II. Access to Credit for Minority-Owned Businesses

Racial Differences in Patterns of Small Business Finance: The Importance of Local Geography

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This paper examines the question of whether considerations of a small business' local geography—defined as the area where the small business is located—have been inappropriately omitted from previous analyses of differences in the credit market experiences of White-owned and minority-owned firms. We consider two types of local geographic characteristics: (1) economic variables that may influence firm risk and (2) other variables that may influence lender decisions. The analysis uses the 1993 National Survey of Small Business Finances (NSSBF) and detailed additional data on the demographic and economic characteristics of the local area where each small business surveyed by the NSSBF is located. After controlling for a variety of loan, firm, owner, and local market characteristics, we find no statistically significant differences in approval rates between White-owned firms and firms owned by Asians, Hispanics, or women. The only racial disparity that is statistically significant is the difference in approval rates between White-owned and Black-owned firms. Importantly, our results show that the economic and demographic characteristics of a firm's local geography should be considered if a more accurate quantification of these racial disparities and understanding of their underlying sources is desired.

Introduction

Concerns about access to credit for small businesses owned by minorities arise as a result of evidence of significant differences between White-owned and minority-owned firms in various credit market experiences (Cavaluzzo and Cavaluzzo, 1998; Cole, 1996; Bates, 1991). Past research on this topic has focused on racial differences in a number of factors, including the endowments and skills of the business owners, the risk profiles of the small businesses, and the business and banking market structure in which the businesses operate, that could explain

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the observed racial disparities in access to credit. For example, given that minorities have smaller endowments than Whites on average in the population at large, minority owners of small businesses may have smaller endowments than White owners. As a result, they might not be able to offer downpayments, guarantees, and collateral that are as attractive to lenders as those offered by White owners. Similarly, racial and ethnic differences in the structure of business and banking markets may also play a role, as economic theory suggests that lender operations will vary with competitive conditions. Illegal forms of discrimination could also adversely affect credit access for minority-owned firms.

In this paper, we examine the question of whether considerations of the local geography have been inappropriately omitted from previous analyses of differences in credit market experiences between White-owned and minority-owned firms. Local geography—defined as the area where the small business is located—could influence small business access to credit in two ways. First, there are a number of *economic variables* associated with the local geography that might affect the riskiness of a small business. For example, the strength of the local economy may be vital in determining the survival of a small business enterprise. In addition, other local factors, such as crime rates, could influence costs of operation and, ultimately, the profitability of the small business. If there are differences in the economic characteristics of the locations where minority-owned and White-owned small businesses operate, then observed racial differences in access to credit may arise in part because of such differences.

Second, *other variables* that have more tenuous links to firm risk but which might influence lender decisions may also be important. The primary variable of this type that we explore in this paper is the racial composition of the local area. In particular, we consider the notion that lenders may be less disposed to extend credit to firms located in areas with large concentrations of minorities, an illegal practice often referred to as "redlining." Its focus on the neighborhood distinguishes redlining from individual discrimination, which is based on characteristics of the credit applicant.

The possible existence of both of these relationships has implications for detecting illegal forms of discrimination. If local geographic economic variables are significantly associated with observed lending patterns, then regulators and researchers focusing on discrimination must consider them or they may reach inappropriate conclusions about existence of discrimination. If redlining is taking place, then previous estimates of discrimination against small businesses based on the race or ethnicity of its owners will be biased if owner race and the racial composition of the local geography of the small business are correlated.

For the analysis, we augment the 1993 National Survey of Small Business Finances (NSSBF)—a nationally representative sample of

4,637 small businesses which includes detailed information on the demographic and financial characteristics of individual small businesses, their recent credit experiences, and demographic characteristics of the firm's owners—with detailed demographic and economic data on each firm's local geography. We then seek evidence that the characteristics of a firm's local geography are correlated with approval rate patterns. The existence of significant correlations would suggest that the estimates of racial disparities in approval rates observed in previous research are biased.

After controlling for a variety of loan, firm, owner, and local market characteristics, our analysis finds no statistically significant differences in approval rates between White-owned firms and firms owned by Asians, Hispanics, or women. The only racial disparity that is statistically significant is the difference in approval rates between White-owned and Black-owned firms. Importantly, our results show that the economic and demographic characteristics of a firm's local geography should be considered if a more accurate quantification of these racial disparities and understanding of their underlying sources is desired.

In the next section, we briefly discuss previous research on redlining and differences in access to credit for small businesses owned by people of different races or ethnicities. Following that is a summary of our empirical approach. The third section discusses the data and preliminary analyses. Our results are discussed in Sections 4. Section 5 interprets the results and provides some concluding remarks.

Existing Literature

Because of a lack of publicly available data for other credit markets, most existing research on redlining has examined lending practices in the mortgage market. This research has shown that much of the racial disparity in access to mortgage credit can be explained by differences in credit quality, debt burden, and other economic characteristics that are important considerations for lenders. There remains some debate about whether the residual disparity is evidence of individual-based discrimination.[1] Regarding redlining, these studies have produced relatively little evidence of redlining, although some research has concluded that redlining does exist.[2]

Only a small number of previous studies have examined differences in the credit market experiences among small businesses based on the race or ethnicity of their owners. Bates (1991) uses the 1982 Characteristics of Business Owners to compare patterns of commercial bank financing of small businesses owned by Whites and Blacks. He finds that significant differences in the characteristics of Black-owned and White-owned firms partly explain why Black-owned firms receive smaller loans. After controlling for these differences,

however, Black-owned firms still receive loans that are smaller than White-owned firms. Bates (1991) argues that this arises due to a race-based credit rationing on the part of lenders which severely limits credit market access for Black-owned businesses.

Using the 1988-89 NSSBF, Cavaluzzo and Cavaluzzo (1998) find that minority small business applicants fare worse than comparable White applicants in several ways. In addition, Cavaluzzo and Cavaluzzo (1998) find that increased competitiveness in the local banking market often reduces racial differences in credit experiences, which is consistent with Becker's theory of discrimination and implies that competition should mitigate the degree of discrimination encountered in a market.[3] Cole (1996) uses the 1993 NSSBF to explore how the availability of credit to small businesses varies with demographic characteristics of the business owner. After controlling for firm characteristics and owner creditworthiness he finds that commercial banks are less likely to extend credit to minority-owned firms. (Interestingly, no analogous relationship is observed for non-bank lenders.)

Using estimated differences in credit market experiences among minority-owned firms as evidence of discrimination in lending practices may be limited by the omission of relevant characteristics of the firm's locality. In each of the papers discussed above, the research focused only on owner and firm characteristics, and each found evidence suggesting that individual race-based discrimination may be present. However, their specifications included neither economic characteristics nor the racial and ethnic composition of the local geography of the small business. These omissions could bias estimates and confound the effects of firm and geographic characteristics on lending decisions. Only by explicitly considering characteristics of the local geography can we obtain a fuller understanding of the sources of racial and ethnic differences in small business lending patterns.

Research Approach

The approach taken in this paper follows the general strategy used in research exploring racial differences in credit market experiences. An initial model representing the lender decision-making process in evaluating loan applications is developed. This model includes many of the variables that economic theory and business practice suggest should influence lender decisions. Variables are then added to the model which proxy for noneconomic characteristics upon which alleged discrimination is based, such as race of the owner. If the initial model is sufficiently complete, significant relationships between loan application decisions and these noneconomic variables would suggest that individual discrimination or redlining may be present. Ultimately, the confidence that one has in arriving at such a conclusion is a function of whether one believes all relevant

economic considerations have been accounted for. This section details the development of our initial model of lender decision-making and then discusses the noneconomic variables we use in our analysis.

Model of Lender Behavior

We begin with a model of lender decision-making in which lenders act to maximize the expected return to loans. Given the terms of a loan (fees, interest rate, and term to maturity), expected profits on the loan will depend mainly on the probability of loan repayment. Clearly, the expected profit on the loan depends critically on the continued viability of the borrower. Lenders therefore assess the likelihood that firms will be sufficiently profitable to repay loans—firm "riskiness"—and extend credit to those firms whose risk is below some threshold. In assessing firm riskiness, lenders rely on a number of different factors. Those factors that increase profitability raise the likelihood that a loan application will be approved, while those that compromise profitability decrease the probability an application is accepted.

The literature has identified a large set of variables that lenders appear to use in determining a firm's riskiness and in making credit decisions. *Firm business characteristics* are perhaps the most important factors influencing lending decisions. Paramount among these are indicators of the financial and business strength of the firm, including current profitability, indebtedness, leverage, asset and employee size, and age. Holding other factors constant, risk decreases with greater current profitability, leverage, size, and age. Lower risk is also associated with lower levels of firm indebtedness. Also, variation in corporate structures and differences across industries might each lead to variation in the volatility of firm performance. Different industries are likely to have different average performance profiles over time. Since higher volatility increases perceived riskiness, those industries with increased variance should be viewed by lenders as more risky. Finally, one might also expect the management structure to impact business efficiency and profitability. Studies have shown that lenders consider each of these to be important in considerations of business loan applications.[4]

In addition, the creditworthiness of small businesses can be inferred using information on credit history, which has been found to be extremely predictive of the likelihood of repayment for future loans.[5] A firm's experiences with suppliers can be indicative of its creditworthiness. In particular, if a business purchases supplies on account, then that account can be viewed as an example of an ongoing credit relationship. Repayment patterns on this account therefore serve as a record of contemporaneous credit performance. Also, a number of lenders have suggested that they view the credit history of the primary small business owner as a useful and important proxy for firm creditworthiness. Many

current credit scoring models used to evaluate small business loan applications incorporate this information into their decision rules.

The nature of the firm's *relationships with potential lenders* has also been shown to be an important determinant of whether small businesses receive loans. Research has shown that firms are more likely to obtain credit from lenders with whom they have had previous and lengthy relationships. These relationships are thought to allow lenders to gather private information about the firm and facilitate more accurate assessments of firm risk.[6]

Evidence also suggests that *characteristics of the loan* influence loan decisions. For example, holding all else equal, larger loans are riskier than smaller loans. Moreover, evidence suggests that lending patterns vary according to the type of loan a small business seeks. The risks associated with nonstandard or uncollateralized loans will generally be higher than those of other types of loans.[7]

There are also a number of other *market factors* which lenders might consider. Economic theory suggests that the profitability of small businesses will be influenced by the competitiveness of the product market. Therefore, some measures of the business environment will likely be used by lenders to assess a firm's likelihood of repayment. In addition, one might expect the size of the local population (or its density) to affect profitability. Population size can be viewed as a proxy for labor supply, which will be inversely related to labor costs. Depending on the nature of the firm and its products, the local population may also be an appropriate representation of product demand. Firm revenue will be positively related to this demand.

The *competitive structure of the local banking market* may also affect the allocation of small business credit. Berger [1995], among others, shows that the market structure a bank faces impacts its behavior and profits in important ways. In particular, banks with greater market share appear to exercise their market power to increase profits or reduce risks. It follows that markets in which a bank has market power might have different lending patterns than markets which are less concentrated.

Several *broad geographic characteristics* might also influence lender decisions. Because of regional differences in economic strength over time, there may be substantial regional variation in credit standards and decision thresholds. Moreover, there may be important differences in how risk is measured in urban as opposed to rural areas. Different decision weights may be applied for particular characteristics for urban firms and rural firms.

Detecting Individual-Based Discrimination or Redlining

In attempting to determine whether illegal discrimination may have a role in explaining racial differences in credit market experiences, most researchers estimate the reduced-form model

$$(1)\ P(Approved) = \alpha' + \beta' X_i + \gamma' APPRACE_i + \varepsilon$$

where P(*Approved*) is the probability that a firm's application is approved; X_i represents the set of factors lenders may use for credit decisions; $APPRACE_i$ is the race or ethnicity of the applicant; α', β', and γ' are the parameters to be estimated; and ε is an identically, independently distributed error term. A significant negative value for γ' would be consistent with the hypothesis that discrimination based on the race of the applicant is present.

To determine whether local geography has been inappropriately omitted from econometric specifications, we estimate

$$(2)\ P(Approved) = \alpha + \beta X_i + \gamma APPRACE_i + \delta LOCGEOG_i + \varepsilon$$

where $LOCGEOG_i$ represents local geography variables that may influence lending patterns. If $LOCGEOG_i$ and $APPRACE_i$ are correlated, then estimates of γ' in Equation (1) will be biased and incorrect inferences may be made.

In our specification, $LOCGEOG_i$ includes the two types of local geography variables discussed earlier. First, we add a set of variables representing *economic characteristics of the local neighborhood*. These characteristics may influence the performance and, by extension, the profitability of a small business enterprise. For example, the purchasing power of the local neighborhood might affect the demand for the small firm's goods. Similarly, a high crime rate in an area may increase the costs of doing business and lower the firm's profitability. Second, we add variables that characterize the *racial composition of the local neighborhood*, which allows for an examination of redlining issues.

Data

The 1993 NSSBF is our primary data source. The NSSBF is a sample of 4,637 small businesses who volunteered to participate in a telephone survey conducted by PriceWaterhouseCoopers on behalf of the Board of Governors of the Federal Reserve System. In defining a target population for the sample, a small business was defined as a for-profit, non-governmental business with 500 or fewer employees in operation during at least part of 1992. Subsidiaries of other companies were excluded, as were businesses whose primary activities were in agriculture, fisheries, forestry, or financial services. Two samples were drawn: a main sample representative of all U.S. small businesses and a minority over-sample, which disproportionately sampled businesses owned by Blacks, Asians, and Hispanics.

The 1993 NSSBF includes detailed demographic and financial data on individual businesses, including the business' location, primary industry, organizational form, and recent financial relationships

with a variety of types of financial institutions. The survey also includes characteristics of the primary owner of the firm, including personal demographics, management experience, and credit history.[8]

The 1993 NSSBF data were augmented with data from several other sources. Credit scores for the businesses in the sample were purchased from Dun and Bradstreet. Economic and demographic characteristics of the ZIP codes where the small businesses were located were obtained from 1990 Census data.[9] Finally, information from annual Call Reports was added to provide measures of the market structure of local lending markets.

Because of our interest in outcomes of loan applications, our sample includes only those firms that applied for credit. NSSBF respondents were asked to provide information on the most recent application for a new loan or line-of-credit, renewal of an existing line-of-credit, or renegotiation of the terms of a loan made *within the three years prior to the survey*. Out of 4,637 firms in the sample, 2,007 reported applying for a loan or line-of-credit within the last three years. Of these 168 were Black-owned, 81 were Asian-owned, and 96 were Hispanic-owned.

Independent Variables

Using the augmented NSSBF, we are able to construct a number of proxies for the factors discussed in the previous section. These are listed in Table 1. Most important among these are the variables representing local geographic factors. The local geography of a small business is defined to be the ZIP code in which the business is located. The ZIP code represents a compromise between a census tract and a county or metropolitan area. ZIP codes typically include both business areas and the residential neighborhoods they serve, which is not generally the case for census tracts. On the other hand, ZIP codes are not as large as counties or metropolitan areas, which are far larger than what many small businesses are likely to view as their local community.

Variables representing the economic vitality of the local geography include the relative income level, the unemployment rate, the vacancy rate, the poverty rate, and relative median house value in the ZIP code. We also include measures of the education of the population residing in the ZIP code and the median size of a household residing in the ZIP code. In addition, two measures of the racial composition of the ZIP code, a continuous variable and a set of categorical dummy variables, were also constructed for each ethnic population.

A few of the other measures in Table 1 require additional comment. Lacking a measure of a firm's profit profile relative to that of firms in different industries with the same current risk pattern, we rely on standard industrial classification (SIC) code dummy variables to capture industry-wide trends and differences in short-run growth and volatility across industries. Regarding the market structure variables,

previous research has shown that a bank's market share, as opposed to the degree of concentration of the local banking market, is the important structural determinant of bank behavior (Berger, 1995). However, our specification includes a market concentration measure—the MSA-level banking Herfindahl index—because we can not identify the specific bank offering the loan and thus can not calculate the appropriate market share. The MSA-level Herfindahl can be viewed as an imperfect proxy for market share, since higher local market concentrations imply that some banks have relatively large market shares.[10]

The first two columns of Table 2 compare the characteristics of the firms in our sample with those of all firms surveyed by the NSSBF. The small businesses that applied for a loan in the three years prior to the survey year were quite different from other firms. On average, such firms had sales and assets that were nearly twice as large as those of the typical small business in the full NSSBF. Firms which recently applied for loans also had slightly worse credit quality and more-educated owners than firms which did not recently apply for loans. Only small differences existed in the average characteristics of the local geographies where the two groups of small businesses operate.

Table 2 also shows mean values for a number of the variables used in the analysis for the small businesses in our sample grouped by the race of the owner. Minority-owned firms and their owners on average were less experienced and had poorer credit quality than White-owned firms and their owners. Black-owned small businesses typically lagged other firms along these and other dimensions. For example, consistent with Bates (1991), Black-owned firms were on average much smaller and far less capitalized than other firms. Taken together, this evidence suggests that minority-owned small businesses, and particularly Black-owned firms, would be less attractive credit applicants than White-owned small businesses to prospective lenders based on business and owner characteristics.

The data in Table 2 also suggest that local geography could be important for explaining approval rate differentials, especially for Black-owned businesses. Regarding economic aspects of the local geography, compared to other firms, Black-owned firms on average were located in poorer areas and in areas which experienced greater economic distress, as reflected by higher poverty and unemployment rates. The data further suggest that redlining effects could be important, as a significant correlation between owner race and racial composition of the neighborhood is observed. As shown in Figure 1, Black-owned firms in our sample were far more likely than other firms to be located in ZIP codes with high percentages of Blacks. Similar relationships are observed for Hispanic-owned firms and heavily Hispanic ZIP codes and for Asian-owned firms and heavily Asian ZIP codes (Figures 2 and 3).

The Dependent Variable and Definitions

The dependent variable for this analysis is whether a firm was approved on their most recent loan application in the three years prior to the survey. Rankings of approval rates by the race of the owner of the small business largely mirror those observed in other research. Black-owned small businesses were approved far less frequently than other firms (52 percent, Table 2). Asian-owned firms also had relatively low approval rates (71 percent), while approval rates for Hispanic-owned and White-owned small businesses were comparable (around 83 percent).

Approval rates vary with the economic characteristics of the local geography. Approval rates were lower for firms located in poorer ZIP codes, although the relationship between approval rates and poverty rates is less consistent (Table 3). This further suggests that the omission of local geography may have biased the results of previous studies. The effects of local geography may have been incorrectly attributed to other factors. This is especially relevant for understanding the relationship between approval rates and the race of the small business owner, since we have observed that minority-owned firms in our sample were more likely to be located in areas that were weaker economically.[11]

Our initial examinations of both the independent and dependent variables suggest that the omission of local geographic variables—both economic and demographic—from previous research may have resulted in biased estimates of the differences in approval rates for firms with different racial and ethnic ownership. The key question is whether this implication remains after a multivariate analysis which considers any covariance between the independent variables used in the analysis.

Results

All estimates in this section are obtained using weighted logistic regressions of Equation (2), where the weights are population weights for individual firms.[12] Estimates are presented as odds ratios because an odds ratio offers a more intuitive interpretation in logistic regressions than coefficient estimates. The odds ratio is calculated as the ratio of two logistic probability functions representing two different firms in the sample space. The ratio simplifies in the case of a one unit increase in a single covariate to $exp(a)$, where a is the coefficient estimate of the covariate. In the tables, an odds ratio of one would indicate no difference in the likelihood of approval; an odds ratio less (greater) than one indicates a lower (higher) probability of approval. For example, if the dummy variable for Black ownership had an odds ratio of .5, this would suggest that small businesses owned by Blacks were only half as likely of being approved as a comparable business with a White owner.

In presenting the results of the multivariate analysis, we show regression results in a sequence which allows for quantifying the extent to which differences in loan approval rates among firms owned by individuals of different racial and ethnic backgrounds are explained by differences in firm characteristics, by differences in loan characteristics and firm and owner credit quality, and by differences in local geography. The specification in the first column includes the race and ethnic categorical variables along with firm and owner characteristics, broad geographic characteristics, and banking market characteristics (odds ratios for these latter variables are not shown).[13] The second column shows regression estimates in which loan characteristics and measures of the credit quality of the small business and its owner are added to the specification. The third column presents regression estimates in which neighborhood ethnic composition measures are added to the specification. The final column shows estimates for a regression in which additional local geographic characteristics are added as regressors.

In the table, the extent to which racial disparities arise due to differences in loan characteristics and firm and owner credit quality can be determined by examining changes in the odds ratios for the racial dummy variables between the first and second columns. The final two columns provide insights as to whether differences in the local geographies of small businesses account for differences in approval rates for firms of different ethnic and racial ownership. The third column is included as a baseline estimate of the role that the racial composition of the local area plays above and beyond the traditional variables included in analyses of racial differences in credit outcomes. Differences in the odds ratio of the racial dummy variables in the second and third columns provide the first clues as to the importance of correlations between the race of the small business owner and the racial composition of the neighborhood where the business operates in estimating race-based differences in approval rates.

