)
	MSA	-0.165 **	0.355 **	-0.169 **	0.366 **
		(0.083)	(0.175)	(0.083)	(0.169)
	CONSTANT	-1.192 ***	0.816	-1.180 ***	1.069
		(0.371)	(1.027)	(0.371)	(0.955)
	RHO	-0.855 **		-1.049 *	
		(0.389)		(0.578)	
	Number of observations	3,444	863	3,444	863

*** Statistically different from zero at the 1% level for a two-tailed test.
** Statistically different from zero at the 5% level for a two-tailed test.
* Statistically different from zero at the 10% level for a two-tailed test.

Table 6. Probability of Loan Application and Loan Denial, continued

Panel B: Hypothesis Tests

HYPOTHESIS (Equation number)	F STATISTIC F (1, 3443) (6.1b)	(6.2b)
H 6: All else equal, non-bank lenders deny non-line-of-credit loan applications at identical rates for race/gender minority-owned firms and majority-owned		
FEMALE = 0	0.27	1.32
MINORITY = 0	3.51 *	
AFROAM = 0		3.80 *
ASIAN = 0		0.01
HISPANIC = 0		4.50 **
H 7: All else equal, non-bank lenders deny line-of-credit loan applications at identical rates for race/gender minority-owned firms and majority-owned		
FEMALE + FEMALE * LOC = 0	0.03	0.33
MINORITY+ MINORITY * LOC = 0	0.81	
AFROAM + AFROAM * LOC = 0		1.39
ASIAN + ASIAN * LOC = 0		0.12
HISPANIC + HISPANIC * LOC = 0		0.57
H 8: All else equal, bank lenders deny non-line-of-credit loan applications at identical rates for race/gender minority-owned firms and majority-owned		
FEMALE + FEMALE * BANK = 0	0.17	0.03
MINORITY+ MINORITY * BANK = 0	13.43 ***	
AFROAM + AFROAM * BANK = 0		4.83 **
ASIAN + ASIAN * BANK = 0		0.33
HISPANIC + HISPANIC * BANK = 0		9.36 ***
H 9: All else equal, bank lenders deny line-of-credit loan applications at identical rates for race/gender minority-owned firms and majority-owned firms.		
FEMALE + FEMALE * LOC + FEMALE * BANK = 0	1.45	0.96
MINORITY+ MINORITY * LOC + MINORITY * BANK = 0	3.76 *	
AFROAM + AFROAM * LOC + AFROAM * BANK = 0		2.37
ASIAN + ASIAN * LOC + ASIAN * BANK = 0		0.04
HISPANIC + HISPANIC * LOC + HISPANIC * BANK = 0		2.66

*** The F-statistic rejects the restriction at the 1% level.
** The F-statistic rejects the restriction at the 5% level.
* The F-statistic rejects the restriction at the 10% level.

TABLE 7. Predicted Probability of Loan Denial

This table presents predicted probabilities that bank and non-bank lenders will reject majority, African-American and Hispanic firm-owners' applications for line-of-credit and non-line-of-credit loans. The probabilities are in percents and range from 0 to 100. The predictions in Panel A are based on Equation (5.2) in Table 5; those in Panel B are based on Equation (6.2b) in Table 6. Predictions appear in the columns for African-American and Hispanic firm owners where F-statistics reported in Panel B of Tables 5 and 6 indicate denial probabilities statistically different from majority firm-owners.

Predictions in both panels were generated by setting the equations' explanatory variables equal to the medians from the sample of firm-owners who applied for loans; the exceptions are the race and market characteristics variables and three of the firm characteristic variables, as shown in the table. Separate predictions are shown for firm-owners with no recent prior legal judgments against them, no late business payments and no recent prior bankruptcy (Case 1); for firm-owners with a recent prior judgment against them only (Case 2); recent late business payments only (Case 3), and a recent prior bankruptcy only (Case 4). Also, separate predictions are shown for firm-owners applying to lenders in banking markets with low concentration (HHI_MED=0, HHI_HIGH=0), medium concentration (HHI_MED=1, HHI_HIGH=0)and high concentration (HHI_MED=0, HHI_HIGH=1).