The fourth column in the table includes a more complete set of local geographic variables. The change in the odds ratio for racial dummy variables from column two to column four represents the degree to which local geography influences lending patterns and drives observed racial differences. The change in the odds ratio for the racial composition of the local geography dummy variables between columns three and four reflects the degree to which racial composition effects observed in simple specifications actually reflect differences in the economic characteristics of the local neighborhoods.

Table 4 shows the estimates of Equation (2) using the sample of small businesses that applied for a loan during the past three years. After controlling for firm, owner, broad geographic, and banking market characteristics, applications by minority-owned small businesses

generally were approved less frequently than White-owned small businesses (i.e., odds ratios on the race dummy variables are less than one), although differences are statistically significant only for small businesses owned by Blacks (column 1, Table 4). The second column shows that more than one-quarter of the disparity between Black-owned small businesses and White-owned small businesses is accounted for by differences in loan characteristics and firm and owner credit quality across these firms (odds ratio rises from .25 to .45).

Adding variables for the racial composition of the local neighborhood reduces the disparity in approval likelihood between Black-owned and White-owned small businesses, as the odds ratio on the Black dummy variable increases from .45 to .54 (column 3, Table 4). The difference remains statistically significant, however. As before, differences between White-owned small businesses and Asian-owned and Hispanic-owned small businesses, while present, are not statistically significant. The odds ratios for these variables do move closer to one, though. Interestingly, odds ratios for all but one of the racial composition variables in column 3 are less than one—applications by firms located in ZIP codes with very few minorities (less than one percent) were approved more frequently than firms located in other areas. However, these differences are not statistically significant.

The effects of the addition of economic characteristics of the local geography are similar to those observed when the neighborhood composition variables were added (column 4, Table 4). Odds ratios on the owner race variables move closer to one (except for Hispanic-owned firms, which remain essentially the same distance from one), and the Black odds ratio remains statistically significant. Surprisingly, the odds ratios on the Black and Hispanic neighborhood composition variables generally move *away* from one with the addition of the local economic variables, although they are still not statistically significant. This suggests that any differences in approval rates of applications by firms located in neighborhoods with different racial and ethnic make-ups do not arise from differences in the economic circumstances of these neighborhoods.

The only economic characteristic of the local geography which is significant is the relative house value of the ZIP code, with small businesses located in areas with low relative house values being much less likely to have their applications approved than comparable businesses located in areas with higher relative median incomes. The significance of relative house value, which could be a signal of a healthy local market, and the direction of the effect is consistent with the notion that lenders are concerned about local conditions when evaluating firm applications.[14]

Taken together, the evidence suggests that the omission of local geography has led to an overstatement of the differences in approval

rates of applications by minority-owned and White-owned small businesses. When local geography variables are added, odds ratios for the race of the owner move closer to one. For example, the odds ratio for Black-owned small businesses increases by 20 percent after the addition of measures of characteristics of the local geography. However, it is important to emphasize that local geography does not explain all of the observed differences in outcomes. Differences in outcomes remain, and are statistically significant in the case of Black-owned firms.

Discussion

This paper examined the role that local geography, which has been omitted from previous analyses of racial differences in access to credit, may play in explaining differences in approval rates for loan applications of small businesses owned by individuals of different races. Using the 1993 NSSBF, we conducted a series of tests to determine the potential contribution of two types of local geographic variables. Economic characteristics of the local geography may directly influence the riskiness of small business enterprises. In addition, other variables, such as the racial composition of the local neighborhood, may influence lending patterns.

Minority-owned firms in our sample are approved less frequently than White-owned firms. However, the data indicate that these firms also have fewer assets, worse credit history, and other features that make them appear more risky to prospective lenders. Indeed, after controlling for firm, owner, loan, and banking market characteristics, we found no statistically significant difference in the approval rates of White-owned firms and firms owned by Asians and Hispanics. The only difference we found to be statistically significant is the difference in approval rates between White-owned and Black-owned firms.

Our results further show that considerations of the local geography are important in measuring differences in credit market experiences across firms. The addition of measures of local geography reduces the estimated differences in approval rates between White-owned firms and firms owned by minorities. By our estimates, the inclusion of these variables reduces the Black-White approval rate disparity by around 20 percent. Thus, considerations of local geography are important for a more accurate quantification of differences in the approval rates of loan applications by White-owned and minority-owned firms. Although this paper only focused on loan application approval rates, the results suggest that local geography should be considered in the analysis of racial differences in other aspects of credit markets, such as pricing.

Local geography is not the entire story, however, as a large and statistically significant Black-White difference remains. There are several

possible explanations for these remaining differences. One possible explanation for these differences is that financial institutions discriminate in lending to small businesses based upon the race and ethnicity of the owners. However, such a definitive interpretation of the data rests on the belief that all of the relevant variables that lenders use in making lending decisions were included in the model. This is unlikely. Although the 1993 NSSBF is the most comprehensive data set on the demographic and financial characteristics of small businesses, there are still firm characteristics that are not collected by the survey. These missing variables may be relevant to a potential lender in assessing the expected profit and risk of a loan to a small business.

For example, financial institutions often attempt to reduce potential losses by requiring the owners of smaller and newly-established businesses to personally guarantee business loans with their own personal assets. The NSSBF does not include information on assets not primarily used in the business, so there is no way of knowing possible differences among owners in their personal assets available to pledge against a business loan. Racial differences in the availability and quantity of such assets could be a factor which contributes to observed racial differences in small business loan application approval rates.

Self selection among applicants may also affect estimates of differences in credit market experiences between groups. For example, if minority-owned businesses apply once, become discouraged, and as a result have lower reapplication rates than firms owned by Whites, then the approval rate for otherwise equivalent minority-owned firms will be lower than that of firms owned by Whites independent of any other considerations. This issue is particularly relevant, because evidence from the 1993 NSSBF suggests that minority owners are more likely to be discouraged.

Moreover, no survey of small businesses can capture the variation in lending standards small businesses encounter in the marketplace. To definitively establish the existence of illegal discrimination would require either a specially-designed survey of lenders or the evaluation of lending patterns of individual lenders on a case by case basis. In spite of this, analyses using the NSSBF are useful for identifying disparities in the credit market experiences of White-owned and minority-owned small businesses.

In sum, for these reasons and others, drawing firm conclusions about the sources of differences in the credit market experiences of small businesses with owners of different races is difficult. Given the complexity of the credit-granting process, it is unlikely that simple characterizations of the small business lending market will capture all of the important aspects of such differences. The research in this paper has shown that considerations of local geography are important for understanding differences in approval rates across firms with different racial

ownership in some cases. The collection of new data and additional research on this topic should be encouraged so that our understanding of the nature of these differences can be further improved.

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TABLE 1

Variable Definitions

Variable	Description
Business Characteristics	
Assets	business assets in 1992 (1000s of dollars)
Liabs	business liabilities in 1992 (1000s of dollars)
Sales	business sales in 1992 (1000s of dollars)
Profits	business profits in 1992 (1000s of dollars)
Totexp	business expenses in 1992 (1000s of dollars)
Total Outstanding Loans	business loans, mortgages, bonds outstanding in 1992 (1000s of dollars)
Card_bal	credit card balances (1000s of dollars)
MRL_fage	age of firm (years)
Sales Primarily in (Percentage of Firms)	
Local Markets	dummy variable = 1 if firm's sales primarily in local area
Regional Markets	dummy variable = 1 if firm's sales primarily in region
National Markets	dummy variable = 1 if firm's sales primarily in nation
International Markets	dummy variable = 1 if firm's sales primarily international
Organizational Type	
Scorp	dummy variable = 1 if firm is organized as an S-corporation
Ccorp	dummy variable = 1 if firm is organized as a C-corporation
Partnership	dummy variable = 1 if firm is organized as a partnership
Sole Proprietorship	dummy variable = 1 if firm is organized as a sole proprietorship
Credit Quality	
Buslate0	dummy variable = 1 if owner was never 60 or more days late on business credit in past three years
Buslate12	dummy variable = 1 if owner was 60 or more days late once or twice on business credit in past three years
Buslate3	dummy variable = 1 if owner was 60 or more days late three or more times on business credit in past three years
Credsc	credit score for firm
Industry (Pct. of Firms)	
Indcat1	dummy variable = 1 if firm's industry is in mining or construction
Indcat2	dummy variable = 1 if firm's industry is in primary manufacturing
Indcat3	dummy variable = 1 if firm's industry is in other manufacturing
Indcat4	dummy variable = 1 if firm's industry is in transportation
Indcat5	dummy variable = 1 if firm's industry is in wholesale trade
Indcat6	dummy variable = 1 if firm's industry is in retail trade
Indcat7	dummy variable = 1 if firm's industry is in insurance or real estate
Indcat8	dummy variable = 1 if firm's industry is in business services
Indcat9	dummy variable = 1 if firm's industry is in professional services
Owner Characteristics	
Female	dummy variable = 1 if business owner is female
Ownage	age of business owner (years)
Experience	experience of owner (years)
Race	
Black	dummy variable = 1 if business owner is black
Asian	dummy variable = 1 if business owner is Asian
Hispanic	dummy variable = 1 if business owner is Hispanic

TABLE 1 (continued)

Education	
Edcat1	dummy variable = 1 if business owner has less than 12 years of schooling
Edcat2	dummy variable = 1 if business owner has 12 years of schooling or equivalent
Edcat3	dummy variable = 1 if business owner has 13-15 years of schooling
Edcat4	dummy variable = 1 if business owner has 16 years of schooling or more college degree or more
Credit Quality	
Ownlate0	dummy variable = 1 if owner was never 60 or more days late on personal credit in past three years
Ownlate12	dummy variable = 1 if owner was 60 or more days late once or twice on personal credit in past three years
Ownlate3	dummy variable = 1 if owner was 60 or more days late three or more times on personal credit in past three years
Ownjudge	dummy variable = 1 if owner has had any delinquency judgments in past three years
Ownbrupt	dummy variable = 1 if owner filed for personal bankruptcy in past three years
Most Recent Loan (MRL) Characteristics	
Applied for Loan	dummy variable = 1 if firm applied for a new loan or a renewal of an existing loan within the 3 years prior to the survey
Approved	dummy variable = 1 if MRL was approved
MRLAsk	amount requested in MRL
Amount Approved	if MRL was approved, the amount extended
MRL_Lien	dummy variable = 1 if lien associated with MRL
MRLDist	distance between firm and bank granting MRL (miles)
MRLPrim	dummy variable = 1 if institution granting MRL is firm's primary bank
MRLYears	time firm has had relationship with bank granting MRL (years)
Relshps0	dummy variable = 1 if relationship was less than 1 year
Relshp13	dummy variable = 1 if relationship was between 1 and 4 years
Relshp4p	dummy variable = 1 if relationship was 4 years or more
Time Elapsed since MRL Application	
MRLTime0	dummy variable = 1 if MRL application was less than .5 years ago
MRLTime1	dummy variable = 1 if MRL application was between .5 and 1.5 years ago
MRLTime2	dummy variable = 1 if MRL application was more than 1.5 years ago
Type of Loan	
MRLAuto	dummy variable = 1 if application is for an automobile purchase loan
MRLEquip	dummy variable = 1 if application is for an equipment purchase loan
MRLLease	dummy variable = 1 if application is for a lease
MRLLoc	dummy variable = 1 if application is for a line-of-credit
MRLMortg	dummy variable = 1 if application is for a mortgage
MRLOther	dummy variable = 1 if application is for a different purpose

TABLE 1 (continued)

Geographic and Banking Market Characteristics	
MSA	dummy variable = 1 if ZIP code is located in a metropolitan area
Region of country	
Region1	dummy variable = 1 if ZIP code is located in East North Central region
Region2	dummy variable = 1 if ZIP code is located in East South Central region
Region3	dummy variable = 1 if ZIP code is located in Middle Atlantic region
Region4	dummy variable = 1 if ZIP code is located in Mountain region
Region5	dummy variable = 1 if ZIP code is located in New England region
Region6	dummy variable = 1 if ZIP code is located in Pacific region
Region7	dummy variable = 1 if ZIP code is located in South Atlantic region
Region8	dummy variable = 1 if ZIP code is located in West North Central region
Region9	dummy variable = 1 if ZIP code is located in West South Central region
Herfmd	Herfindahl-Hirschman Index for MSA based on deposits
Compz	number of banks in ZIP code
Offzip	number of banking offices in ZIP code
Local Geographic Characteristics	
Povrate	poverty rate in ZIP code
Povcat1	dummy variable =1 if Poverty Rate < .05
Povcat2	dummy variable =1 if .05 <= Poverty Rate < .10
Povcat3	dummy variable =1 if .10 <= Poverty Rate < .30
Povcat4	dummy variable =1 if .30 <= Poverty Rate
Povhigh	dummy variable =1 if .10 <= Poverty Rate
Hsvpct	median house value in ZIP code/median house value in MSA
Hsvcat1	dummy variable =1 if Rel. Median House Value < .80
Hsvcat2	dummy variable =1 if 0.8 <= Rel. Median House Value < 1.0
Hsvcat3	dummy variable =1 if 1.0 <= Rel. Median House Value < 1.2
Hsvcat4	dummy variable =1 if 1.2 <= Rel. Median House Value
Unemp	unemployment rate in ZIP code
Vacrate	residential housing vacancy rate in ZIP code
HHSize	median household size in ZIP
Pop	population in ZIP code
Hhypct	median household income in ZIP code/median household income in MSA
Hhycat1	dummy variable =1 if Rel. Median Household Income < .80
Hhycat2	dummy variable =1 if 0.8 <= Rel. Median Household Income < 1.0
Hhycat3	dummy variable =1 if 1.0 <= Rel. Median Household Income < 1.2
Hhycat4	dummy variable =1 if 1.2 <= Rel. Median Household Income
WellEd	population in ZIP code with at least high school diploma/total population in ZIP code
WellEd2	population with more than high school diploma/total population in ZIP code
Blkpct	black population in ZIP code/total population in ZIP code
Blkcat1	dummy variable = 1 if 0 <= Percent Black < 0.01
Blkcat2	dummy variable = 1 if 0.01 <= Percent Black < 0.10
Blkcat3	dummy variable = 1 if 0.10 <= Percent Black < 0.30
Blkcat4	dummy variable = 1 if 0.30 <= Percent Black
Blkhigh	dummy variable = 1 if 0.10 <= Percent Black

TABLE 2

Mean Values for Selected Characteristics

Variable	All Firms	Applied For MRL	Firms that Applied for MRL: By Race of Owner			
			White	Black	Asian	Hispanic
Number of Firms	4637	2007	1652	168	81	96
Business Characteristics						
Total Assets	488,843	889,445	921,769	232,020	955,478	745,568
Total Liabilities	284,587	547,434	572,439	147,353	617,164	308,572
Total Sales	1,001,330	1,794,984	1,869,498	590,446	1,625,129	1,361,289
Total Profits	67,103	86,669	84,385	60,359	85,828	189,482
Total Outstanding Loans	265,933	417,927	437,251	91,049	505,117	222,071
Firm Age	14.28	13.43	13.64	11.49	9.64	13.28
Sales Primarily in (Percentage of Firms)						
Local Markets	0.61	0.54	0.55	0.43	0.56	0.55
Regional Markets	0.29	0.34	0.34	0.40	0.22	0.31
National Markets	0.10	0.12	0.11	0.17	0.20	0.10
International Markets	0.01	0.01	0.00	0.01	0.02	0.04
Organizational Type (Pct. of Firms)						
S-corporation	0.20	0.26	0.27	0.12	0.25	0.14
C-corporation	0.28	0.33	0.33	0.32	0.45	0.41
Partnership	0.08	0.08	0.08	0.08	0.06	0.07
Sole Proprietorship	0.43	0.33	0.32	0.49	0.24	0.38
Number of Delinquencies in Past Three Years (Pct. of Firms)						
Zero	0.81	0.76	0.77	0.52	0.71	0.75
One	0.04	0.04	0.03	0.09	0.08	0.01
Two	0.04	0.04	0.04	0.12	0.02	0.05
Three or More	0.12	0.17	0.16	0.28	0.19	0.19
Industry (Pct. of Firms)						
Mining and Construction	0.14	0.15	0.16	0.14	0.06	0.16
Primary Manufacturing	0.08	0.10	0.10	0.08	0.18	0.01
Other Manufacturing	0.08	0.11	0.10	0.13	0.13	0.10
Transportation	0.22	0.23	0.23	0.10	0.21	0.22
Wholesale Trade	0.48	0.42	0.41	0.56	0.42	0.51
Retail Trade	0.22	0.23	0.23	0.10	0.21	0.22
Insurance or Real Estate	0.07	0.06	0.07	0.03	0.01	0.03
Business Services	0.21	0.17	0.16	0.35	0.24	0.23
Professional Services	0.17	0.16	0.16	0.12	0.16	0.24

TABLE 2 (continued)

Variable	All Firms	Applied For MRL	Firms that Applied for MRL: By Race of Owner			
			White	Black	Asian	Hispanic
Type of Loan (Pct. of Loan Applications)						
Automobile Purchases	0.09	0.09	0.09	0.05	0.04	0.07
Equipment	0.10	0.10	0.10	0.12	0.11	0.12
Lease Loans	0.03	0.03	0.02	0.03	0.08	0.06
Lines-of Credit	0.50	0.50	0.51	0.47	0.48	0.48
Mortgage	0.12	0.11	0.12	0.06	0.10	0.08
Other Purposes	0.17	0.17	0.17	0.28	0.19	0.19
Geographic and Banking Market Characteristics						
Located in MSA	0.81	0.77	0.75	0.92	0.95	0.91
Region (Pct. of Firms)						
East North Central	0.16	0.18	0.19	0.18	0.10	0.02
East South Central	0.05	0.06	0.06	0.11	0.06	0.01
Middle Atlantic	0.15	0.14	0.14	0.08	0.12	0.13
Mountain	0.06	0.06	0.07	0.02	0.01	0.08
New England	0.07	0.06	0.06	0.05	0.02	0.07
Pacific	0.18	0.15	0.14	0.17	0.42	0.23
South Atlantic	0.15	0.15	0.16	0.21	0.13	0.16
West North Central	0.08	0.10	0.11	0.04	0.01	0.03
West South Central	0.10	0.11	0.10	0.14	0.14	0.27
MSA Herfindahl	0.06	0.06	0.06	0.06	0.06	0.06
Banks in ZIP Code	5.83	5.53	5.45	5.35	7.75	6.34
Banking Offices in ZIP Code	8.46	8.14	8.06	8.05	10.60	8.95
Local Geographic Characteristics						
Poverty Rate (ZIP Code)	0.12	0.12	0.12	0.19	0.15	0.15
Rel. Median House Value (ZIP)	1.06	1.07	1.08	0.88	0.98	1.00
Unemployment Rate (ZIP)	0.04	0.04	0.04	0.06	0.05	0.04
Vacancy Rate (ZIP)	0.09	0.09	0.09	0.09	0.08	0.10
Median Household Size (ZIP)	3.11	3.10	3.08	3.22	3.29	3.20
Population (ZIP)	24,408	23,140	22,724	28,446	29,347	24,877
Rel. Med. House Income (ZIP)	1.01	1.02	1.03	0.85	0.89	1.02

TABLE 2 (continued)

Variable	All Firms	Applied For MRL	Firms that Applied for MRL: By Race of Owner			
			White	Black	Asian	Hispanic
Type of Loan (Pct. of Loan Applications)						
Automobile Purchases	0.09	0.09	0.09	0.05	0.04	0.07
Equipment	0.10	0.10	0.10	0.12	0.11	0.12
Lease Loans	0.03	0.03	0.02	0.03	0.08	0.06
Lines-of Credit	0.50	0.50	0.51	0.47	0.48	0.48
Mortgage	0.12	0.11	0.12	0.06	0.10	0.08
Other Purposes	0.17	0.17	0.17	0.28	0.19	0.19
Geographic and Banking Market Characteristics						
Located in MSA	0.81	0.77	0.75	0.92	0.95	0.91
Region (Pct. of Firms)						
East North Central	0.16	0.18	0.19	0.18	0.10	0.02
East South Central	0.05	0.06	0.06	0.11	0.06	0.01
Middle Atlantic	0.15	0.14	0.14	0.08	0.12	0.13
Mountain	0.06	0.06	0.07	0.02	0.01	0.08
New England	0.07	0.06	0.06	0.05	0.02	0.07
Pacific	0.18	0.15	0.14	0.17	0.42	0.23
South Atlantic	0.15	0.15	0.16	0.21	0.13	0.16
West North Central	0.08	0.10	0.11	0.04	0.01	0.03
West South Central	0.10	0.11	0.10	0.14	0.14	0.27
MSA Herfindahl	0.06	0.06	0.06	0.06	0.06	0.06
Banks in ZIP Code	5.83	5.53	5.45	5.35	7.75	6.34
Banking Offices in ZIP Code	8.46	8.14	8.06	8.05	10.60	8.95
Local Geographic Characteristics						
Poverty Rate (ZIP Code)	0.12	0.12	0.12	0.19	0.15	0.15
Rel. Median House Value (ZIP)	1.06	1.07	1.08	0.88	0.98	1.00
Unemployment Rate (ZIP)	0.04	0.04	0.04	0.06	0.05	0.04
Vacancy Rate (ZIP)	0.09	0.09	0.09	0.09	0.08	0.10
Median Household Size (ZIP)	3.11	3.10	3.08	3.22	3.29	3.20
Population (ZIP)	24,408	23,140	22,724	28,446	29,347	24,877
Rel. Med. House Income (ZIP)	1.01	1.02	1.03	0.85	0.89	1.02

TABLE 3

Approval Rates by Selected Local Geographic Characteristics

Characteristic	Approval Rate
Poverty Rate	
Less than 5 Percent	82.3
5-10 Percent	85.8
10-30 Percent	85.2
Greater than 30 Percent	80.4
Relative Household Income	
Less than .80	77.6
.80-1.0	85.6
1.0-1.2	86.0
Greater than 1.2	85.5
Relative House Value	
Less than .80	76.9
.80-1.0	87.2
1.0-1.2	86.4
Greater than 1.2	84.2

TABLE 4

Estimated Odds Ratios from Logistic Regressions of Likelihood of Approval Using All Most Recent Loan Applicants

Variable	Equation (1)	Equation (2)	Equation (3)	Equation (4)
Owner Race and Gender				
black	.247**	.454**	.542**	.563*
asian	.658	.708	.733	.790
hisp	1.092	1.121	.960	1.047
female	.748	.830	.861	.816
Owner and Firm Credit Quality Characteristics				
buslat12		.579*	.436**	.431**
buslate3		.617*	.585*	.637
creditsc		1.008**	1.009**	1.009**
ownage		.991	.988	.985
ownlat12		.843	.759	.704
ownlate3		.375**	.344*	.312**
ownjudge		.581	.572	.537*
ownbrupt		.365**	.376*	.313**
Most Recent Loan Characteristics				
mrlprim		1.682**	1.682**	1.6362*
mrl_ask		1.000	1.000	1.000
mrl_lien		1.199	1.459*	1.386
mrldist		1.000	1.000	1.000
mrlyears		.969	.967	.966
mrltime1		.928	.893	.897
mrltime2		.620*	.576*	.567**
relshps0		1.027	.934	.961
relshp4p		1.253	1.242	1.3084
mrllease		1.470	1.357	1.312
mrlmortg		1.092	1.049	1.015
mrlauto		2.514**	2.405*	2.417
mrlequip		.885	.759	.703
mrlother		.463**	.418**	.376**
Local Geographic Characteristics				
blkcat2			.807	.801
blkcat3			.633	.616
blkcat4			.778	.793
asiacat2			.812	.846
asiacat3			1.666	1.485
asiacat4			.499	.449
hispcat2			.740	.674
hispcat3			.845	.747
hispcat4			1.084	.782
welled2				.235
unemp				1.061
vacrate				1.001
povcat4				.865
hhycat1				.888
hsvcat1				.528**
Observations	2005	1923	1831	1810

NOTE: Single asterisks indicate a statistical level of significance of 10 percent. Double asterisks indicate a 5 percent level of significance. Variable definitions are in table 1. Omitted categories are white-owned, male, buslate0, ownlate0, mrltime0, relshp13, mrlloc, blkcat1, asiacat1, hispcat1, povcat1-povcat3, hhycat2-hhycat4, and hsvcat2-hsvcat4. All regressions include a firm, owner, broad geographic, and banking market characteristics as regressors. These variables are edcat1, edcat3-edcat4, sales, totexp, card_bal, assets, liabs. mrl_fage, msa, ccorp, scorp, region2-region9, indcat1, indcat3-indcat9, herfmd, offzip, compz. The omitted categories are edcat2, region1, partnership and sole proprietorship, and indcat2.

FIGURE 1

Distribution of Small Businesses by the Percentage of Blacks in ZIP Code

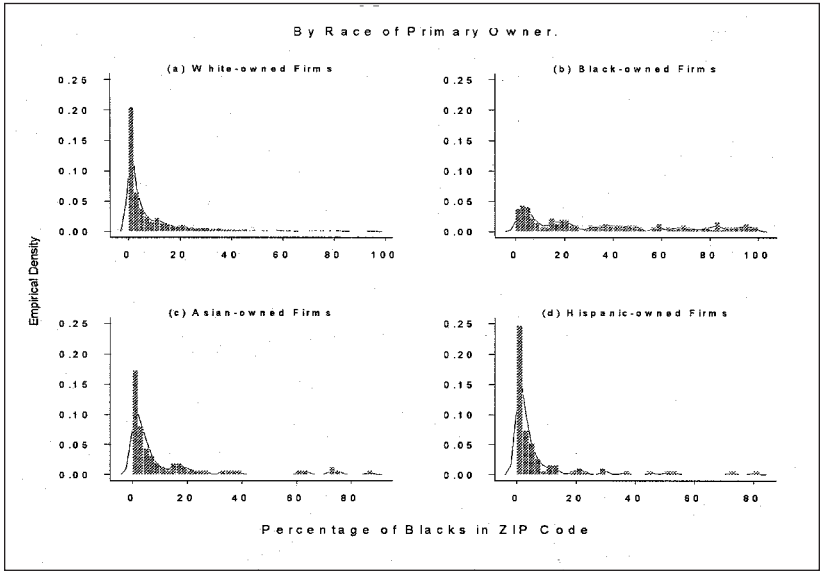


FIGURE 2

Distribution of Small Businesses by the Percentage of Asians in ZIP Code

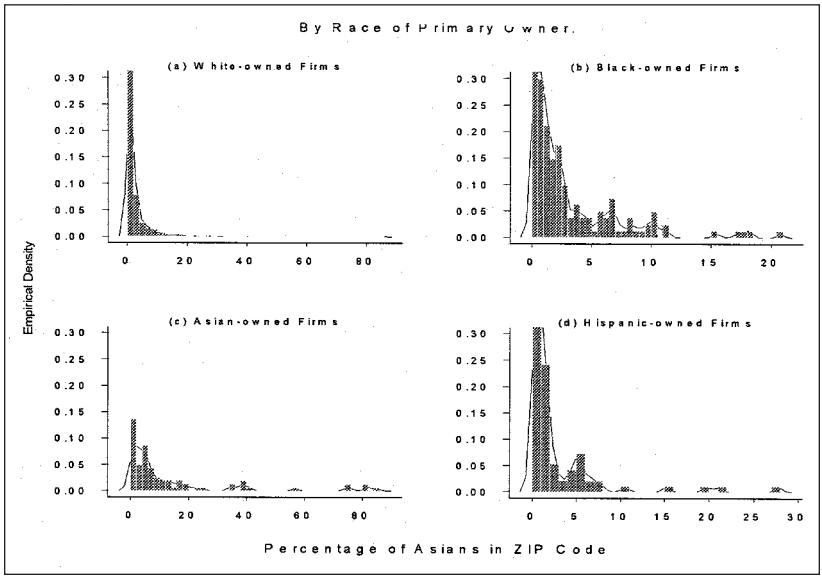
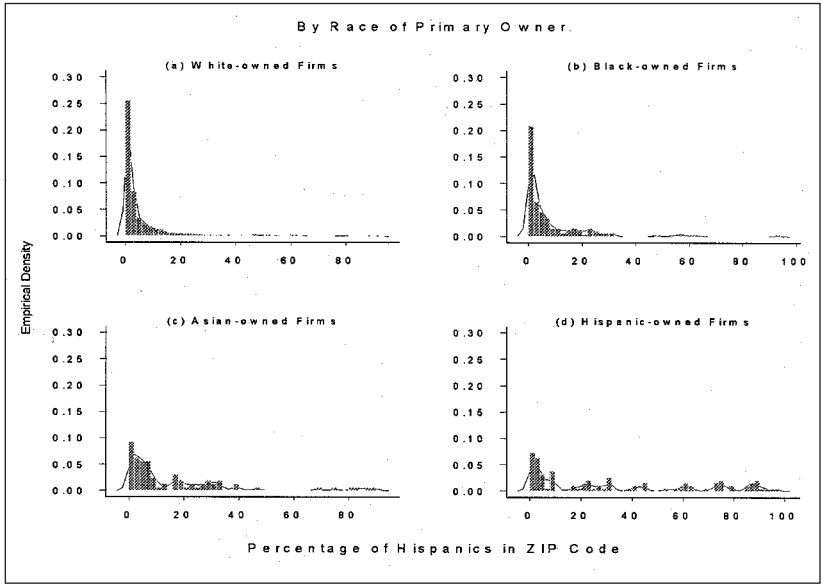


FIGURE 3

Distribution of Small Businesses by the Percentage of Hispanics in ZIP Code



Notes

[1] For more on this issue, see the symposium "Discrimination in Product, Capital, and Labor Markets" in the Spring 1998 volume of the *Journal of Economic Perspectives*.

[2] Ross and Tootell (1999), Gabriel and Rosenthal (1991) Bradbury, Case, and Dunham (1989), Dedman (1988), and Avery and Buynak (1981), and find evidence suggesting that redlining exists in mortgage lending. Tootell (1996), Canner, Gabriel, and Woolley (1991), Schafer and Ladd (1981), and Benston, Horsky, and Weingartner (1978) do not find evidence of redlining in the mortgage market.

[3] See Becker (1957).

[4] See, for example, Cavaluzzo and Cavaluzzo (1998) and Peterson and Rajan (1994).

[5] For example, see Munnell, et al. [1996] and Avery, Bostic, Calem and Canner (1996) for evidence of the predictive nature of credit history for mortgage repayment.

[6] Burger and Udell (1995) and Peterson and Rajan (1994) are two early examples from the large literature on relationship lending.

[7] See Avery, Bostic and Samolyk (1998).

[8] To protect the confidentiality of survey respondents, some of the information collected in the survey is not publicly available.

[9] Tract-level census data were reconfigured at the ZIP code level by CACI.

[10] The Herfindahl index was calculated based on shares of total bank deposits as reported in the 1993 Call Report.

[11] We recognize that these economic differences may themselves arise as a result of discrimination. However, this is beyond the scope of the current research.

[12] To carry out these regressions properly, the strata from which the sample was drawn should be accounted for in the estimations. Unfortunately, the number of firms drawn from strata used to over-sample minority-owned firms is often too sparse to allow estimation. The effect of not accounting for the stratification in the sample design will bias the variance of the parameter estimates, although it will not bias point estimates.

[13] Estimates for all regressors are presented in an appendix.

[14] Additional economic variables were statistically significant in alternative specifications. However, these relationships were not robust.

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APPENDIX

Estimated Odds Ratios from Logistic Regressions of Likelihood of Approval Using All Most Recent Loan Applicants—Full Regression Results

Variable	Equation (1)	Equation (2)	Equation (3)	Equation (4)
Owner Race and Gender				
black	.247**	.454**	.542**	.563*
asian	.658	.708	.733	.790
hisp	1.092	1.121	.960	1.047
female	.748	.830	.861	.816
Owner and Firm Characteristics				
edcat1	.494	.503	.703	.680
edcat3	.896	.921	.968	.909
edcat4	1.203	1.268	1.352	1.303
sales	1.000**	1.000**	1.000**	1.000**
totexp	1.000**	1.000**	1.000**	1.000**
card_bal	1.000	1.000	1.000	1.000
assets	1.000	1.000	1.000	1.000
liabs	1.000*	1.000	1.000	1.000
mrl_fage	1.043**	1.047**	1.048**	1.046**
msa	.560**	.585**	.717	.931
ccorp	1.137	1.021	.999	.973
scorp	.998	.929	.982	.978
indcat1	.818	.452	.394	.349*
indcat3	.616	.513	.532	.514
indcat4	.600	.472	.709	.691
indcat5	.725	.443	.464	.414
indcat6	.774	.581	.649	.595
indcat7	1.408	.933	.892	.895
indcat8	.908	.534	.547	.589
indcat9	1.357	1.014	1.053	.983
Broad Geographic Characteristics				
region2	1.790	1.709	1.495	1.433
region3	.412**	.478**	.454**	.457*
region4	.534	.511	.594	.665
region5	.439**	.542	.614	.598
region6	.522**	.613	.596	.717
region7	.525**	.499*	.559	.633
region8	.890	.933	.867	.876
region9	.660	.747	.861	.904

APPENDIX (continued)

Banking Market Characteristics				
herfmd	.652	.432	.309	.143
offzip	1.000	1.011	1.010	1.006
compz	.985	.965	.981	.987
Owner and Firm Credit Quality Characteristics				
buslat12		.579*	.436**	.431**
buslate3		.617*	.585*	.637
creditsc		1.008**	1.009**	1.009**
ownage		.991	.988	.985
ownlat12		.843	.759	.704
ownlate3		.375**	.344*	.312**
ownjudge		.581	.572	.537*
ownbrupt		.365**	.376*	.313**
Most Recent Loan Characteristics				
mrlprim		1.682**	1.682**	1.6362*
mrl_ask		1.000	1.000	1.000
mrl_lien		1.199	1.459*	1.386
mrldist		1.000	1.000	1.000
mrlyears		.969	.967	.966
mrltime1		.928	.893	.897
mrltime2		.620*	.576*	.567**
relshps0		1.027	.934	.961
relshp4p		1.253	1.242	1.3084
mrllease		1.470	1.357	1.312
mrlmortg		1.092	1.049	1.015
mrlauto		2.514**	2.405*	2.417
mrlequip		.885	.759	.703
mrlother		.463**	.418**	.376**
Local Geographic Characteristics				
blkcat2			.807	.801
blkcat3			.633	.616
blkcat4			.778	.793
asiacat2			.812	.846
asiacat3			1.666	1.485
asiacat4			.499	.449
hispcat2			.740	.674
hispcat3			.845	.747
hispcat4			1.084	.782
welled2				.235
unemp				1.061
vacrate				1.001
povcat4				.865
hhycat1				.888
hsvcat1				.528**
Observations	2005	1923	1831	1810

NOTE: Single asterisks indicate a statistical level of significance of 10 percent. Double asterisks indicate a 5 percent level of significance. Variable definitions are in table 1. Omitted categories are white-owned, male, edcat2, region1, partnership and sole proprietorship, indcat2, buslate0, ownlate0, mrltime0, relshp13, mrlloc, blkcat1, asiacat1, hispcat1, povcat1-povcat3, hhycat2-hhycat4, and hsvcat2-hsvcat4.

Competition, Small Business Financing, and Discrimination: Evidence From a New Survey

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Using data from the 1993 National Survey of Small Business Finances, we examine some of the factors influencing differences in small business credit market experiences across demographic groups. We analyze credit applications, loan denials, and interest rates paid across gender, race and ethnicity of small business owners. In addition, we analyze data gathered from small business owners who said they did not apply for credit because they believed that their application would have been turned down. This set of analyses, in combination with important new information on the personal credit history of the principal owner, the business credit history of the firm, a rich set of additional explanatory variables, and information on local bank market structure, helps us to better understand the sources of observed differentials in the credit market experiences of small business operators across demographic groups.

Credit market experiences often differ markedly among demographic groups. However, so do the characteristics of firms and owners. Results of our multivariate analyses show that many of the factors we consider help to explain the observed differences in credit market experiences. However, even after controlling for a large number of firm and owner characteristics, substantial differences often remained. There was also evidence that some of the differentials were associated with the degree of lender market concentration in the firm's local area.

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Introduction (Section I)

Despite a recent survey (Selz, 1996) that documented dramatic race-based differences in the credit market experiences of small business owners, very little is known about the sources of these differentials. The purpose of this paper is to shed light on some of the potential factors that influence observed differences in the credit market experiences of small businesses across demographic groups. We analyze credit applications, loan denials, and interest rates paid. In addition, we examine data gathered from small business owners who said they did not apply for credit because they believed that their application would have been turned down. Where possible, for each of our analyses, we also examine a single loan type, lines of credit.[1] Doing so allows us to assess the extent to which our results are influenced by the heterogeneity of loan types. In each analysis, we take advantage of newly available cross-sectional data on small businesses and information on the extent of competition in small business credit markets to gain a better understanding of the sources behind the differences in credit market experiences across demographic groups.

It is well known that demographic differentials in credit market experiences may arise for a variety of reasons. Financial characteristics of the firm, the credit history of the firm and its owner, the age, experience, and education of the principal owner, a firm's credit (risk) score, firm relationships with financial institutions and suppliers, as well as other firm and owner characteristics all may influence the credit market experiences of small business operators. However, even after controlling for these factors, differentials across demographic groups may remain. If economically important factors that are used by lenders in the loan granting or rate setting process are correlated with demographic group, but are left uncontrolled by the researcher, then the estimated demographic coefficients will be biased by these omitted variables. Alternatively, lenders may be unable to observe, or it may be costly to collect, economically relevant information that is correlated with demographic group. If these lenders use demographic attributes as a proxy for missing information, then the resulting disparate treatment has an economic basis. This form of disparate treatment is called statistical discrimination (Phelps, 1972). Differentials may also arise because of the preferences of the lender—commonly referred to as non-economic or "prejudicial" discrimination. Finally, differentials may arise from differences in preferences for credit use on the part of the borrower.

We use data from the 1993 National Survey of Small Business Finances (NSSBF) to examine the degree to which information on firm and owner characteristics explains the observed univariate differences in credit market experiences of small businesses. The NSSBF

data set is the most extensive public data set available on small businesses. We supplement these data with information furnished by the Board of Governors of the Federal Reserve on local bank market structure and Dun and Bradstreet credit scores for the firm. An important feature of the NSSBF data set is that it includes firms that do not use credit markets. These data allow us to test for possible selection biases (Heckman, 1979), and to investigate the extent to which feedback effects were present (Arrow, 1973). In the present setting, feedback effects would arise if discriminatory practices limited access to credit, and as a result of this limited access, firms from the affected group subsequently did not apply for a loan.

Specifically, we examine whether minority or female small business operators were: (1) less likely to apply for loans or lines of credit, (2) more likely to report that they did not apply for a loan because they thought they would be turned down, (3) more likely to be denied credit on any loan applied for in the last three years, (4) less likely to have their credit needs met, (5) more likely to be denied credit on their most recent application and, (6) more likely to face higher interest rates than small businesses owned by White males. In each analysis, we investigate the importance of the financial characteristics of the firm, the characteristics of the principal owner (e.g. owner education, age, and years of work experience), information on self-reported firm and owner credit history, a credit score constructed by Dun and Bradstreet, and information regarding a firm's relationships with financial institutions and suppliers. We also interact demographic indicators with a proxy characterizing the extent of competition in the firm's local geographic area. To the extent that lenders have more liberty to exercise their tastes in less competitive markets, differentials associated with lender market concentration are consistent with Becker's (1971) early theories of discrimination.

Overview of Results

Our first analysis examines the propensity to apply for a loan. With the exception of Asian owners, all else equal, our analysis reveals no differences in the propensity of small business owners to have applied for credit across demographic groups. This result holds for all loans and for lines of credit separately. Important factors in the decision to apply for credit include a firm's use of credit from suppliers, the education of the owner, the number of firm financial relationships and various measures of firm size, including a firm's asset base and number of employees. Firm profitability appeared to play no role in the decision to apply for credit. Similarly, firm self-reported indicators of credit history played a surprisingly limited role in the decision to apply for credit. Finally, there was no evidence that remaining differentials varied with lender market concentration.

Our second analysis explores firms' self-reported credit needs and application avoidance (not applying because the firm believed it would be turned down). Self-reported credit needs on the part of African Americans and Hispanics exceeded those of White-owned businesses by between 25 and 77 percent. In combination with our analysis of application rates above, this finding suggests that feedback effects may be present. Factors influencing application avoidance were whether the firm had ever been denied trade credit, and a firm's assets and sales-to-assets ratio. There was also evidence of an important role for firm and owner self-reported credit history, as well as the independently tabulated Dun and Bradstreet firm credit score. However, even after including a broad set of controls, our analysis of application avoidance reveals that African American- and Hispanic-, but not Asian-owned firms, were more likely to have avoided applying for credit than firms owned by White males. These differences were not statistically related to lender market structure. There was some evidence though that female-owned firms were more likely to have avoided applying for credit as lender market concentration increased.