Panel A: Predicted Probabilities of Loan Denial, Given Loan Application

CASE NUMBER:	Case 1: No judgments against the firm-owner, no late business payments, firm-owner hasn't been bankrupt. (JUDGMENT = 0, BUSPAYLATE = 0, BANKRUPT = 0)			Case 2: One or more judgments against the firm-owner, no late business payments, firm-owner hasn't been bankrupt. (JUDGMENT = 1, BUSPAYLATE = 0, BANKRUPT = 0)			Case 3: No judgments against the firm-owner, one or more late business payments, firm-owner hasn't been bankrupt. (JUDGMENT = 0, BUSPAYLATE = 1, BANKRUPT = 0)			Case 4: No judgments against the firm-owner, no late business payments, firm-owner has been bankrupt. (JUDGMENT = 0, BUSPAYLATE = 0, BANKRUPT = 1)		
DEMOGRAPHIC GROUP:	MAJORITY	AFRICAN-AMERICAN	HISPANIC	MAJORITY	AFRICAN-AMERICAN	HISPANIC	MAJORITY	AFRICAN-AMERICAN	HISPANIC	MAJORITY	AFRICAN-AMERICAN	HISPANIC
MARKET CHARACTISTICS: LOAN and LENDER TYPE:												
Lowest concentration banking market												
Non-line-of-credit loan denied by a non-bank lender	0.0	same as majority	0.4	0.0	same as majority	2.6	0.1	same as majority	3.6	9.4	same as majority	57.9
Line-of-credit loan denied by a non-bank lender	0.1	same as majority	same as majority	0.6	same as majority	same as majority	0.9	same as majority	same as majority	35.1	same as majority	same as majority
Non-line-of-credit loan denied by a bank lender	0.0	1.1	11.3	0.0	5.8	31.1	0.0	7.6	36.2	8.6	71.4	95.0
Line-of-credit loan denied by a bank lender	0.1	3.0	1.3	0.5	9.0	6.4	0.8	11.5	8.3	33.4	78.7	73.2
Medium-concentration banking market												
Non-line-of-credit loan denied by a non-bank lender	0.0	same as majority	0.0	0.5	same as majority	0.2	0.7	same as majority	0.3	32.0	same as majority	23.0
Line-of-credit loan denied by a non-bank lender	0.8	same as majority	same as majority	4.7	same as majority	same as majority	6.3	same as majority	same as majority	68.0	same as majority	same as majority
Non-line-of-credit loan denied by a bank lender	0.0	0.8	1.6	0.4	4.6	7.6	0.6	6.2	9.8	30.4	67.7	76.1
Line-of-credit loan denied by a bank lender	0.7	1.5	0.1	4.3	7.4	0.7	5.7	9.5	1.0	66.3	75.5	37.5
Highest concentration banking market												
Non-line-of-credit loan denied by a non-bank lender	0.0	same as majority	0.4	0.5	same as majority	2.8	0.7	same as majority	3.8	32.6	same as majority	58.9
Line-of-credit loan denied by a non-bank lender	0.9	same as majority	same as majority	4.9	same as majority	same as majority	6.5	same as majority	same as majority	68.5	same as majority	same as majority
Non-line-of-credit loan denied by a bank lender	0.0	9.4	11.8	0.4	27.4	32.0	0.6	32.3	37.1	31.0	93.8	95.3
Line-of-credit loan denied by a bank lender	0.8	13.9	1.3	4.4	35.6	6.7	5.9	41.0	8.7	66.9	96.2	74.0

TABLE 7. Predicted Probability of Loan Denial, continued

Panel B: Predicted Probabilities of Loan Denial, Probability of Loan Application and Loan Denial Estimated Jointly