Our next set of analyses focused on denial rates across demographic group. We considered three aspects of the denial decision: (1) Has the firm been denied a loan anytime within the last three years?; (2) Has the firm been denied credit, or were there times when the firm needed credit over the last three years but did not apply for fear of being turned down?; (i.e., Have the firm's credit needs within the past three years been met?); and (3) Was the firm denied credit on its most recent loan? Firm assets, the Dun and Bradstreet credit score, many of the firm's self-reported credit history variables, in addition to whether the firm has ever been denied credit by suppliers, played important roles in explaining differentials across demographic groups. Nonetheless, even after including these factors, substantial differences across some demographic groups remained. African American-owned firms were more likely to have been denied credit within the last three years, less likely to have their credit needs met, and more likely to have been denied credit on the firm's most recent loan. There was also some evidence that these differentials increased with increases in lender market concentration. African American denial rates on lines of credit also increased with increases in lender market concentration. Hispanic- and Asian-owned firms also appear to have a higher incidence of unmet credit needs relative to those of White males. Interestingly though, Hispanics and Asians were not actually denied credit at higher rates than White males on their most recent loan, or on any loan within the past three years. Finally, there was some evidence that female denial rates on at least one loan any time within the past three years and unmet credit needs widened with lender market concentration. There was more pervasive evidence that

female denial rates on the most recent loan attempt also increased with increases in lender market concentration.

Our final analysis examined the nominal interest rate paid on the firm's most recent loan. Firm financial characteristics and self-reported credit history played only a limited role in determining the loan's interest rate. In contrast, the Dun and Bradstreet credit score, the market index rate at the time of the loan, loan characteristics such as the loan type, whether the loan rate was a fixed versus floating rate, and the amount of funds borrowed were important influences on the initial nominal interest rate paid. These factors were enough to eliminate any univariate differences in interest rates paid across demographic groups. However, even with our full set of explanatory variables, there was evidence that rates paid by African American- and female-owned firms (but not those owned by Hispanics or Asians) *decreased* with increases in lender market concentration.

Including observations for all loan types in the same interest rate equation may be problematic. Different types of loans may have different loan underwriting standards and pricing formulae. Consequently, we analyze interest rates on lines of credit separately. The line of credit analysis finds no evidence that interest rates paid by African Americans or females were related to the degree of competition among lenders. However, we do find some evidence that rates paid by Hispanic-owned firms for lines of credit increased with increases in lender-market concentration.

The remainder of the paper is organized as follows: Section II discusses the theoretical foundation of our analysis. Section III discusses the data. Section IV develops the empirical approach. We present our empirical results in Section V, and Section VI presents our line of credit analyses and results. Conclusions are presented in Section VII.

Theory and Background (Section II)

The credit needs of firms, their ability to obtain credit, and the rates they must pay for it, are as varied as the firms themselves and the markets in which they operate. Consider first the financial needs of firms. Younger firms, or firms that operate in growth industries, are more apt to require credit to pay for initial capital investments and expansions than are mature firms and firms operating in mature industries. Larger, or more profitable firms, are likely to have access to larger pools of earnings that can be reinvested in the firm as well as a broader set of credit instruments. Firms that do not have access to trade credit to help maintain an inventory of merchandise or other supplies will have greater need for loans from commercial lenders. In addition, the type of business that a firm engages in will have an important effect

on its need for physical and financial capital. The education and managerial experience of the owners of the firm and their personal wealth or family resources may also play a role in a firm's propensity to make use of credit markets. Finally, cultural differences among owners may influence their credit needs.

The ability of firms to obtain credit will also vary widely, based on the perceived riskiness of the loan. Younger firms may represent a greater risk, both because of the lack of a significant credit history, and because younger firms have substantially higher failure rates than more mature firms. The nature of the enterprise will also affect the risk of failure. A dental practice may have a better chance of survival than a pizzeria, for example. The quality of the collateral associated with the enterprise may also play a role in the risk associated with the loan. If there is a robust secondary market for the equipment that will be purchased under the loan agreement, a creditor will be exposed to fewer losses if the borrower defaults on the loan than in the absence of a secondary market. Older firms, larger firms, firms with higher rates of profits and sales, and lower liabilities relative to assets are likely to signal lower risk to lenders. Perhaps more important than the attributes of the business or their owners, the credit history of the firm and its principal owner (late payments on business or personal obligations, whether legal judgements have been levied or whether its owners have declared personal bankruptcy), sends a strong signal to lenders about the risk of repayment. Finally, lenders can buttress information gathered on credit applications with information obtained from credit bureaus, including firm credit risk scores. These scores are based on statistical models of the propensity to repay a loan, given the attributes of the firm and its credit history. Credit scores can be used to decide whether to grant credit and, in some cases, to determine the price that should be charged for that credit.

Even though lenders have access to a great deal of information about the creditworthiness of applicants, the decision to extend credit necessarily requires the lender to accept a degree of risk. The lender cannot know with certainty whether the loan will be repaid. If the gender, race, or ethnic background of the applicant adds information (by acting as a proxy for additional unobserved risk factors), and the lender uses this information in the loan granting or rate setting process, then the lender is engaging in "statistical" discrimination (Phelps, 1972). Because statistical discrimination has an economic basis, lenders can (in the absence of penalties associated with detection) improve their profits by engaging in this form of discrimination. In contrast, "non-economic," or prejudicial discrimination, is based solely on lender tastes. As Becker has shown, these tastes will come at a cost. As a result, strong competition should purge discriminators from the market place over time. But more concentrated markets do not exert

the same pressure for cost minimization. Thus, in the absence of competition, it may be possible to sustain non-economic discrimination.

In his analysis of prejudicial discrimination, Becker hypothesized that individuals who have a taste for discrimination behave *as if* they were willing to pay something, either directly or in the form of a reduced income, to indulge those tastes (Becker, 1971, p. 14). In the present context, we can envision a financial institution that would normally loan funds at rate r, requiring instead $r(1+\delta)$, where δ is the discrimination coefficient, or interest premium that must be charged, in order to compensate for having to associate with the group for which the lender has a distaste. The discriminator will avoid making profitable loans to this group at any rate r* less than $r(1+\delta)$. The higher interest rate faced by the group facing discriminatory treatment implies fewer loans held and perhaps more denied loans and fewer loan applications.

While the above analysis is a simple application to interest rates of Becker's wage discrimination model, much of the literature on consumer credit and mortgage lending finds that interest rates have little flexibility and, therefore, may be the wrong place to look for discrimination (Peterson, 1981; Duca and Rosenthal, 1994). In this setting, lenders may discriminate by "raising the bar" for applicants from affected demographic groups at prevailing interest rates.

Becker recognized that prejudicial behavior raises a firm's costs (or lowers its revenues), so competition should serve to mitigate this type of discrimination in the long run. While many studies in the labor market literature test for an association between competition and the extent of differentials across demographic groups (Comanor, 1973; Haessel and Palmer, 1976; Long, 1976; Oster, 1975; Shepherd and Levin, 1973; Cymrot, 1985; Jones and Walsh, 1991; among others), much of the credit market literature instead estimates some variant of the following econometric model:

$$Y = \alpha + \gamma D + X'\beta + \varepsilon$$

where Y represents either denial rates or interest rates charged, X represents a vector of risk (and any other relevant) characteristics, and D represents an indicator variable for demographic group.

The NSSBF data set, along with additional data furnished by the Federal Reserve, provides us the unique opportunity to investigate the influence of many factors on observed differentials across demographic group. Among those factors included in our X vector are the financial characteristics of the firm, the credit history of the firm and its principal owner, a credit risk score developed by Dun and Bradstreet, the age, experience, and education of the principal owner as well as a number of other measures and controls.[2] Then γ captures differences in Y due to all characteristics associated with D not

captured in X. These differences may include statistical and prejudicial discrimination, as well as economic differentials not properly accounted for in the X vector. To the extent that preferences for borrowing vary by demographic group, these differences will also be picked up in γ. In addition to the above specification, we exploit variation in concentration across banking markets and also estimate econometric models of the following form:

$$Y = \alpha + \gamma D + \gamma'(D*HHI) + X'\beta + \varepsilon.$$

Under this specification, γ continues to capture group differentials that can arise from a variety of sources that we expect to be invariant to market structure.[3] In contrast, γ' reflects differentials associated with lender market concentration. Wider differentials in less competitive lending markets are consistent with Becker's theories of discrimination. We know of only one published paper that examines small business credit market experiences across different demographic groups and lender market concentration. Cavalluzzo and Cavalluzzo (1998) found wide differences in denial rates for African American- and Hispanic-owned firms relative to those of White males. They found no evidence that these differentials were related to lender market structure. However, they found some evidence that Hispanic-owned firms that were located in concentrated banking markets were less likely to have loans. Hispanic-owned firms located in concentrated markets also paid higher rates than others on the loans that they did have. Interestingly, female-owned firms located in concentrated markets actually paid lower rates than those located in more competitive banking markets. Cavalluzzo and Cavalluzzo found little evidence that other differences across demographic groups were statistically related to lender market structure. However, their ability to draw strong conclusions was severely limited by small sample size.

Data and Descriptive Statistics (Section III)

Data

We use data from the 1993 National Survey of Small Business Finances (NSSBF) to investigate some of the factors that influence differentials in the credit market experiences of small business operators across different demographic groups. The NSSBF data set is the most extensive public data set available on small businesses. Our sample consists of 4,570 small businesses in operation as of 1993 and includes 1,025 minority-owned businesses (431 African American-, 301 Hispanic-, and 303 Asian-owned), 816 female-owned, and 2,951 firms owned by White males.[4]

The NSSBF provides us with the firm's age, geographic location, level of employment, 2-digit SIC code, ownership and management characteristics, capital structure, income statement and balance sheet. Several aspects of the credit market experiences of these firms, as well as beliefs about the ability to obtain credit, are also contained in the data. These include whether the firm applied for a loan in the last three years, whether *and why* the owner believed that its loan request would have been rejected, the terms of the most recent loan the business received, and whether the firm was denied funding, both for the most recent loan application and for anytime within the last three years.

This data set also provides several important new variables on the credit history of the owner, characteristics of the application, and costs of the loan that were not part of the 1987 National Survey of Small Business Finances. These variables include the amount of money requested on the loan application, points and/or fees paid to obtain the loan, the frequency with which the owner reported delinquencies on personal and/or business obligations, whether there were any legal judgements against the firm, whether the owner declared bankruptcy on any business within the past seven years, and whether the firm had been denied trade credit. We supplement these data with business credit scores for year-end 1993 obtained by the Federal Reserve Board from Dun and Bradstreet. We also include the degree of commercial bank concentration in the business' local credit market. "Local" is defined as the MSA or non-MSA county where the firm's headquarters were located. "Concentration" is based on the continuous Herfindahl-Hirschman index (HHI) for commercial bank deposits in the same local area, and is calculated from the June 1993 Summary of Deposits.

Descriptive Statistics

The NSSBF data set is a nationwide survey of small businesses (less than 500 employees) that over-sampled large and minority-owned firms. We use weights provided in the NSSBF data set to develop population estimates of the characteristics of firms shown in Tables 1 and 2. The indicators of statistical significance shown in these tables are for a test of differences in means between each demographic group and the White male subsample.[5] Variable definitions are provided in Table 3.

Table 1 displays information on the borrowing experiences of small businesses. Numbers in parentheses indicate the number of observations for each subsample and variable. About 64 percent of businesses owned by White males had loans. Businesses owned by African American or Hispanic males were just as likely to have loans. But female-owned firms, and firms owned by Asian males were less likely to hold loans. Application rates by demographic group followed a pattern similar to that for loan holdings: African American male and Hispanic male small business owners applied at rates similar to that of

White male small business owners. Female and Asian male small business owners had lower application rates.

We report percentages for two indicators of loan denials. *EverDen* measures the percentage of small business owners who applied for and were denied credit within the last three years. *DenMRL* measures the percentage of owners who applied for credit in the last three years and had their most recent loan application rejected. Table 1 shows that White males had lower denial rates than most other groups. Businesses owned by African Americans were over two-and-one-half times as likely to be denied credit within the last three years, and almost three times as likely to be denied credit on their most recent loan request than were businesses owned by White males. Hispanic male (Asian male) small business owners were 10.3 (12.72) percentage points more likely to have been denied credit within the last three years, and 2.7 (9) percentage points more likely to have had their most recent loan application rejected than those owned by White males. Finally, White male small business owners reported lower interest rates on their most recent loan than owners from every other demographic group. Indeed, small businesses that were owned by African American males experienced interest rates that were over 99 basis points or 11.1 percent higher than interest rates paid by White male small business owners. Because the preceding statistics do not control for firm characteristics and credit history, they must be interpreted with care. However, they do suggest that there were some substantial differences in credit experiences among the various demographic groups.

Table 2 provides a variety of descriptive statistics on firm and owner characteristics, credit history, and information on the firm's most recent loan. Characteristics of firms and their owners are contained in Panel A. With the exception of owner age and experience, the data tend to be skewed, as seen in comparisons of the mean and median. Within each subpopulation, there appear to be a few firms that were unusually old, large, more profitable, or with unusually high sales receipts relative to assets, and a few with unusually high debt-to-asset or loan-to-asset ratios.

A number of theories (e.g., Jovanovic, 1982) and empirical studies (e.g., Evans, 1987) suggest that firm behavior changes with firm size. Firms owned by White males were by far the largest, as measured by total assets. Hispanic-owned firms generated the highest sales and profit figures as a percent of assets, and firms owned by African American males were somewhat less profitable than those owned by White males, measured by the median profit-to-asset ratio. Use of the debt-to-asset ratio to evaluate firm risk is widespread among commercial banks (Gibson, 1983). Median debt-to-asset ratios, as well as loan-to-asset ratios, were roughly similar across firms. Asian and African American owners were more educated and Hispanic owners

less educated than White male owners. Minority owners were younger and less experienced than White male owners. Even so, the typical business in our sample is a mature firm with owners who are, on average, middle aged with substantial managerial experience.

Summary statistics on firm credit history are contained in Panel B. The credit history variables indicate that the minority-owned firms, especially those of African Americans, may have been considerably more risky than others. African American small business owners have bankruptcy rates that were at least double those of White male small business owners. African Americans were also far more likely to be delinquent on personal or business obligations, or to have legal judgements against their firm, than were White-owned small businesses. Dun and Bradstreet credit scores were also higher (indicating superior credit worth) for White male owned firms than for every other subpopulation, except Asian females. Finally, Hispanic male owners were denied trade credit more than twice as frequently as White male owners, while African American males were denied trade credit almost three times as often.

Panel C contains information on the characteristics of the most recent loan. Over 80 percent of the most recent small business loans came from commercial banks, and 96 percent came more generally from some financial institution. The high incidence of commercial bank use cuts across demographic groups, although it was lower (but not statistically) for small businesses owned by African American females and Asian males. These two groups made more use than others of financing from other businesses. Only 0.75 percent of small business owners borrowed from families and other individuals. Minority women made no use of this source, while less than 3 percent of minority men obtained their recent loan from families or other individuals.

Strong relationships between banks and small businesses have been shown to increase the availability of funds and reduce the cost of capital to small businesses (Petersen and Rajan, 1994; Burger and Udell, 1995). Hispanic small business owners reported longer relationships with their lending institution than White owners, while owners from other minority groups reported substantially shorter relationships with lenders. And, with the exception of Hispanic women owners, small business owners from all demographic groups were less likely than White male owners to have received originally desired terms on their most recent loan.

The last two entries in Panel C are consistent with findings reported by other researchers who have found that small business owners borrow locally (Elliehausen and Wolken, 1990, and Kwast, Starr-McCluer, and Wolken, 1997). Eighty-four percent of the most recently acquired loans came from the same city in which the headquarters of the small business resided. Moreover, the median distance between the firm and the loan granting institution was only 3 miles.

Empirical Approach (Section IV)

Analyses and Dependent Variables

We analyze four different aspects of the credit market experience to gain a better understanding of possible differences in credit treatment across demographic groups.[6] These include whether businesses applied for credit, whether they avoided applying because they believed they would be denied, whether those that did apply were denied credit,[7] and the interest rates firms were charged on their most recent loans.

The first analysis focuses on differences by demographic group on the probability that firms applied for credit. Our dependent variable, *Apply*, equals one if a firm applied for credit within the last three years and zero otherwise.[8] *Ceteris paribus* differences in application rates by demographic group may reflect systematic differences in the nature of the firm or industry that are not fully accounted for in other control variables, systematic differences in the risk preferences of owners, differences in use of informal networks (e.g., family) over formal financial markets, and/or feedback effects that may result from discrimination. To the extent that discriminatory practices discourage small business operators from seeking credit, application rates for some groups would be lower, all else equal, in the presence of these effects. Moreover, we would expect feedback effects that arise from non-economic discrimination to be more pronounced in more highly concentrated lending markets.

While considerable conceptual discussion of the influence of feedback effects exists in the literature, there is scant information on the size of such effects.[9] We examine this aspect of the firm's credit experience by focusing on the firm's reluctance to apply for credit for fear of being turned down. The NSSBF data set provides us with a unique opportunity to investigate the extent to which feedback effects exist for certain demographic groups. Specifically, the NSSBF survey asked all firms, conditional on a need for credit, if during the last three years there were times that the firm did not apply because it thought the application would be turned down. For all firms that expressed a demand for credit sometime over the past three years (either by applying for credit or by not applying for fear of being rejected), we define the variable *FearDen*, and set it equal to 1 if the firm did not apply for credit, zero otherwise.

The next avenue of analysis focuses on demographic differences in denial rates by lender market structure. Our sample is limited to firms that applied for credit within three years of the survey interview date. The dependent variable, *EverDen* equals one if a firm was denied credit anytime within the last three years, zero otherwise. One potential shortcoming of the "ever denied" analysis is that it is subject to

feedback effects (Arrow, 1973) because it ignores firms that would have applied for credit but did not for fear of being turned down. If this is the case, the *EverDen* analysis may understate minority and female access to credit markets. To examine the extent to which this selection process influenced the *EverDen* analysis, we redefine the *EverDen* sample to include the additional firms that did not apply for credit over the past three years, if they reported that they did not apply because they anticipated that their loan application would have been rejected (Blanchflower, et al. 1998). The dependent variable in this analysis equals one for firms that did not obtain credit (either because they did not apply for fear of denial or because their application was rejected), and zero otherwise (*EverDen2*). Thus, the additional firms included in this analysis are treated as if they were denied. This variable should more closely capture a firm's unmet credit needs. We also examine a third variable, *DenMRL*, equal to one if the firm was denied credit on its most recent loan request. The presence of discrimination in the market place does not imply that all creditors discriminate (Becker, 1971). If, as is likely to be the case, only some creditors discriminate against particular classes of borrowers, then their negative effect on access to credit will be reduced (and perhaps fully mitigated) by additional searches for funding. While *EverDen* more closely captures the average presence of discriminators in the market place, *DenMRL* better approximates the impact on credit access that is caused by discrimination.

Our final analysis focuses on differences in interest rates paid across demographic groups. All else equal, we expect discriminatory creditors to require higher rates from borrowers for which they have a distaste. However, applicants that recognize that the quoted rate exceeds the market rate may apply for credit elsewhere. If discrimination is not omnipresent, borrowers who do so will be able to find nondiscriminators from which to borrow, and the impact of discrimination on market prices will be reduced.[10] The dependent variable, *IntRate*, is the nominal interest rate that the firm paid at the time of issue of the most recent loan. The analysis investigates the possibility that minorities or women pay higher rates than White males, all else equal.[11]

Model Specifications

For each aspect of the credit market experiences that we examine, we compare results from five specifications of the model. The first is a baseline model that includes financial characteristics of the firms as well as bivariate demographic indicators, and a Herfindahl-Hirschman index (HHI) that controls for the degree of commercial bank concentration in the local credit market.[12] We call this a baseline model because it most closely resembles the type of model that traditionally has been reported in the literature on market discrimination. The second specification augments the first with eight variables on the

credit history of the firm and its owner. These data are normally not available to researchers, and are an important potential source of omitted variable bias. Our third specification adds the Dun and Bradstreet credit score (CREDSCR) to the model. CREDSCR is a constructed variable that ought to be highly correlated with the credit histories, firm, and financial characteristics already in the model (and, in fact, may add no new information). Rather than mask the importance of these characteristics in a credit score, we chose to add the latter variable, which many lenders use to augment information gathered on loan applications, in a stepwise fashion. Having included the full set of indicators of credit risk, we next include interactions between demographic groups and market concentration in Model 4. Following Becker, this specification provides an opportunity to evaluate inferential evidence of heightened levels of discrimination in highly concentrated markets. We call Model 4 the "full specification."[13] In a final model, Model 5, we include the bivariate indicator DENTC. Although "denied trade credit" is likely to be affected by credit risk variables already in the model, we include it because both bankers and suppliers of trade credit have an opportunity to meet the small business owner. This personal interaction provides an opportunity for these lenders to gain information about the borrower that may not be available to the researcher.

In a series of robustness checks, we also estimated Models 3 and 4 using several different criteria for sample selection, alternative specifications of lender market concentration and other control variables, and unweighted data. For details, see Appendix B.

Statistical Controls

Empirical studies that attempt to quantify the effects of discrimination are particularly vulnerable to criticism associated with model specification. Unobservable or omitted variables are especially worrisome since they have the potential to bias estimates of the demographic coefficients that are intended to capture discriminatory practices. One of the strengths of NSSBF data sets is the vast amount of information they contain on both credit market participants and potential participants (that is, firms that chose not to apply for credit). Cavalluzzo and Cavalluzzo (1998) exploit the 1987 data set to make new contributions to the literature on the credit market experiences of small business operators by demographic group. Their conclusions, nevertheless, are limited by the data. They can observe interest rates, but they cannot observe fees that may have been tied to the loan. They know a good deal about the characteristics of the firms and their owners, but they do not have credit histories. In addition, minority samples are small. The 1993 NSSBF data mitigates these drawbacks. Minority samples are substantially larger, loan fees and points paid are provided, and information on firm and owner credit histories are available. We use

these data along with information on firm and owner characteristics, financial characteristics of the firm, and firm relationships with lenders and suppliers in our analyses. In addition, we supplement these data with information made available to us by the Board of Governors of the Federal Reserve System on the credit scores assigned to the small businesses in our sample and the level of competition in the credit markets used by these small businesses. Table 3 contains all variable definitions, in addition to model specifications for each of our analyses. Additional details on the statistical controls are provided in Appendix C.

Results (Section V)

Apply Analysis (Apply)

Table 4 presents coefficients from a logit model that estimates the probability that a firm applied for a loan, or loan renewal, "within the last three years" of the interview date.[14] Apart from Asians, we find no evidence that application rates varied across demographic group. Models 1-3 present results without the HHI interaction terms. Coefficients on all demographic variables, save ASIAN, are statistically insignificant, while those on ASIAN are significant at the one percent level. The coefficient on ASIAN in Model 3 suggests that, all else equal, Asians were less likely to apply for credit than their White male counterparts by eight percentage points.[15]

If market discrimination reduces the chances that members of particular demographic groups will be able to obtain credit, then it is also possible that these reduced chances will influence the behavior of would-be borrowers from the affected demographic groups. Arrow (1973) calls these second-order effects *feedback effects*. Models 4 and 5 demonstrate that application rates were not sensitive to lender market structure; all the HHI interaction terms are statistically insignificant. At this point, there is little evidence to suggest that non-economic discrimination dampened owners' propensity to apply for credit.

Firm attributes that were associated with increases in loan application rates include firm size, measured as both the natural log of assets and employment, the ratio of liabilities to assets, the use of trade credit, some college education, and the number of firm relationships with financial institutions. Among credit history variables, only delinquencies on personal obligations were statistically significant. Firms with greater personal delinquencies were statistically less likely to apply for credit.

Credit Needs and Application Avoidance (FearDen)

In this section, we examine the factors that determine whether small business owners refrained from applying for credit at least once over the past three years because they anticipated being denied credit.

Table 5 presents descriptive statistics on firm demand for credit and owner expectations concerning the ability to obtain credit. Over the past three years, about 50 percent of firms demonstrated a need for credit, either by applying for a loan or reporting that they did not apply because they did not think they would be able to obtain credit. Among all demographic groups, African Americans displayed the greatest desire for credit (79 percent for females and 70 percent for males) followed by Hispanics, Whites, and Asians. The relatively low credit needs expressed by Asians is consistent with our previous analysis, which found that Asians were less likely than other groups to have applied for loans.[16] The relatively high credit needs on the part of African American and Hispanic small business owners, coupled with insignificant differences in loan application rates between these groups and White males, suggests that these groups were more likely than White male owners to have had unmet credit needs.

Of the firms that expressed a need for credit, fully half reported that they did not apply for credit sometime within the last three years because they did not expect to be able to get credit. These "fear" rates ranged from between 45 and 50 percent for White-owned businesses, to the low 60s for businesses owned by Hispanic and Asian males and the low to mid 80s for African American- and Hispanic female-owned businesses. Looking at the distribution of reasons for believing that their application would be rejected, we find that poor credit history or firm financial conditions were by far the leading reasons, with close to 60 percent of owners citing these explanations. In addition, about 20 (13) percent of African American males (females) cited prejudice as a reason that they anticipated rejection of a loan application. Few members of other demographic groups cited prejudice.

We use a logit analysis to examine the factors that influenced the decision not to apply for a loan because the firm feared denial (Table 6). All else equal, we find that African American and Hispanic business owners were far more likely to fear denial than were White male owners, after controlling for financial characteristics of the firm. Coefficients from Model 1 imply that African American owners were almost 53% more likely, and that Hispanic owners were almost 27% more likely to have avoided applying for a loan due to fear of denial than were businesses owned by White males.[17] Inclusion of credit history controls and the credit score (Models 2 and 3) reduces these differences somewhat, but African American owners were still about 37% more likely, and Hispanic owners were 22.8% more likely to fear that their application would be rejected, when these variables are taken into account.

A number of factors proved to be important in influencing the firm's fear of being turned down for credit. Among financial characteristics, firms with a larger asset base and those with greater revenues

relative to sales were important determinants in a firm's fear of denial. The firm's self-reported credit history variables, and the Dun and Bradstreet credit score also played important roles in influencing a firm's fear of denial.

We add interaction terms between market concentration and demographic variables in Models 4 and 5. While the Hispanic coefficient (HISPAN) is still large and significant, the African American coefficient (AFAM) is now insignificant. But FEMALE interacted with lender market concentration (FML*HHI) is statistically significant. The direction of effect indicates that, as lender markets became more concentrated, female-owned firms were more likely to have avoided applying for a loan because of fear that their application would be rejected. This result will prove to be consistent with results from the loan denial analyses. We now turn to that topic.

Denied Analysis

In this section, we present denial results for small business applications anytime within the last three years and for the most recent loan application.

3-level Ever Denied (EverDen)

Our analysis of the determinants of whether the firm was denied credit anytime within the last three years is summarized in Table 7. Looking across specifications reveals the importance of credit history in the ability to obtain financing, and in the estimated size of observed differentials by demographic group. Model 1, which incorporates 44 control variables, but omits firm and owner credit history, leads to a large and highly significant coefficient for African Americans; these firms were more than twice as likely to be denied credit than their White male counterparts. The estimated probability that an African American-owned firm would have been denied credit at least once during the last three years is 56.4 percent compared to 27.1 percent for firms owned by White males. The addition of 8 indicators of credit history reduces the African American coefficient, and the predicted probability of African American denial rates to 48.80 percent. The addition of the Dun and Bradstreet credit score reduces the predicted probability further to 47.3 percent (Model 3).

Firms owned by Asians were also statistically more likely to have been denied credit than firms owned by White males. Model 1 suggests that the probability of denial for Asians was 38.3 percent. The inclusion of the credit history variables in subsequent models has little effect on the size of the Asian coefficient, but renders it statistically insignificant.

In all, 5 of the 8 credit history indicators were statistically significant at commonly accepted levels. While it appears that creditors are willing to accept the risk associated with up to two delinquencies on the

personal obligations of small business owners, having three or more personal delinquencies increased the probability of being denied from 27 to 45 percent. In contrast, missing one business obligation did not appear to increase the likelihood of being denied credit, but missing a second increased the probability of denial from 28 to 44 percent. The Dun and Bradstreet credit score is also highly significant.

The addition of the HHI interaction terms in Model 4 provides important insights into the treatment of different demographic groups across bank market structure. The coefficient on AFAM now approaches zero, but the interaction of AFAM with HHI is quite large and significant at the five percent level. The coefficient on the interaction between FEMALE and HHI is positive and significant at the one percent level. Both results indicate that denial rates increased relative to rates for firms owned by White males as concentration rates rose in small business credit markets. However, the results for African Americans were more tenuous.[18]

Due to the continuous nature of HHI, and the non-linearity of the logit specification, we offer insight into the influence of bank market structure on denial rates by predicting the probability of denial for each observation at the tenth, fiftieth, and ninetieth percentiles of HHI for each demographic group in the sample.[19] Our estimate of the probability of denial for firms owned by White and African American males at the competitive (tenth percentile of the African American male HHI distribution) evaluation point (HHI = 0.085) is similar: 0.32 and 0.39, respectively. In contrast, our estimate of the probability of denial in the least competitive markets (90^{th} percentile of the African American male HHI distribution, HHI = 0.225) is 0.27 for firms owned by White males compared to 0.55 for firms owned by African Americans. At the median HHI value for African American-owned firms (HHI = 0.164) the probability of denial for White- and African American-owned firms was 0.29 and 0.48 respectively.[20]

The impact of increasing levels of concentration on loan denial rates is similar for firms owned by females. At the tenth percentile of HHI for females (HHI = 0.11), denial rates were 0.21 for female-owned firms versus 0.31 for firms owned by White males, while at the ninetieth percentile (HHI = 0.35) the denial rate for female-owned firms was 0.37 versus 0.23 for firms owned by White males. The estimated denial rate of 0.26 for the median female-owned firm (HHI = 0.199) was similar to that for White males (0.28).

While the differentials between African American- and female-owned firms located in concentrated markets and those owned by White males are large, a possible explanation for the observed differentials is that creditors have access to (and use) information in the application process that is unavailable to the research community. In order to further address concerns regarding omitted variable biases,

Model 5 includes information on a firm's ability to obtain credit from suppliers by adding "denied trade credit" to the model. [21] We define DENTC as one if any supplier denied a firm's request for trade credit, zero otherwise. The coefficient on DENTC, though large and highly significant (Model 5), has little influence on the coefficients of AFAM*HHI or FML*HHI, or their significance levels.

Influence of Selection Bias on Estimated Effects (EverDen2)

The results of the *EverDen* analysis indicate that denial rates for African American and female small business owners increased with lender market concentration. However, the analysis presented in Section V.B suggested that minority- and female-owned small business operators were less likely to have applied for credit because they anticipated having their loan application rejected. Our analysis of *EverDen2*, including firms that did not apply for credit for fear of being turned down, attempts to address this selection process. Results are presented in Table 7B. The coefficients in Columns 1-3 suggest that African American-, Hispanic-, and Asian-owned firms are more likely than those owned by White males to have unmet credit needs. (In contrast the *EverDen* results only uncovered statistically significant differences for African Americans and, to some extent, Asians). The coefficients on ASIAN are now significant across all specifications. Based on Model 1, African American owners were about 47% more likely to have unmet credit needs than were similar firms owned by White males. Hispanic and Asian owned firms were about 23 to 26 percent more likely to have their credit needs unfulfilled. The addition of the eight credit history variables and the Dun & Bradstreet credit score reduces the differential for African American-owned firms from 22.7 to 16.7 percentage points; however, there was little change in the probability levels for Hispanics and Asians.

Inclusion of the HHI interaction terms (Models 4 and 5) demonstrates that, for firms owned by African Americans and females (but not Hispanics or Asians), the differentials became more pronounced as lender market concentration increased. Estimated probabilities of *EverDen2* in concentrated markets for African American firms (HHI = 0.26) were 0.73 compared to 0.47 for businesses owned by White males.[22] While the estimated probabilities of *EverDen2* were by construction higher than the corresponding denial rates observed in the previous analysis, the difference in the probability levels between African Americans and White males in each analysis is remarkably similar. The difference in the probability of denial (*EverDen*) is 29 percentage points compared to 26 percentage points for *EverDen2*, suggesting that the estimated effect of market structure was largely insensitive to the selection concerns. Unmet credit needs in concentrated markets for female-owned firms (HHI = 0.35) were 58.2 percent

compared to 44.6 percent for firms owned by White males.[23] The difference between estimated denial rates and unmet credit needs for White male- and female-owned firms was very similar in the two analyses, equaling about 14 percentage points. Further evidence that selection was invariant to market structure can be seen in the ASIAN interaction terms which are statistically insignificant.

Denied most recent loan (DenMRL)

Our analysis of the disposition of small business owner's most recent loan application is summarized in Table 8. Consistent with the results of the previous section, credit history played an important role in the ability of small businesses to obtain financing, and in the size of estimated differentials. Model 1, which incorporates 53 control variables, but omits firm and owner credit history, leads to a large and highly significant coefficient for African Americans. Model 1 suggests that African American denial rates were 32.1 percent compared to 17 percent for White males. The addition of 8 indicators of credit history reduces the probability of denial for African Americans to 26.2 percent. In all, 5 of the 8 credit history indicators are statistically significant at commonly accepted levels of significance. And, as shown in Model 3, the addition of the Dun and Bradstreet credit score (CREDSCR) reduces the probability of denial for African Americans to 25.5 percent, an amount that is still statistically significant at the one percent level, but which is also 6.6 percentage points lower than the Model 1 estimate.

The addition of the HHI interaction terms in Model 4 again leads to some interesting results. The coefficient on AFAM now approaches zero, and the interaction of African Americans with HHI, though quite large, is statistically insignificant. The coefficient on the female HHI interaction term is large and statistically significant at the one percent level. While female denial rates were similar to those for White males at the median female HHI (18.7% compared to 17.6%), for firms located in more concentrated markets (HHI = 0.35) denial rates were 29 percent for females compared with 16 percent for White males. Surprisingly, the interaction between Asian and HHI is negative and significant. Finally, the addition of DENTC (Model 5) does little to dampen the magnitude or significance of the race and gender coefficients.[24]

Interest Rate Analysis (IntRate)

Table 9 summarizes our results for the nominal interest rate the firm paid on its most recent loan.[25] Models 1-3 are robust to the changes in specification. Interest rates did not vary significantly by demographic group. Instead, key determinants were current market interest rates, as embodied in the index of relevant interest rates at the time of the most recent loan (MRL_INDX), the type of loan that was being

financed (auto loans had lower rates than others), and whether the loan had a fixed rate (more expensive). Firm attributes that raised rates include increases in the liability to asset ratio (LIABASST), and rejection of a loan application in the last three years (EDENALL). Firms that borrowed more paid lower rates (LNAMTBRR), as did firms that had checking accounts (CHECKING), while firms that borrowed from sources other than financial institutions paid about a percentage point and a half less than others. Inclusion of firm credit history did reveal some statistically significant effects, but including these factors had little impact on other coefficient estimates.[26]

The addition of interaction terms between demographic groups and lender market concentration has an important impact on our results (Models 4 and 5). Although the firm and market influences discussed above remained robust to the change in specification, there is a dramatic effect on variables tied to market concentration. First, the size of the coefficient on HHI increases and becomes statistically significant. All else equal, firms paid higher interest rates as credit market concentration increased. In addition, African Americans and women paid more than White men, but the rate paid *declined* as market concentration increased. This finding, though unexpected, is consistent with findings reported for women in Cavalluzzo and Cavalluzzo (1998). Based on coefficients reported for Model 4, African American small business owners in the most competitive markets (HHI = .0847) were estimated to pay 1.06 percentage points more than White male owners, while African American owners in the most concentrated banking markets (HHI = 0.2245) were predicted to pay 0.44 percentage points less than White males.[27] In the median African American market (HHI = 0.1640), rates for African American loans were 21 basis points higher than those for White males. Predictions for females find that women paid about a quarter of a percentage point more than White males in the most competitive markets in which they owned businesses and almost a full percentage point less in the most concentrated banking markets in which they owned businesses.[28]

The negative coefficients on the HHI interaction terms with African American- and female-owned businesses is unexpected, and there are a number of potential explanations for this phenomenon that we consider. First, it could be the case that though the interaction terms are negative, the overall effect of competition on interest rates charged to minority- and female-owned businesses is positive. That is, it is possible that interest rates for African American- and female-owned businesses increased with lender market concentration, though they increased at a lower rate than they did for businesses owned by White males. However, for this to be the case, the coefficients on the HHI interaction terms would have had to be smaller in absolute value than the coefficient on the main effect of HHI. This is clearly not the

case. A second explanation may come from the fact that in the interest rate analysis, we are only observing successful loan applicants. For example, African American and female business owners with firms located in more concentrated banking markets may have left their local markets and entered more competitive markets in order to obtain a loan. If that is the case, then what we may be observing is that those firms, though located in more concentrated markets, obtain their most recent loan in a relatively more competitive market, and thus ultimately paid a lower *risk-adjusted* rate than their counterparts that obtained their most recent loan in more concentrated markets.

To test this hypothesis, we examined the extent to which minority- and female-owned businesses were more likely to leave their local area to obtain their most recent loan than were businesses owned by White males. We define the dependent variable LOCAL equal to 1 if the firm's latest loan was obtained within 30 miles of the firm's headquarters, zero otherwise, and regressed this variable on (1) the demographic variables and HHI, and (2) a set of HHI interaction terms to determine the extent to which lender market concentration motivated small business owners to seek credit outside their local area.[29] While the evidence did suggest that African Americans and Asians were statistically more likely to leave their local area than were businesses owned by White males, there was no evidence to suggest that this likelihood increased with market concentration.[30] A third explanation is that the bivariate controls for loan type (line of credit, motor vehicle, etc.) in our interest rate model do not properly adjust for differences in prices associated with these different forms of credit. We address this possibility in Section VI.

Analysis Of Lines Of Credit (Section VI)

Analyses presented in the previous sections found some evidence consistent with Becker's hypotheses. Lender market concentration appears to hamper the ability of African American- and female-owned firms to obtain financing. However, we found no evidence that interest rates increased with concentration. Indeed, the results from Model 4 above indicate that interest rates on loans received by African American- and female-owned businesses *declined* with increases in market concentration. We also found little evidence to suggest that market concentration motivated borrowers to look to more competitive markets for loans. However, it is possible that inclusion of all loan types in the interest rate model, without adequately controlling for differences in underwriting and pricing policies for each loan type, may have influenced our estimates. This is a concern for other models as well as the interest rate model.

Lines of credit (LOCs) are the dominant credit instrument used by small businesses, accounting for more than 52 percent of the most recent loans. In this section, we re-estimate all relevant models restricting our analyses to lines of credit. The dependent variables we examine are as follows: whether the firm has a line of credit; whether the firm applied for a line of credit; whether the firm was denied credit on its most recent LOC application; and the interest rate paid on lines of credit.[31] Rather than present all five of our specifications for each dependent variable, we present only Model 3 or Model 4, depending on whether a Wald test on the set of HHI interaction terms is significant.

Results

Line of credit results are presented in Table 10. Column one contains the results from estimating whether a firm has any lines of credit and includes HHI interaction terms. The coefficients on the Hispanic, Asian, and female interaction terms are large, negative, and for females, statistically significant at the five percent level. These results contrast with those from a previous analysis which found no differences in the likelihood of having loans due to lender market structure (see Appendix A). At the 90th HHI percentile for female-owned firms, we observe that female-owned firms were about 20 percent less likely to have lines of credit than were firms owned by White males (22 percent versus 28 percent). However, as with all loans, there is no evidence that application rates differed across demographic groups or lender market structure (Column 2), except for Asian owners.

Column 3 presents denial rates for lines of credit. These results are similar to those for all types of loans in that denial rates for African American and female owners, relative to White male owners, increased with increases in concentration. Moreover, the statistical significance for the AFAM*HHI interaction term has greatly increased ($p < 0.01$), while the FML*HHI interaction term becomes significant at the 10 percent level. The coefficient on the AFAM*HHI interaction term suggests that African Americans located in concentrated markets (HHI = 0.2807) faced line of credit denial rates equal to 0.50, while businesses owned by White males faced denial rates equal to 0.14 in markets with similar levels of lender market competition.

The results for the interest rate model are presented in Column 4. The adjusted R^2 for the line of credit model is 0.32 versus 0.22 in the original model including all loans, suggesting that the fit of the model has improved considerably. The interaction terms between female and African American owners and market structure are no longer significant. In addition, the HHI interaction term with African Americans is now positive (although statistically insignificant). For these groups, analysis of a single loan type does not lead us to conclude that interest rates varied by level of competition among lenders. However, when we

compare interest rates for lines of credit paid by Hispanic-owned firms, we find that this group paid more as lender market concentration increased. A one percentage point increase in HHI translates into an 11.40 basis point increase in the price Hispanics paid for lines of credit. In the median market for Hispanic-owned firms (HHI = 0.1625), Hispanics paid about the same as firms owned by White males. In contrast, Hispanic-owned firms located in the 90th percentile of lender market concentration (HHI = 0.2268) paid 69 basis points higher on lines of credit than their White male counterparts.