CASE NUMBER:	Case 1: No judgments against the firm-owner, no late business payments, firm-owner hasn't been bankrupt. (JUDGMENT = 0, BUSPAYLATE = 0, BANKRUPT = 0)			Case 2: One or more judgments against the firm-owner, no late business payments, firm-owner hasn't been bankrupt. (JUDGMENT = 1, BUSPAYLATE = 0, BANKRUPT = 0)			Case 3: No judgments against the firm-owner, one or more late business payments, firm-owner hasn't been bankrupt. (JUDGMENT = 0, BUSPAYLATE = 1, BANKRUPT = 0)			Case 4: No judgments against the firm-owner, no late business payments, firm-owner has been bankrupt. (JUDGMENT = 0, BUSPAYLATE = 0, BANKRUPT = 1)		
DEMOGRAPHIC GROUP:	MAJORITY	AFRICAN-AMERICAN	HISPANIC	MAJORITY	AFRICAN-AMERICAN	HISPANIC	MAJORITY	AFRICAN-AMERICAN	HISPANIC	MAJORITY	AFRICAN-AMERICAN	HISPANIC
MARKET CHARACTISTICS: LOAN and LENDER TYPE:												
Lowest concentration banking market												
Non-line-of-credit loan denied by a non-bank lender	1.6	25.0	13.8	4.2	40.0	25.1	5.5	44.8	29.2	52.4	93.7	86.7
Line-of-credit loan denied by a non-bank lender	7.1	same as majority	same as majority	14.8	same as majority	same as majority	17.8	same as majority	same as majority	77.0	same as majority	same as majority
Non-line-of-credit loan denied by a bank lender	1.5	22.8	48.3	4.0	37.2	64.6	5.1	41.9	69.1	51.2	92.8	98.5
Line-of-credit loan denied by a bank lender	6.7	same as majority	same as majority	14.1	same as majority	same as majority	17.0	same as majority	same as majority	76.1	same as majority	same as majority
Medium-concentration banking market												
Non-line-of-credit loan denied by a non-bank lender	7.7	25.3	4.7	15.6	40.2	10.4	18.8	45.1	12.8	78.1	93.8	70.1
Line-of-credit loan denied by a non-bank lender	22.7	same as majority	same as majority	37.1	same as majority	same as majority	41.8	same as majority	same as majority	92.7	same as majority	same as majority
Non-line-of-credit loan denied by a bank lender	7.2	23.0	26.4	14.9	37.4	41.6	18.0	42.2	46.5	77.2	92.9	94.2
Line-of-credit loan denied by a bank lender	21.8	same as majority	same as majority	35.9	same as majority	same as majority	40.6	same as majority	same as majority	92.3	same as majority	same as majority
Highest concentration banking market												
Non-line-of-credit loan denied by a non-bank lender	6.6	55.4	13.9	13.9	71.1	25.3	16.8	75.1	29.4	75.8	99.0	86.9
Line-of-credit loan denied by a non-bank lender	20.5	same as majority	same as majority	34.3	same as majority	same as majority	38.9	same as majority	same as majority	91.6	same as majority	same as majority
Non-line-of-credit loan denied by a bank lender	6.3	52.5	48.5	13.2	68.5	64.8	16.1	72.8	69.3	74.9	98.8	98.5
Line-of-credit loan denied by a bank lender	19.6	same as majority	same as majority	33.2	same as majority	same as majority	37.8	same as majority	same as majority	91.1	same as majority	same as majority

Table 8: Univariate Statistics and T tests for Firms with Approved Loans

This table presents mean values of variables defined in Table 2 for the sub-sample of firms whose loan applications were approved. Asterisks denote means that differ from the means for majority-owned firms.Means that do no differ significantly from the means for majority firm-owners fail to reject hypothesis H 10, that lenders require minority loan applicants to have characteristics no more preferred than majority applicants to be induced to lend to them.