Conclusions (Section VII)

We investigated the sources of differentials in credit market experiences across small business owners from different demographic groups. Our analyses considered the financial characteristics of each firm, each firm's self-reported credit history, an independently tabulated credit risk score, several indicators of each firm's relationship with suppliers and financial institutions, firm success at obtaining credit from suppliers, the education and experience of the principle owner, the firm's organizational form, industry, region, and whether the firm was located in an MSA. These factors were enough to explain raw differences for one of the credit market experiences we considered (interest rates paid by firms owned by African American and White males). In most cases, however, large differences remained. Furthermore, there was some evidence that the extent of these differences, particularly for African American- and female-owned firms, varied with lender market concentration.

Our analysis of applications indicated that, apart from Asians, there were no differences in application rates across demographic groups. Asians were less likely to have applied for credit, even after including a broad set of explanatory variables. However, there is no evidence that the Asian differentials were related to lender market structure, suggesting that Asians were less likely to desire credit in general. Results for Asians did not change when we focused on a single credit instrument, lines of credit rather than a heterogeneous set of loans. Important factors that were associated with increases in loan application rates included the use of trade credit, some college education, the number of firm relationships with financial institutions, the ratio of liabilities to assets, and firm size, as measured by both the natural log of assets and employment. In contrast, self-reported credit history variables played a surprisingly limited role in the decision to apply for credit.

The next component of our analysis examined the extent to which certain demographic groups refrained from applying for credit because they believed that their application would have been rejected. Results indicate that African American and Hispanic owners were

more likely than White owners to have avoided applying for credit at least once in the last three years, even after including a broad range of explanatory variables. But application avoidance did not vary with lender market concentration. However, female-owned firms were more likely to have avoided applying for credit as concentration in lender markets increased. Some firm financial characteristics, firm and owner self-reported credit history, the Dun and Bradstreet credit score, and whether a firm was ever denied credit by suppliers (among other variables) all were associated with a reduction in the propensity to apply for credit for fear of being turned down.

Our next set of analyses examined denial rates. We began by focusing on whether firms were denied credit on a loan anytime over the past three years. Firm and owner self-reported credit history indicators, including whether the owner has declared bankruptcy anytime within the past seven years, whether the owner had been delinquent on three or more personal obligations, whether the owner had been delinquent on two or more business obligations, and whether there were any judgments against the firm all contributed to the probability of having been denied credit. Furthermore, the Dun and Bradstreet credit score, whether the firm had been denied credit from suppliers, and some financial characteristics such as firm assets, were all important in determining a firm's probability of denial. Despite the role played by these important explanatory variables, African American-owned firms still faced substantially higher denial rates than businesses owned by White males. In an effort to understand better the remaining differential, we included a set of interaction terms with race, ethnicity, and gender and lender market structure. Consistent with Becker's early theories of discrimination, inclusion of these interaction terms uncovered some evidence that African American- and female-owned firms (but not Hispanic- or Asian-owned firms) were denied credit more frequently as lender market concentration increased. These results maintained commonly accepted levels of statistical significance even after including additional African American and female interaction terms with a rural/urban market indicator variable or limiting the sample to include only those firms with less than $10 million in sales. However, eliminating rural markets from the sample reduced the coefficient on the African American (but not the female) HHI interaction term to below commonly accepted levels of statistical significance. It should be pointed out though that removing rural markets from the sample reduced the sample by about 25 percent, eliminated the most concentrated markets from the analysis, and reduced our African American representation by approximately 7 percent.[32]

We buttressed our ever-denied analysis with a measure of a firm's desire to obtain credit. Many of the same factors that played a role in our initial denial analysis were also important in this second set of

analyses. In particular, firm and owner credit history, the Dun and Bradstreet credit score, and whether the firm was ever denied credit from suppliers were important determinants of a firm's access to credit markets. Nonetheless, even after including these factors, substantial differentials across some of the demographic variables remained. African American- Hispanic- and Asian-owned firms were all less likely to have their credit desires met relative to firms owned by White males. Coupled with the results from the applied analysis, which found no evidence of differences in application rates across African American- and Hispanic-owned firms, these results are consistent with the presence of feedback effects as postulated by Arrow (1973). That is, the evidence suggests that application rates for these firms would have been *higher* than those of White males, but for these effects. Even so, there was no evidence that the Hispanic and Asian differentials varied with lender market concentration. There was some evidence that the differentials for African American- and female-owned firms were related to lender market concentration, however. Coefficients on the interaction terms for these variables were statistically significant at commonly accepted levels in both the full sample and in the sample including only those firms with less than $10 million in sales. But coefficient estimates limiting the sample to just MSAs, MSAs and firms with less than $10 million in sales, or using a binary HHI in place of our continuous HHI measure, though positive, were never statistically significant at commonly accepted levels.

The final element of our denial analyses focused on the firm's most recent loan application. Firm and owner credit history, the Dun and Bradstreet credit score, being denied credit from suppliers, and some firm financial characteristics played important roles in the probability of being denied credit on the firm's most recent loan. Nevertheless, large differentials between African American- and White male-owned firms remained. However, in contrast to the previous two sets of denial analyses, which found some evidence that the African American differentials were associated with lender market structure, there was no evidence that this was the case for the most recent loan. We did find evidence that denial rates on the most recent loan for female-owned firms varied with lender market structure, however. Models that included female interacted with HHI were positive and statistically significant in six of the seven estimations presented for this indicator of credit market experience. Additional analysis that focused on a single loan type, lines of credit, also found a positive and significant relationship between female denial rates (as well as those for African Americans) and lender market concentration.

Our study concluded with a look at interest rates paid on a heterogeneous set of loans and on one specific type of loan, lines of credit. Raw differentials indicated that only African American males paid

statistically higher interest rates than White males. Inclusion of the characteristics of the most recent loan eliminated this differential. Other important factors that influenced the initial nominal interest rate paid included the prevailing market index rate at the time of the loan, a set of variables characterizing the type of loan received, the size of the loan, and whether the interest rate was fixed or floating. In contrast to our set of denial analyses, information on self-reported credit histories played a relatively minor role in determining the nominal interest rate paid on the firm's most recent loan. But this does not mean that interest rate paid did not vary with borrower risk characteristics; the Dun and Bradstreet credit score was statistically related to interest rates paid, with less risky firms paying lower rates. While there were no differences in interest rates across demographic groups prior to including the concentration interaction terms, inclusion of race, ethnicity, and gender interaction terms found evidence that African American- and female-owned firms paid *lower* rates as lender market concentration increased. Because this result could be caused by the heterogeneous set of loan types contained in the data, we conducted a separate analysis of a single loan type, lines of credit. This analysis found no evidence that African Americans and females paid less as lender market concentration increased. However, evidence emerged that Hispanic-owned firms paid higher interest rates as lender market concentration increased in the lines of credit analysis.

In sum, we find an important role for many of the factors considered in our study of differences in the credit market experiences of small business owners from different demographic groups. In one case, these factors were enough to explain away raw differences. In other cases, substantial differences remained. Further analysis indicated, particularly for African American- and female-owned firms, that some of these observed differences were related to lender market structure in a manner consistent with Becker's early theories of discrimination.

It is difficult to determine whether observed differences in credit market experiences across demographic groups are due to discrimination. We attempted to understand the sources of observed differentials by examining a broad set of firm and owner characteristics, along with information on the competitiveness of the local banking market. However, in many of the cases we examined, substantial differences remained. We recognize that research of the type presented here always suffers from limitations of various sorts. Nonetheless, we believe documenting the existence of differences in credit market experiences, providing a framework for analyzing those differences, and identifying potential reasons for the differences is an important step in increasing our understanding of small business credit markets.

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TABLE 1

Borrowing Characteristics of Small Businesses by Demographic Group—Population Estimates

	All	White		African American		Hispanic		Asian	
		Males	Females	Males	Females	Males	Females	Males	Females
Percent with loans (*Loan*)	62.24	63.70	58.55*	64.50	51.39*	63.20	53.08	54.48*	47.35*
	(4,570)	(2,951)	(594)	(336)	(95)	(236)	(65)	(238)	(65)
Percent applied (*Apply*)	34.50	35.95	31.55	36.71	28.09	35.96	12.67*	25.86*	16.97*
	(4,570)	(2,951)	(594)	(336)	(95)	(236)	(65)	(238)	(65)
Percent denied within last three years (*EverDen*)	28.67	26.04	30.33	68.54*	52.46*	36.29	33.72	38.76	-
	(1,985)	(1,418)	(225)	(134)	(31)	(82)	(16)	(66)	
Percent denied on most recent loan (*DenMRL*)	18.45	16.01	22.99	49.15*	37.26*	18.72	12.62	25.01	-
	(1,985)	(1,418)	(225)	(134)	(31)	(82)	(16)	(66)	
Average interest rate on most recent loan (*IntRate*)	8.77	8.72	8.78	9.71*	9.27	9.13	-	9.03	-
	(1,682)	(1,265)	(189)	(70)	(18)	(68)		(52)	

NOTES:

1. Population estimates weighted to reflect differences in sample selection and response rates (see Price Waterhouse LLP, 1996).
2. An * signifies that the statistic is significantly different from the white male-owned firm value at the 95% level of confidence. Standard errors for these tests are calculated using 1,000 bootstrap sample and weight replicates.
3. A "-" signifies that statistics were not reported because the sample size (N) was 15 or less.

TABLE 2

Descriptive Statistics: Means (Medians)

	All	White		African American		Hispanic		Asian	
		Males	Females	Males	Females	Males	Females	Males	Females
Panel A: Firm and Owner Characteristics									
Assets (000)	490	590	220*	190*	90*	370	140*	410*	340
	(70)	(80)	(50)*	(50)*	(20)*	(60)	(30)*	(70)	(60)
Sales/assets	6.16	6.24	5.94	6.01	5.96	5.66	8.85	6.03	3.59*
	(2.96)	(2.99)	(2.88)	(2.78)	(2.61)	(3.18)	(3.72)	(3.00)	(2.20)
Profit/assets	0.97	1.01	0.80	0.75	0.91	1.09	1.30	1.25	0.37*
	(0.21)	(0.21)	(0.19)	(0.19)	(0.04)*	(0.59)*	(0.46)	(0.28)	(0.07)
Debt/assets	0.63	0.62	0.61	0.93	0.69	0.58	0.71	0.72	0.47*
	(0.47)	(0.48)	(0.47)	(0.48)	(0.43)	(0.43)	(0.50)	(0.50)	(0.41)
Loan/assets	0.40	0.41	0.38	0.38	0.43	0.38	0.44	0.39	0.33
	(0.25)	(0.26)	(0.23)	(0.20)	(0.21)	(0.21)	(0.25)	(0.30)	(0.13)
Firm age (years)	14.34	15.26	12.42*	12.64*	10.22*	12.62*	10.75*	9.24*	11.26*
	(11)	(12)	(9)*	(10)*	(7)*	(10)*	(8)*	(8)*	(9)
Owner age (years)	49.46	50.16	47.91*	49.56	46.74*	47.49*	45.50*	45.83*	48.18
	(48)	(49)	(46)*	(48)	(44)*	(47)	(45)	(45)*	(46)
Owner experience (years)	18.93	20.37	15.29*	16.75*	12.54*	16.15*	12.88*	14.51*	15.11*
	(17)	(19)	(14)*	(15)*	(10)*	(15)*	(10)*	(14)*	(14)*
Percent not finishing high school	4.49	4.72	2.20*	3.92	1.19*	12.18*	5.37	5.48	3.38
Percent with some college	71.99	71.50	73.48	79.90*	87.85*	61.40*	49.09*	81.59*	85.32*

NOTES:

1. An * signifies that the statistic is significantly different from the white male-owned firm value at the 95% level of confidence. Standard errors for these tests are calculated using 1,000 bootstrap sample and weight replicates.

TABLE 2 (continued)

	All	White		African American		Hispanic		Asian	
		Males	Females	Males	Females	Males	Females	Males	Females
Panel B: Credit History									
Percent declared bankruptcy within past 7 years	2.20	2.27	1.45	5.33*	4.40	1.40	5.03	2.53	0.00*
Percent delinquent on personal obligations (3 or more times)	8.02	7.25	7.60	22.41*	17.67*	12.02	26.33*	4.17*	10.70
Percent delinquent on business obligations (3 or more times)	11.71	10.90	13.68	19.75*	14.65	16.68	12.43	7.81	7.03
Percent with judgements	4.91	4.48	3.96	14.80*	15.50*	7.72	14.58	6.44	0.00*
D & B Credit Score	50.12	51.81	47.57*	35.86*	42.15*	43.66*	45.00	44.63*	52.77
(Range: 1-100)	(47)	(50)	(41)*	(31)*	(39)*	(39)*	(39)*	(39)*	(50)
Percent denied trade credit	6.13	5.27	7.09	14.94*	9.82	11.74*	5.41	8.11	5.55
Panel C: Most Recent Loan									
Percent from commercial bank	80.58	81.23	79.86	75.36	63.02	82.35	79.78	68.99	-
Percent from financial institution (including commercial banks)	95.97	95.87	98.18	91.79	84.10	94.22	100.00*	90.61	-
Percent from government institution	0.51	0.31	0.61	3.95*	5.89	1.23	0.00	1.31	-
Percent from other businesses	2.78	3.12	0.77*	1.99	10.02	1.67	0.00*	8.08	-
Percent from family or individuals	0.75	0.70	0.44	2.27	0.00*	2.88	0.00*	2.91*	-
Length of relationship with	6.80	7.28	4.96*	4.80*	2.78*	8.36	8.69	4.70*	-
institution at time of application	(4)	(5)	(3)*	(3)*	(2)*	(5)	(8)	(3)*	-
Percent receiving less desirable terms than originally requested	9.40	8.41	11.95	20.12*	14.07	14.05	-	13.03	-
Percent not applying fearing denial	24.37	22.30	22.45	58.81*	68.05*	38.26*	48.20*	25.60	26.80
Percent of firms located in concentrated banking markets	50.61	51.23	55.13	37.67*	44.38	37.63*	42.60	39.16*	41.26
Percent with most recent loan institution in same city	84.13	84.91	82.98	82.86	74.83	82.04	100.00*	67.04*	-
Distance (miles) between firm	50.68	45.81	57.73	46.26	78.08	22.27*	-	234.54	-
and institution with most recent loan	(3)	(3)	(2)	(4)	(9)	(4)	-	(6)	-

NOTES:

1. An * signifies that the statistic is significantly different from the white male-owned firm value at the 95% level of confidence. Standard errors for these tests are calculated using 1,000 bootstrap sample and weight replicates.
2. A "-" signifies that statistics were not reported because the sample size (N) was 15 or less.

TABLE 3

Variable Definitions and Model Specifications

Variables	Definitions	Analysis[a]						
Dependent Variables		(1)	(2)	(3)	(4)	(5)	(6)	(7)
Loan (see Appendix)	Indicates whether the firm had at least one line of credit, equipment, motor vehicle, capital lease, mortgage, or other loans.	X						
Apply	Indicates whether during the last three years the firm applied for credit or asked for a renewal of terms on an existing loan.		X					
FearDen	Indicates whether there were times in the last three years that the firm did not apply because it thought it would be turned down. Defined only over those firms that either applied for credit in the past 3 years, or did not apply for fear of denial.			X				
EverDen	Indicates whether any lender turned down a request for credit from the firm within the last three years. Defined only for those firms that applied for credit in the past 3 years.				X			
EverDen2	Equal to one if the firm was ever denied credit or did not apply for fearing denial, zero otherwise. Defined only for those firms that either applied for credit in the past 3 years, or did not apply for fear of denial.					X		
DenMRL	Indicates whether the firm was denied its most recent loan request. Defined only for those firms that applied for credit in the past 3 years.						X	
IntRate	Initial nominal interest rate on the firm's most recent loan.							X
Firm Characteristics								
LIABASST	Total short and long term debts / Total assets.	X	X	X	X	X	X	X
PROFASST	Operating Profits / Total assets.	X	X	X	X	X	X	X
LNASSET	Natural log of total assets (in millions of dollars).	X	X	X	X	X	X	X
LNTOTEMP	Natural log of the total number of employees.	X	X	X	X	X	X	X
SALEASST	1992 Sales / Total assets.	X	X	X	X	X	X	X
LNAGE	Natural log of firm age at the time of the survey.	X	X	X				
LNAGE2	Natural log of firm age at the time of the most recent loan application (for those firms that never applied as in the CREDACCESS models, we substitute LNAGE for LNAGE2).				X	X	X	X
SOURCES	Number of institutions that the firm uses for all financial services.	X	X	X	X	X		
LEND_SRC	Number of distinct lending sources used by the firm for lines of credit, equipment loans, motor vehicle loans, mortgage loans, capital leases, or other loans.						X	X
CHECKING	Indicates whether the firm had any checking accounts.	X	X	X	X	X	X	X

TABLE 3 (continued)

Variables	Definitions	Analysis						
Firm Characteristics (continued)		(1)	(2)	(3)	(4)	(5)	(6)	(7)
SAVING	Indicates whether the firm had any savings accounts (includes savings accounts, money market accounts, share accounts, CDs, or other time deposits; excludes retirement accounts, pension funds, and trusts).	X	X	X	X	X	X	X
TCUSE	Indicates whether the firm uses trade credit.	X	X	X	X	X	X	X
DENTC	Indicates whether the firm was ever denied trade credit.	X	X	X	X	X	X	X
LOAN4	Indicates whether the firm has loans other than the most recent loan.				X	X	X	X
LOAN2	Indicates whether the firm has any loans.			X				
PRIM_FIN	Indicates whether the firm's primary institution is a financial institution.	X	X	X	X	X		
REL_PRIM	Number of years the firm has been conducting business with its primary institution (set to zero if the firm has no primary institution).	X	X	X				
RELPRIM2	Number of years firm has been conducting business with its primary institution at the time of the most recent loan (set to zero if the firm has no primary institution).				X	X		
PROP	Indicates whether the firm was a proprietorship.							
PARTNER	Indicates whether the firm was a partnership.	X	X	X	X	X	X	X
SCORP	Indicates whether the firm was a s-corporation.	X	X	X	X	X	X	X
CCORP	Indicates whether the firm was a c-corporation.	X	X	X	X	X	X	X
FRANCHIS	Indicates whether the firm was a franchise.	X	X	X	X	X	X	X
D6_SAME	Indicates whether the firm's primary sales or delivery of products are in the same area as the firm's main office.							
D6_REG	Indicates whether the firm's primary sales or delivery of products are in the same geographic area as the firm's main office.	X	X	X	X	X	X	X
D6_NATN	Indicates whether the firm's primary sales or delivery of products are throughout the United States.	X	X	X	X	X	X	X
D6_OUTSD	Indicates whether the firm's primary sales or delivery of products are outside the United States.	X	X	X	X	X	X	X
FEARDEN2	Indicates whether the firm needed credit any time over the past three years but didn't apply for fear of being turned down. Defined over all firms.	X	X					
EDENALL	Indicates whether the firm was denied credit anytime over the past three years. Defined over all firms.	X		X				X
HHI	Herfindahl-Hirschman index of market concentration derived from June 1993 FDIC summary of deposit data.	X	X	X	X	X	X	X
Owner Characteristics								
AFAM	Indicates whether an African American owns more than 50% of the firm.	X	X	X	X	X	X	X
ASIAN	Indicates whether an Asian-American owns more than 50% of the firm.	X	X	X	X	X	X	X
HISPAN	Indicates whether a Hispanic-American owns more than 50% of the firm.	X	X	X	X	X	X	X
FEMALE	Indicates whether a woman owns more than 50% of the firm.	X	X	X	X	X	X	X
OWNSHR	Percentage of the firm that is owned by the principal owner.	X	X	X	X	X	X	X
EXPER	Number of years of experience that the principal owner has had owning or managing a business.	X	X	X	X	X	X	X
NOT_HS	Indicates whether the firm's principal owner is a non-graduate of high school.	X	X	X	X	X	X	X
COLLEGE	Indicates whether the firm's principal owner has had some level of college education.	X	X	X	X	X	X	X
MANAGE	Indicates whether the firm is managed on a daily basis by the owner or a partner.	X	X	X	X	X	X	X

TABLE 3 (continued)

Variables	Definitions	Analysis						
Owner Characteristics (continued)		(1)	(2)	(3)	(4)	(5)	(6)	(7)
BANKRUPT	Indicates whether the firm's principal owner declared bankruptcy within the last seven years.	X	X	X	X	X	X	X
PDELINQ0	Indicates whether the firm's principal owner was never delinquent on personal obligations within the last three years.							
PDELINQ1	Indicates whether the firm's principal owner was 60 or more days delinquent on personal obligations 1 time within the last three years	X	X	X	X	X	X	X
PDELINQ2	Indicates whether the firm's principal owner was 60 or more days delinquent on personal obligations 2 times within the last three years.	X	X	X	X	X	X	X
PDELINQ3	Indicates whether the firm's principal owner was 60 or more days delinquent on personal obligations 3 or more times within the last three years.	X	X	X	X	X	X	X
BDELINQ0	Indicates whether the firm's principal owner was never delinquent on business obligations within the last three years.							
BDELINQ1	Indicates whether the firm's principal owner was 60 or more days delinquent on business obligations 1 time within the last three years.	X	X	X	X	X	X	X
BDELINQ2	Indicates whether the firm's principal owner was 60 or more days delinquent on business obligations 2 times within the last three years.	X	X	X	X	X	X	X
BDELINQ3	Indicates whether the firm's principal owner was 60 or more days delinquent on business obligations 3 or more times within the last three years.	X	X	X	X	X	X	X
JUDGMENT	Indicates whether any judgments have been rendered against the principal owner within the past three years.	X	X	X	X	X	X	X
CREDSCR	Credit score percentile ranging from 0 to 100 percent, with 100 percent being the best credit rating. Created by Dun & Bradstreet.	X	X	X	X	X	X	X
Most Recent Loan Characteristics								
MRL_INDX	Interest rate of the index to which the most recent loan was tied. For fixed rate loans it is the market prime rate.							X
POINTS	Number of points paid to close (extreme observations set to the 99th percentile).							X
FEE_AMT	Fees paid to close divided by amount borrowed (extreme observations set to the 99th percentile).							X
FIXED	Indicates whether the interest rate on the firm's most recent loan is fixed (vs. variable).							X
TERMPREM	Yield on a government bond of similar maturity minus the yield on treasury bills.							X
INVMAT	Inverse of the maturity of the loan (in months).							X
LNAMTBRR	Natural log of the dollar amount borrowed.							X
BONDSPRD	Yield on corporate bonds rated BAA – yield on ten year government bonds (at time of loan).							X
FIN_IBNK	Indicates whether the firm's most recent loan application was to a financial institution.						X	X
GUAR	Indicates whether the firm was required to have a guarantor.							X
BCOL (PCOL)	Indicates whether the firm provided business (or personal) collateral on its most recent loan.							X
USE_MRL	Indicates whether the most recent loan was intended for short-term financing.						X	
MRL_EQP	Indicates whether the most recent loan was for equipment.							
MRL_LOC	Indicates whether the most recent loan was a line of credit.						X	X
MRL_LEASE	Indicates whether the most recent loan was a lease.						X	X
MRL_MRTG	Indicates whether the most recent loan was a mortgage.						X	X

TABLE 3 (continued)

Variables	Definitions	Analysis						
Most Recent Loan Characteristics (continued)		(1)	(2)	(3)	(4)	(5)	(6)	(7)
MRL_MV	Indicates whether the most recent loan was a motor vehicle loan.						X	X
MRL_OTH	Indicates whether the most recent loan was for something other than the above, but excluding loans from owners.						X	X
J5_ASST	The size of the loan request relative to firm assets.						X	
MRL_PRIM	Indicates whether the firm's most recent loan application was to its primary institution.						X	X
MRL_9394	Indicates whether the firm's most recent loan application was requested in 1993 or 1994.						X	X
REL_JBNK	Number of years that the firm has been conducting business with the institution where the firm applied for its most recent loan (set to zero if the firm did not have a relationship with the most recent lending institution).						X	X
Additional Controls								
IND_1 – IND_9	Industry controls, based on groupings of two digit SIC codes. IND_1 (SIC 10-19), IND_2 (SIC 20-29), IND_3 (SIC 30-39), IND_4 (SIC 40-49), IND_5 (SIC 50-51), IND_6 (SIC 52-59), IND_7 (SIC 60-69), IND_8 (SIC 70-79), and IND_9 (SIC 80-89). IND_2 is excluded from the analysis.	X	X	X	X	X	X	X
MSA	Indicates whether the firm's headquarters are located in an MSA (MSA=1) or rural area (MSA=0).	X	X	X	X	X	X	X
REGION1 – REGION9	Census region controls. REGION1 (East North Central – excluded from analysis), REGION2 (East South Central), REGION3 (Middle Atlantic), REGION4 (Mountain), REGION5 (New England), REGION6 (Pacific), REGION7 (South Atlantic), REGION8 (West North Central), and REGION9 (West South Central)	X	X	X	X	X	X	X

[a] Column 1 contains all the variables included in our Loan analysis (see appendix). Columns 2-7 contain all the variables included in our Apply, FearDen, EverDen, EverDen2, DenMRL, and IntRate analyses, respectively. All models are estimated using the STATA programming package and control for the weighting and stratification employed in collecting the NSSBF data.

TABLE 4

***Apply*: Firm Applied for a Loan or Line of Credit Within the Past Three Years**

	Model 1	Model 2	Model 3	Model 4	Model 5
Majority Ownership					
AFAM	0.061	0.071	0.066	0.438	0.434
	(0.417)	(0.476)	(0.439)	(1.407)	(1.393)
HISPANIC	0.111	0.103	0.100	-0.025	-0.044
	(0.584)	(0.537)	(0.521)	(-0.079)	(-0.140)
ASIAN	-0.493***	-0.461**	-0.461**	-0.467	-0.494
	(-2.665)	(-2.507)	(-2.512)	(-1.450)	(-1.514)
FEMALE	-0.087	-0.096	-0.096	-0.106	-0.102
	(-0.741)	(-0.818)	(-0.819)	(-0.440)	(-0.421)
Market Structure					
HHI	-0.280	-0.251	-0.248	-0.256	-0.235
	(-0.574)	(-0.514)	(-0.507)	(-0.468)	(-0.430)
AFAM*HHI				-2.138	-2.214
				(-1.337)	(-1.371)
HISP*HHI				0.644	0.687
				(0.463)	(0.496)
ASN*HHI				0.032	0.154
				(0.022)	(0.103)
FML*HHI				0.046	0.011
				(0.045)	(0.011)
Financial Characteristics					
ASSETS	0.283***	0.281***	0.282***	0.282***	0.284***
	(7.488)	(7.455)	(7.476)	(7.466)	(7.515)
EMPLOY	0.118**	0.115**	0.114**	0.114**	0.115**
	(2.353)	(2.279)	(2.267)	(2.265)	(2.286)
SALEASST	-0.000	-0.000	-0.000	-0.000	0.000
	(-0.062)	(-0.047)	(-0.012)	(-0.022)	(0.079)
LIABASST	0.250***	0.242***	0.241***	0.241***	0.236***
	(3.025)	(2.963)	(2.947)	(2.941)	(2.865)
PROFASST	0.003	0.003	0.002	0.002	0.002
	(0.188)	(0.186)	(0.172)	(0.175)	(0.180)
Credit History					
BANKRUPT		0.012	0.009	0.005	-0.037
		(0.039)	(0.031)	(0.016)	(-0.121)
PDELINQ1		-0.523*	-0.530*	-0.535*	-0.544*
		(-1.789)	(-1.802)	(-1.808)	(-1.830)
PDELINQ2		-0.010	-0.014	-0.017	-0.055
		(-0.033)	(-0.046)	(-0.059)	(-0.186)
PDELINQ3		0.069	0.067	0.064	0.054
		(0.371)	(0.360)	(0.345)	(0.286)
BDELINQ1		0.102	0.094	0.096	0.087
		(0.423)	(0.390)	(0.395)	(0.359)
BDELINQ2		-0.040	-0.050	-0.047	-0.063
		(-0.177)	(-0.221)	(-0.210)	(-0.277)
BDELINQ3		0.300*	0.285*	0.287*	0.231
		(1.867)	(1.757)	(1.765)	(1.395)
JUDGMENT		-0.211	-0.215	-0.208	-0.244
		(-0.990)	(-1.009)	(-0.975)	(-1.132)
Credit Score					
CREDSCR			-0.001	-0.001	-0.001
			(-0.473)	(-0.469)	(-0.359)
Denied Trade Credit					
DENTC					0.405**
					(2.114)
Number of obs	4570	4570	4570	4570	4570
F-statistic	11.37***	9.74***	9.56***	8.98***	8.80***

Other variables included in the analysis are: PRIM_FIN, REL_PRIM, CCORP, SCORP, PARTNER, LNAGE, FRANCHIS, D6_NATN, D6_OUTSD, D6_REG, CHECKING, SAVING, NOT_HS, COLLEGE, EXPER, MANAGE, OWNSHR, TCUSE, IND_1, IND_3 - IND_9, MSA, REGION2 - REGION9, SOURCES

Key: ***Significance at the .01 level; **Significance at the .05 level; and *Significance at the .10 level.

TABLE 5

Credit Needs and Application Avoidance by Demographic Group

	All	White		Black		Hispanic		Asian	
		Males	Females	Males	Females	Males	Females	Males	Females
Percent of Firms that Desired Credit	48.8	48.8	44.5	69.9*	78.9*	60.2*	55.7	41.9	33.3*
Percent that Desired Credit that Feared Denial	49.9	45.7	50.4	84.1*	86.3*	63.6*	86.5*	61.1*	80.4*
Reasons for Fear of Denial									
Poor credit histories or finances	58.8	58.3	69.6*	50.5	55.7	53.7	35.0	56.4	51.7
Prejudice	4.6	3.1	5.2	19.8*	13.4*	4.9	4.9	1.1	3.8
Other reasons	44.1	43.3	41.4	42.3	46.0	52.1	63.4	48.9	51.4

NOTES:

1. A firm expressed a need for credit if it applied for a loan within the last three years or if it did not apply for a loan within the last three years because it feared that the application would be turned down.
2. Percentages are weighted to reflect population averages. Columns will not add up to 100 since firms were allowed to give up to three reasons for fearing denial.
3. An "*" signifies that the statistic is significantly different from the white male-owned firm value at the 95% level of confidence. Standard errors for these tests are calculated using 1,000 bootstrap sample and weight replicates.

TABLE 6

Dependent Variable

***FearDen*: Firm Did Not Apply, Fearing Denial**

	Model 1	Model 2	Model 3	Model 4	Model 5
Majority Ownership					
AFAM	1.491***	1.247***	1.160***	0.663	0.713
	(6.305)	(5.012)	(4.701)	(1.298)	(1.398)
HISPANIC	0.737***	0.714**	0.715**	1.086*	1.048*
	(2.652)	(2.469)	(2.413)	(1.916)	(1.870)
ASIAN	0.401	0.464	0.477	0.595	0.532
	(1.424)	(1.435)	(1.388)	(0.774)	(0.673)
FEMALE	0.061	0.001	-0.022	-0.599	-0.586
	(0.350)	(0.005)	(-0.114)	(-1.542)	(-1.511)
Market Structure					
HHI	0.552	0.503	0.600	-0.200	-0.138
	(0.714)	(0.589)	(0.692)	(-0.196)	(-0.136)
AFAM*HHI				2.816	2.482
				(1.034)	(0.913)
HISP*HHI				-1.886	-1.831
				(-0.715)	(-0.690)
ASN*HHI				-0.565	-0.236
				(-0.145)	(-0.059)
FML*HHI				2.757*	2.567*
				(1.780)	(1.654)
Financial Characteristics					
ASSETS	-0.338***	-0.355***	-0.349***	-0.351***	-0.352***
	(-5.282)	(-5.195)	(-5.143)	(-5.133)	(-5.180)
EMPLOY	-0.041	-0.041	-0.045	-0.040	-0.034
	(-0.494)	(-0.482)	(-0.530)	(-0.466)	(-0.398)
SALEASST	-0.014**	-0.011**	-0.009	-0.010*	-0.009
	(-2.385)	(-1.975)	(-1.602)	(-1.687)	(-1.507)
LIABASST	0.052	-0.027	-0.032	-0.026	-0.031
	(0.396)	(-0.275)	(-0.351)	(-0.282)	(-0.365)
PROFASST	-0.039	-0.040	-0.043	-0.042	-0.045
	(-0.968)	(-0.815)	(-0.876)	(-0.845)	(-0.934)
Credit History					
BANKRUPT		0.903**	0.907***	0.888**	0.808**
		(2.515)	(2.602)	(2.555)	(2.352)
PDELINQ1		0.748*	0.687*	0.708*	0.732*
		(1.759)	(1.714)	(1.771)	(1.813)
PDELINQ2		-0.018	-0.028	-0.043	-0.151
		(-0.043)	(-0.063)	(-0.100)	(-0.332)
PDELINQ3		0.918***	0.919***	0.920***	0.942***
		(3.420)	(3.446)	(3.439)	(3.483)
BDELINQ1		0.321	0.253	0.217	0.198
		(0.950)	(0.768)	(0.662)	(0.578)
BDELINQ2		1.826***	1.694***	1.693***	1.663***
		(5.215)	(4.683)	(4.720)	(4.653)
BDELINQ3		1.115***	0.915***	0.916***	0.790***
		(5.782)	(4.707)	(4.688)	(3.967)
JUDGMENT		0.764**	0.720**	0.710**	0.660*
		(2.334)	(2.219)	(2.163)	(1.923)
Credit Score					
CREDSCR			-0.010***	-0.010***	-0.009***
			(-3.789)	(-3.807)	(-3.634)
Denied Trade Credit					
DENTC					0.909***
					(3.305)
Number of obs	2609	2609	2609	2609	2609
F-statistic	7.15***	6.96***	7.05***	6.71***	6.57***

Other variables included in the analysis are: PRIM_FIN, REL_PRIM, CCORP, SCORP, PARTNER, LNAGE, FRANCHIS, D6_NATN, D6_OUTSD, D6_REG, CHECKING, SAVING, NOT_HS, COLLEGE, EXPER, MANAGE, OWNSHR, TCUSE, IND_1, IND_3 - IND_9, MSA, REGION2 – REGION9, SOURCES, LOAN2, EDENALL

Key: ***Significance at the .01 level; **Significance at the .05 level; and *Significance at the .10 level.

TABLE 7

Dependent Variable

***EverDen*: Firm Denied Credit Anytime Over the Past Three Years**

	Model 1	Model 2	Model 3	Model 4	Model 5
Majority Ownership					
AFAM	1.481***	1.151***	1.084***	-0.315	-0.249
	(6.055)	(4.476)	(4.131)	(-0.454)	(-0.364)
HISPANIC	0.412	0.368	0.351	-0.012	-0.052
	(1.190)	(1.055)	(1.012)	(-0.019)	(-0.077)
ASIAN	0.603*	0.579	0.575	1.577	1.295
	(1.775)	(1.535)	(1.424)	(1.454)	(1.135)
FEMALE	0.024	-0.055	-0.064	-1.389***	-1.406***
	(0.117)	(-0.253)	(-0.293)	(-2.865)	(-2.847)
Market Structure					
HHI	-0.362	-0.636	-0.537	-2.144*	-2.310*
	(-0.309)	(-0.518)	(-0.434)	(-1.722)	(-1.929)
AFAM*HHI				8.346**	7.909*
				(1.973)	(1.957)
HISP*HHI				1.975	2.292
				(0.676)	(0.788)
ASN*HHI				-5.549	-3.851
				(-0.994)	(-0.673)
FML*HHI				6.481***	6.407***
				(3.065)	(2.965)
Financial Characteristics					
ASSETS	-0.212***	-0.196***	-0.189***	-0.189***	-0.192***
	(-3.106)	(-2.747)	(-2.665)	(-2.645)	(-2.621)
EMPLOY	-0.014	-0.018	-0.021	-0.019	-0.037
	(-0.161)	(-0.191)	(-0.220)	(-0.198)	(-0.387)
SALEASST	0.000	0.005	0.006	0.005	0.007
	(0.046)	(0.487)	(0.623)	(0.492)	(0.719)
LIABASST	-0.065	-0.115*	-0.115	-0.094	-0.109
	(-1.061)	(-1.670)	(-1.599)	(-1.293)	(-1.383)
PROFASST	-0.008	-0.016	-0.019	-0.018	-0.019
	(-0.251)	(-0.550)	(-0.621)	(-0.610)	(-0.624)
Credit History					
BANKRUPT		1.149**	1.197**	1.196**	1.083**
		(2.378)	(2.498)	(2.407)	(2.039)
PDELINQ1		0.555	0.550	0.599	0.646
		(0.994)	(0.941)	(0.987)	(1.035)
PDELINQ2		0.499	0.482	0.452	0.266
		(0.948)	(0.891)	(0.821)	(0.451)
PDELINQ3		0.988***	0.971***	1.047***	1.014***
		(3.506)	(3.437)	(3.603)	(3.594)
BDELINQ1		0.423	0.380	0.222	0.140
		(0.999)	(0.909)	(0.537)	(0.317)
BDELINQ2		0.899**	0.751**	0.784**	0.767**
		(2.429)	(1.967)	(2.037)	(1.976)
BDELINQ3		0.589***	0.403*	0.395*	0.191
		(2.762)	(1.799)	(1.750)	(0.836)
JUDGMENT		0.673*	0.637*	0.621*	0.483
		(1.906)	(1.817)	(1.693)	(1.290)
Credit Score					
CREDSCR			-0.009***	-0.009***	-0.009***
			(-3.245)	(-3.261)	(-3.078)
Denied Trade Credit					
DENTC					1.317***
					(4.867)
Number of obs	1985	1985	1985	1985	1985
F-statistic	3.68***	3.83***	3.86***	3.75***	3.82***

Other variables included in the analysis are: PRIM_FIN, RELPRIM2, CCORP, SCORP, PARTNER, LNAGE2, FRANCHIS, D6_NATN, D6_OUTSD, D6_REG, CHECKING, SAVING, NOT_HS, COLLEGE, EXPER, MANAGE, OWNSHR, TCUSE, IND_1, IND_3 - IND_9, MSA, REGION2 – REGION9, SOURCES, LOAN4

Key: ***Significance at the .01 level; **Significance at the .05 level; and *Significance at the .10 level.

TABLE 7B

Dependent Variable

***EverDen2*: Whether Firms Expressed Credit Needs Anytime Over the Past Three Years**

	Model 1	Model 2	Model 3	Model 4	Model 5
Majority Ownership					
AFAM	1.440***	1.165***	1.106***	-0.095	-0.051
	(6.097)	(4.793)	(4.484)	(-0.154)	(-0.085)
HISPANIC	0.659**	0.630**	0.623**	0.347	0.317
	(2.354)	(2.304)	(2.328)	(0.730)	(0.617)
ASIAN	0.737***	0.780***	0.783**	1.667**	1.577**
	(2.620)	(2.599)	(2.496)	(2.535)	(2.346)
FEMALE	-0.033	-0.089	-0.104	-1.479***	-1.463***
	(-0.192)	(-0.485)	(-0.562)	(-3.235)	(-3.207)
Market Structure					
HHI	0.082	0.164	0.231	-1.650	-1.600
	(0.086)	(0.167)	(0.232)	(-1.481)	(-1.441)
AFAM*HHI				7.186*	6.761*
				(1.924)	(1.957)
HISP*HHI				1.501	1.564
				(0.623)	(0.633)
ASN*HHI				-4.976	-4.440
				(-1.560)	(-1.366)
FML*HHI				6.847***	6.699***
				(3.084)	(3.003)
Financial Characteristics					
ASSETS	-0.290***	-0.288***	-0.282***	-0.283***	-0.284***
	(-5.494)	(-5.300)	(-5.174)	(-5.165)	(-5.082)
EMPLOY	-0.063	-0.064	-0.072	-0.070	-0.069
	(-0.902)	(-0.872)	(-0.967)	(-0.944)	(-0.931)
SALEASST	0.003	0.006	0.008	0.007	0.009
	(0.465)	(0.930)	(1.202)	(1.114)	(1.352)
LIABASST	-0.041	-0.092***	-0.098***	-0.096***	-0.098***
	(-1.146)	(-2.685)	(-2.775)	(-2.868)	(-2.980)
PROFASST	-0.012	-0.020	-0.021	-0.020	-0.022
	(-0.376)	(-0.727)	(-0.786)	(-0.769)	(-0.791)
Credit History					
BANKRUPT		1.308***	1.324***	1.313***	1.251***
		(3.584)	(3.666)	(3.484)	(3.301)
PDELINQ1		0.677	0.620	0.670	0.684
		(1.401)	(1.239)	(1.293)	(1.325)
PDELINQ2		0.576	0.527	0.462	0.361
		(1.111)	(1.011)	(0.883)	(0.690)
PDELINQ3		1.106***	1.085***	1.126***	1.126***
		(4.293)	(4.170)	(4.215)	(4.277)
BDELINQ1		0.366	0.314	0.200	0.164
		(1.028)	(0.891)	(0.570)	(0.455)
BDELINQ2		0.851**	0.743**	0.753**	0.697**
		(2.514)	(2.136)	(2.136)	(1.969)
BDELINQ3		0.585***	0.425**	0.425**	0.282
		(3.136)	(2.187)	(2.145)	(1.409)
JUDGMENT		0.946***	0.901***	0.905***	0.820***
		(3.260)	(3.101)	(3.014)	(2.718)
Credit Score					
CREDSCR			-0.008***	-0.008***	-0.008***
			(-3.133)	(-3.173)	(-2.924)
Denied Trade Credit					
DENTC					1.023***
					(3.995)
Number of obs	2609	2609	2609	2609	2609
F-statistic	6.97***	6.94***	6.97***	6.71***	6.70***

Other variables included in the analysis are: PRIM_FIN, RELPRIM2, CCORP, SCORP, PARTNER, LNAGE2, FRANCHIS, D6_NATN, D6_OUTSD, D6_REG, CHECKING, SAVING, NOT_HS, COLLEGE, EXPER, MANAGE, OWNSHR, TCUSE, IND_1, IND_3 - IND_9, MSA, REGION2 – REGION9, SOURCES, LOAN4

Key: ***Significance at the .01 level; **Significance at the .05 level; and *Significance at the .10 level.