Firms, by Owner, Loan and Lender Type:	All Loans			Line-of-Credit Loans From Banks			Line-of-Credit Loans From Other Lenders			Other Loans From Banks			Other Loans From Other Lenders		
Independent Variables:	Majority-Owned Firms	African-American Owned Firms [1]	Hispanic-Owned Firms [1]	Majority-Owned Firms	African-American Owned Firms [1]	Hispanic-Owned Firms [1]	Majority-Owned Firms	African-American Owned Firms [1]	Hispanic-Owned Firms [1]	Majority-Owned Firms	African-American Owned Firms [1]	Hispanic-Owned Firms [1]	Majority-Owned Firms	African-American Owned Firms [1]	Hispanic-Owned Firms [1]
Owner Characteristics															
Education / Experience															
POST_HS	0.26	0.42 **	0.21	0.30	0.51 *	0.36	0.38	1.00 *		0.20	0.41	0.11	0.31	0.00	0.17
COLLEGE	0.49	0.52	0.44	0.55	0.40	0.38	0.51	0.00		0.49	0.59	0.46	0.44	0.92 **	0.48
EXPER	17.72	12.39 ***	14.28 **	16.93	12.01 **	13.84	14.97	10.66		18.43	13.80	14.80	17.96	10.93	14.17
Control / Wealth															
OWNSHR [2]	0.79	0.86	0.82	0.80	0.95 **	0.81	0.87	0.57 *		0.77	0.66	0.85	0.81	1.00	0.81
OWNMGR	0.91	0.90	0.94	0.94	0.90	0.96	0.98	1.00		0.88	0.89	1.00	0.91	0.92	0.86
NETW [3]	9.54	2.72	3.10	11.38	3.25	3.97	6.78	0.75		10.41	2.06	2.78	7.09	2.27	2.64
FAMILY	0.81	0.76	0.88	0.85	0.89	0.93	0.83	0.13 **		0.76	0.46 **	0.85	0.89	1.00	0.87
Firm Characteristics															
Financial															
ASSETS [3]	7.41	2.40	3.78	7.66	1.73	3.85	3.32	2.96		7.95	4.27	5.95	7.50	0.84	1.70
SALES [3]	20.24	6.97	10.56	33.25	6.29	6.57	7.66	26.16		19.03	8.86	16.72	15.40	3.11	8.31
ROA	238.31	16.49	1.56	1126.06	0.99	3.09	1.02	3.77 ***		2.21	0.76	0.50	1.01	116.65 ***	1.21
EQUITY [3]	2.15	-0.81	0.00	0.95	0.64	0.86	0.82	0.43		2.57	-3.75 *	-1.17	2.83	-0.12	0.34
NEGEQ	0.27	0.38	0.20	0.30	0.35	0.37	0.21	0.00		0.28	0.36	0.15	0.24	0.62 *	0.11
Credit Record															
BANKRUPT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.01
JUDGMENT	0.03	0.00	0.03	0.06	0.01	0.11	0.03	0.00		0.01	0.00	0.00	0.01	0.00	0.00
OWNPAYLATE	0.05	0.06	0.01	0.02	0.05	0.00	0.00	0.00		0.06	0.00	0.00	0.05	0.25 *	0.04
BUSPAYLATE	0.38	0.48	0.23 *	0.40	0.47	0.21	0.24	1.00 **		0.42	0.42	0.12 **	0.32	0.62	0.36
HIGHRISK	0.31	0.36	0.35	0.33	0.35	0.33	0.25	0.00		0.30	0.24	0.27	0.32	0.68 *	0.43
DENIEDTRCR	0.06	0.14 *	0.07	0.04	0.11	0.20 **	0.07	0.00		0.06	0.01	0.01	0.09	0.60 ***	0.01
Relationships															
NUMRELATIONS	2.96	3.13	3.02	2.89	2.48	2.50	3.24	7.73 ***		2.76	2.92	3.05	3.31	5.71 ***	3.44
LONGESTREL [4]	10.01	7.84	6.52 **	8.37	5.68	4.80 *	7.41	4.57		11.04	8.48	7.10	10.29	15.57	7.49
PRIMARYREL [4]	7.35	4.58 **	4.16 ***	5.86	3.99	2.33 **	5.41	4.17		8.46	6.18	6.46	7.12	3.42	3.62 *
USETRCR	0.73	0.76	0.73	0.73	0.77	0.75	0.57	1.00		0.77	0.74	0.70	0.68	0.75	0.74
USEOWNCC	0.50	0.37	0.44	0.53	0.53	0.74	0.55	0.00		0.47	0.10 **	0.01 ***	0.51	0.35	0.57
USEBUSCC	0.48	0.52	0.50	0.55	0.40	0.56	0.36	1.00 *		0.47	0.68	0.60	0.48	0.62	0.36
Non-Financial															
AGE [4]	12.62	7.74 ***	8.79 ***	11.61	7.93 *	9.23	10.86	5.40		13.73	8.90	7.68 **	11.89	4.60 *	9.45
EMPLOYEES	13.23	10.08	10.84	15.82	7.71	12.01	7.15	70.57 ***		14.16	8.79	11.68	11.15	15.24	9.03
LOCATIONS	1.36	1.65	1.15	1.53	1.37	1.21	1.17	7.10 *		1.33	2.12 *	1.13	1.35	1.04	1.11
CCORP	0.25	0.07 **	0.25	0.24	0.05 *	0.36	0.07	0.00		0.26	0.15	0.11	0.29	0.00	0.28
SCORP	0.28	0.47 **	0.39	0.35	0.26	0.41	0.24	0.13		0.26	0.79 ***	0.39	0.28	0.66	0.37
NATIONAL	0.12	0.14	0.10	0.13	0.15	0.31 *	0.25	0.00		0.13	0.06	0.01	0.05	0.28 **	0.00
MSA	0.73	0.83	0.86 *	0.82	0.82	0.85	0.80	1.00		0.65	0.92 *	0.87	0.78	0.66	0.87
Loan Application															
LENGTH [4]	5.87	4.45	1.64 ***	5.46	5.34	0.88 **	2.12	2.60		7.64	4.81	2.93 *	3.96	0.25	1.10 *
NORELATION	0.23	0.29	0.49 ***	0.23	0.18	0.48 **	0.32	0.13		0.16	0.20	0.20	0.33	0.92 ***	0.78 ***
PRIMARY	0.55	0.62	0.36 **	0.65	0.68	0.64	0.27	0.00		0.69	0.82	0.47	0.28	0.00	0.00 **
Number of Observations	602	34	41	134	17	15	37	2	0	296	10	11	135	5	15

Notes

[1] Asterisk denotes a mean statistically different from the mean for majority-owned firms.

*** Statistically different at the 1% level.

** Statistically different at the 5% level.

* Statistically different at the 10% level.

[2] Percent, in decmial form.

[3] Expressed in hundreds of thousands of dollars.

[4] Expressed in years.