TABLE 8

Dependent Variable

***DenMRL*: Firms Denied for Most Recent Loan Application**

	Model 1	Model 2	Model 3	Model 4	Model 5
Majority Ownership					
AFAM	1.090***	0.717***	0.663**	-0.122	-0.069
	(4.115)	(2.695)	(2.447)	(-0.202)	(-0.107)
HISPANIC	-0.043	-0.096	-0.111	-0.137	-0.117
	(-0.111)	(-0.231)	(-0.269)	(-0.201)	(-0.171)
ASIAN	0.449	0.457	0.500	3.018**	2.817**
	(1.177)	(1.062)	(1.115)	(2.517)	(2.192)
FEMALE	0.302	0.187	0.181	-1.241**	-1.229**
	(1.262)	(0.743)	(0.723)	(-2.553)	(-2.527)
Market Structure					
HHI	0.889	0.869	0.961	-0.953	-0.996
	(0.686)	(0.606)	(0.673)	(-0.658)	(-0.728)
AFAM*HHI				4.520	4.438
				(1.409)	(1.288)
HISP*HHI				0.264	0.392
				(0.089)	(0.136)
ASN*HHI				-14.646**	-13.379*
				(-2.262)	(-1.959)
FML*HHI				6.777***	6.613***
				(3.379)	(3.274)
Financial Characteristics					
ASSETS	-0.222**	-0.208**	-0.202**	-0.215**	-0.205**
	(-2.446)	(-2.263)	(-2.202)	(-2.267)	(-2.179)
EMPLOY	-0.019	-0.054	-0.055	-0.051	-0.087
	(-0.155)	(-0.402)	(-0.410)	(-0.368)	(-0.637)
SALEASST	0.001	0.006	0.006	0.004	0.007
	(0.059)	(0.496)	(0.550)	(0.315)	(0.589)
LIABASST	-0.091	-0.134*	-0.128*	-0.112	-0.115
	(-1.196)	(-1.723)	(-1.651)	(-1.414)	(-1.439)
PROFASST	-0.048	-0.054*	-0.058*	-0.056*	-0.060*
	(-1.605)	(-1.757)	(-1.892)	(-1.794)	(-1.902)
Credit History					
BANKRUPT		1.485***	1.531***	1.566***	1.432**
		(2.917)	(2.933)	(2.922)	(2.521)
PDELINQ1		-0.199	-0.228	-0.220	-0.251
		(-0.375)	(-0.430)	(-0.434)	(-0.489)
PDELINQ2		0.498	0.477	0.439	0.197
		(1.078)	(1.051)	(0.976)	(0.410)
PDELINQ3		0.801**	0.796**	0.860**	0.808**
		(2.421)	(2.397)	(2.504)	(2.315)
BDELINQ1		1.085**	1.047**	0.940*	0.929*
		(2.026)	(1.966)	(1.799)	(1.757)
BDELINQ2		0.819*	0.695*	0.736*	0.710
		(1.944)	(1.653)	(1.689)	(1.626)
BDELINQ3		0.863***	0.703***	0.728***	0.537*
		(3.351)	(2.630)	(2.720)	(1.943)
JUDGMENT		0.542	0.501	0.502	0.364
		(1.508)	(1.371)	(1.329)	(0.932)
Credit Score					
CREDSCR			-0.008**	-0.008**	-0.008**
			(-2.324)	(-2.319)	(-2.177)
Denied Trade Credit					
DENTC					1.141***
					(4.037)
Number of obs	1985	1985	1985	1985	1985
F-statistic	3.14***	3.68***	3.57***	3.46***	3.55***

Other variables included in the analysis are: FIN_JBNK, REL_JBNK, CCORP, SCORP, PARTNER, LNAGE2, FRANCHIS, D6_NATN, D6_OUTSD, D6_REG, CHECKING, SAVING, NOT_HS, COLLEGE, EXPER, MANAGE, OWNSHR, TCUSE, IND_1, IND_3 - IND_9, MSA, REGION2 — REGION9, LOAN4, J5_ASST, MRL_LOC, MRL_MV, MRL_OTH, MRL_LEAS, MRL_MRTG, USE_MRL, LEND_SRC, MRL_PRIM, MRL_9394

Key: ***Significance at the .01 level; **Significance at the .05 level; and *Significance at the .10 level.

TABLE 9

Dependent Variable

***IntRate*: Interest Rate on Most Recent Loan**

	Model 1	Model 2	Model 3	Model 4	Model 5
Majority Ownership					
AFAM	0.251	0.268	0.193	1.965	1.938
	(0.598)	(0.616)	(0.446)	(1.609)	(1.580)
HISPANIC	0.081	0.058	0.053	-1.177	-1.176
	(0.244)	(0.174)	(0.163)	(-1.490)	(-1.494)
ASIAN	0.325	0.253	0.210	-0.121	-0.049
	(1.155)	(0.878)	(0.741)	(-0.189)	(-0.074)
FEMALE	-0.239	-0.242	-0.267	0.854*	0.870*
	(-1.172)	(-1.181)	(-1.327)	(1.938)	(1.948)
Market Structure					
HHI	0.956	1.207	1.332	1.739*	1.735*
	(1.118)	(1.410)	(1.575)	(1.943)	(1.939)
AFAM*HHI				-10.715*	-10.458*
				(-1.800)	(-1.744)
HISP*HHI				6.288	6.256
				(1.398)	(1.396)
ASN*HHI				1.586	1.229
				(0.489)	(0.371)
FML*HHI				-5.504***	-5.532***
				(-2.847)	(-2.828)
Financial Characteristics					
ASSETS	0.058	0.038	0.047	0.055	0.057
	(0.566)	(0.415)	(0.505)	(0.594)	(0.625)
EMPLOY	-0.090	-0.094	-0.096	-0.110	-0.112
	(-1.033)	(-1.124)	(-1.148)	(-1.334)	(-1.361)
SALEASST	0.001	-0.001	0.000	0.003	0.003
	(0.106)	(-0.134)	(0.002)	(0.305)	(0.325)
LIABASST	0.241**	0.238***	0.238**	0.229**	0.230**
	(2.517)	(2.668)	(2.570)	(2.493)	(2.509)
PROFASST	-0.008	-0.001	-0.005	-0.005	-0.006
	(-0.382)	(-0.032)	(-0.215)	(-0.242)	(-0.264)
Credit History					
BANKRUPT		0.365	0.446	0.441	0.471
		(0.670)	(0.855)	(0.849)	(0.891)
PDELINQ1		-1.721**	-1.697**	-1.643**	-1.662**
		(-2.309)	(-2.286)	(-2.291)	(-2.305)
PDELINQ2		0.294	0.268	0.347	0.376
		(0.694)	(0.615)	(0.794)	(0.880)
PDELINQ3		-0.229	-0.216	-0.215	-0.209
		(-0.634)	(-0.603)	(-0.607)	(-0.593)
BDELINQ1		0.154	0.090	0.133	0.140
		(0.263)	(0.153)	(0.227)	(0.239)
BDELINQ2		-0.451	-0.626*	-0.638*	-0.628*
		(-1.198)	(-1.727)	(-1.775)	(-1.730)
BDELINQ3		0.158	-0.066	-0.056	-0.019
		(0.711)	(-0.291)	(-0.247)	(-0.079)
JUDGMENT		0.461	0.425	0.479	0.469
		(0.548)	(0.513)	(0.574)	(0.562)
Credit Score					
CREDSCR			-0.010***	-0.010***	-0.010***
			(-3.770)	(-3.728)	(-3.840)
Denied Trade Credit					
DENTC					-0.278
					(-0.772)
Number of obs	1682	1682	1682	1682	1682
F-statistic	3.62***	3.58***	3.62***	3.60***	3.61***
Adjusted R^2	0.20	0.20	0.21	0.22	0.22

Other variables included in the analysis are: FIN_JBNK, REL_JBNK, CCORP, SCORP, PARTNER, LNAGE2, FRANCHIS, D6_NATN, D6_OUTSD, D6_REG, CHECKING, SAVING, NOT_HS, COLLEGE, EXPER, MANAGE, OWNSHR, TCUSE, IND_1, IND_3 - IND_9, MSA, REGION2 – REGION9, BONDSPRD, TERMPREM, MRL_INDX, FIXED, PCOL, BCOL, GUAR, MRL_LOC, MRL_MV, MRL_OTH, MRL_LEAS, MRL_MRTG, LEND_SRC, LOAN4, MRL_9394, MRL_PRIM, EDENALL, INVMAT, LNAMTBRR, POINTS, FEE_AMT

Key: ***Significance at the .01 level; **Significance at the .05 level; and *Significance at the .10 level.

TABLE 10

Lines of Credit

	HAVELOC Model 4	APPLYLOC Model 3	DENLOC Model 4	RATELOC Model 4
Majority Ownership				
AFAM	-0.166	0.017	-2.038*	-0.656
	(-0.553)	(0.097)	(-1.660)	(-1.060)
HISPANIC	0.933**	-0.072	-0.240	-2.124**
	(2.164)	(-0.301)	(-0.193)	(-2.156)
ASIAN	-0.214	-0.526**	3.402	0.605
	(-0.551)	(-2.313)	(1.235)	(0.932)
FEMALE	0.400	-0.110	-1.648*	0.330
	(1.458)	(-0.763)	(-1.753)	(0.637)
Market Structure				
HHI	0.812	-0.054	-2.228	-0.995
	(1.382)	(-0.094)	(-1.023)	(-1.238)
AFAM*HHI	0.876		17.418***	1.602
	(0.597)		(2.576)	(0.550)
HISP*HHI	-2.957		-2.861	12.396**
	(-1.402)		(-0.414)	(2.211)
ASN*HHI	-2.450		-17.709	-1.017
	(-1.381)		(-1.108)	(-0.253)
FML*HHI	-2.476**		6.760*	-1.433
	(-2.123)		(1.657)	(-0.589)
Financial Characteristics				
ASSETS	0.332***	0.319***	-0.495***	0.004
	(7.784)	(7.111)	(-2.632)	(0.035)
EMPLOY	0.194***	0.144**	0.090	-0.139
	(3.572)	(2.432)	(0.379)	(-1.689)
SALEASST	0.007	0.009*	0.004	-0.006
	(1.304)	(1.815)	(0.262)	(-0.858)
LIABASST	0.152**	0.204***	-0.057	0.335***
	(2.170)	(2.759)	(-0.453)	(4.039)
PROFASST	-0.011	-0.001	-0.032	-0.010
	(-0.554)	(-0.120)	(-0.623)	(-0.540)
Credit History				
BANKRUPT	-0.535	-0.157	1.421	1.205*
	(-1.471)	(-0.413)	(1.096)	(1.935)
PDELINQ1	-0.691*	-0.778*	1.365*	0.130
	(-1.899)	(-1.915)	(1.696)	(0.236)
PDELINQ2	-0.119	-0.456	-0.105	0.916**
	(-0.366)	(-1.240)	(-0.147)	(2.497)
PDELINQ3	-0.431**	0.182	0.968*	0.355
	(-2.004)	(0.831)	(1.795)	(1.050)
BDELINQ1	-0.062	0.050	1.563*	-0.199
	(-0.223)	(0.173)	(1.802)	(-0.391)
BDELINQ2	-0.095	0.153	1.406***	0.052
	(-0.360)	(0.572)	(2.681)	(0.160)
BDELINQ3	0.320*	0.037	0.618	-0.428**
	(1.832)	(0.204)	(1.415)	(-2.055)
JUDGMENT	-0.166	-0.478*	-0.540	-0.495
	(-0.682)	(-1.699)	(-0.927)	(-0.983)

TABLE 10 (continued)

Credit Score				
CREDSCR	0.002	0.000	-0.012**	-0.007***
	(0.921)	(0.026)	(-2.020)	(-2.918)
Number of obs	4570	4570	1126	1001
F-statistic	9.09***	8.60***	3.01***	8.77***
Adjusted R2				0.31

[1] Other variables included in the analysis are: PRIM_FIN, REL_PRIM, CCORP, SCORP, PARTNER, LNAGE, FRANCHIS, D6_NATN, D6_OUTSD, D6_REG, CHECKING, SAVING, NOT_HS, COLLEGE, EXPER, MANAGE, OWNSHR, TCUSE, IND_1, IND_3 - IND_9, MSA, REGION2 – REGION9, SOURCES, EDENALL, FEARDEN2

[2] Other variables included in the analysis are: PRIM_FIN, REL_PRIM, CCORP, SCORP, PARTNER, LNAGE, FRANCHIS, D6_NATN, D6_OUTSD, D6_REG, CHECKING, SAVING, NOT_HS, COLLEGE, EXPER, MANAGE, OWNSHR, TCUSE, IND_1, IND_3 - IND_9, MSA, REGION2 – REGION9, SOURCES

[3] Other variables included in the analysis are: FIN_JBNK, REL_JBNK, CCORP, SCORP, PARTNER, LNAGE2, FRANCHIS, D6_NATN, D6_OUTSD, D6_REG, CHECKING, SAVING, NOT_HS, COLLEGE, EXPER, MANAGE, OWNSHR, TCUSE, IND_1, IND_3 - IND_9, MSA, REGION2 – REGION9, LOAN4, J5_ASST, USE_MRL, LEND_SRC, MRL_PRIM, MRL_9394

[4] Other variables included in the analysis are: FIN_JBNK, REL_JBNK, CCORP, SCORP, PARTNER, LNAGE2, FRANCHIS, D6_NATN, D6_OUTSD, D6_REG, CHECKING, SAVING, NOT_HS, COLLEGE, EXPER, MANAGE, OWNSHR, TCUSE, IND_1, IND_3 - IND_9, MSA, REGION2 – REGION9, BONDSPRD, TERMPREM, MRL_INDX, FIXED, PCOL, BCOL, GUAR, LEND_SRC, LOAN4, MRL_9394, MRL_PRIM, EDENALL, INVMAT, LNAMTBRR, POINTS, FEE_AMT

Key: ***Significance at the .01 level; **Significance at the .05 level; and *Significance at the .10 level.

TABLE 11

Summary of Results

Summary of Results

		African American	Hispanic	Asian	Female	HHI	AFAM*HHI	Hisp*HHI	Asian*HHI	Female*HHI
All Loans	Model									
Loan	3	-	+	-*	-	+				
	4	-	+	-	-	+	-	-	-	+
Apply	3	+	+	-**	-	-				
	4	+	-	-	-	+	-	+	+	+
FearDen	3	+***	+**	+	-	+				
	4	+[a]	+*	+	-	-	+[a]	-	-	+*
EverDen	3	+***	+	+	-	-				
	4	-	-	+	-***	-*	+**	+	-	+***
EverDen2	3	+***	+**	+**	-	+				
	4	-[a]	+[c]	+**[b]	-***[a]	-	+*[a]	+[c]	-[b]	+***[a]
DenMRL	3	+**	-	+	+	+				
	4	-[b]	-	+**[b]	-**[a]	-	+[b]	+	-**[b]	+***[a]
IntRate	3	+	+	+	-	+				
	4	+	-	-	+*[a]	+*	-*	+	+	-***[a]
Lines of Credit										
HAVELOC	3	-	+*	-***	-	+				
	4	-	+**	-	+	+	+	-	-	-**
APPLYLOC	3	+	-	-**	-	-				
	4	+	+	-[b]	+	+	-	-	-[b]	-
DENLOC	3	+**	-	+	-	-				
	4	-*[a]	-	+	-*	-	+***[a]	-	-	+*
RATELOC	3	-	+	+	+	-				
	4	-	-**[c]	+	+	-	+	+**[c]	-	-

[a, b, c] Demographic dummy and demographic interaction with HHI is jointly significant at the 1%, 5%, and 10% level.

Notes

[1] The 1993 NSSBF collected data on six loan types: lines of credit, capital leases, business mortgages, equipment loans, vehicle loans, and "other" loans. Lines of credit were the most widely held loan type. About 60 percent of small businesses reported one or more loans. Approximately 25 percent of small businesses reported one or more outstanding lines of credit in 1993 and 52 percent of the most recent loans were lines of credit.

[2] For a complete description of the variables included in our model, see Table 3 and Appendix C.

[3] Because of potential concerns with the independence of credit quality and market structure, we examine the relationship between the Dun and Bradstreet credit score (CREDSCR) and the level of bank competition (HHI). Although these variables are correlated, the correlation coefficient is only .0567. A regression model of HHI and CREDSCR predicts that a 100 percentage point increase in the CREDSCR variable (a change that spans the range of CREDSCR) is associated with only a .02132 increase in HHI.

[4] From the original total of 4,637 observations, we drop 35 minority businesses that were owned either by Native Americans or owners of mixed / multiple races, 4 that reported zero assets and 28 others that were missing data on one of several key explanatory variables. Eighteen of these observations were missing credit scores. Additionally, the final sample included 6 firms whose owners were African American and Hispanic, and 4 firms whose owners were Asian and Hispanic.

[5] Standard errors and statistical significance for these statistics are calculated using 1,000 bootstrap samples. Statistics for minority-female owned businesses should be interpreted cautiously due to small sample size. Cells containing fewer than 16 observations are not reported.

[6] A fifth analysis that focuses on loans held is contained in Appendix A.

[7] Our denial analyses examine three different dependent variables: 1) whether the firm has been turned down for credit anytime within the past three years, 2) whether the firm has either been turned down for credit or did not apply for fear of being turned down, and 3) whether the firm was turned down on its most recent loan request. Each aspect is discussed, in turn, below.

[8] Loan application dates span the 1990-1994 period. Most of the recent loans were applied for during 1992 and 1993.

[9] Though Cavalluzzo and Cavalluzzo (1998) provide an indirect test for feedback effects.

[10] Alternatively, discriminators may, because of fear of detection, simply "raise the bar" for particular classes of applicants, driving those applicants to other (nondiscriminatory) lenders. In this case, given risk attributes and market conditions, interest rate differentials may not be observed across demographic groups.

[11] The interest rate models control for, among other things, points and fees paid to close the loan (POINTS, FEE_AMT), whether the loan was fixed or variable (FIXED), maturity (INVMAT), term structure (TERMPREM), a small firm risk premium (BONDSPRD), and the prevailing market interest rate at the time of the loan (MRL_INDX). In these models, length of relationship (REL_JBNK) and firm age (LNAGE2) are adjusted to the loan application date. For details, see Table 3.

[12] HHI is computed based on FDIC summary of deposit data and ranges from one to 10,000. We rescale this index, placing it on a zero to one scale to ease interpretability. The rescaled mean value of HHI in the banking markets used by small businesses in our data set is 0.2018, and ranges from 0.0661 to 0.8215 in MSAs and from 0.1005 to 1.0 in non-metropolitan areas.

[13] The full set of coefficient estimates for Model 4 (full specification) for each dependent variable is presented in Appendix E.

[14] For the applied, denied, and interest rate analyses, length of relationship and age of firm are adjusted to reflect the value of these variables at the time the loan application was made.

[15] The mean predicted probability that a firm owned by a White male applied for credit is 35 percent vs. 27 percent for Asian males. Probability estimates are computed for each observation in the sample, assuming the observation has the characteristic of interest. In this case, they are computed twice, first assuming every observation is a firm owned by an Asian male and second assuming every observation is a firm owned by a White male. Unless otherwise stated, all race and ethnicity point estimates pertain to males and female point estimates refer to firms owned by White females.

[16] The analysis is also consistent with results reported in Appendix A on the propensity to have credit.

[17] In model 1, the predicted probability of not applying for credit at least once over the past three years due to fear of denial for African American (Hispanic) males is 73.36 (60.87) percent vs. 47.98 percent for White males.

[18] Robustness checks restricting the sample to firms located in MSAs resulted in an insignificant coefficient on the AFAM* HHI interaction term. In contrast, FEMALE interacted with HHI remains consistent for firms located in urban areas. Urban businesses accounted for about 80 percent of the sample. For results from sensitivity tests on Model 4, see Appendix B.

[19] The Department of Justice and Federal Reserve System use 0.18 as their indicator of a highly concentrated market in their merger analysis, potentially rejecting merger applications in situations which create a Herfindahl index exceeding 0.18. As such, we also provide estimates of the probability of denial for each demographic group at this level of concentration.

[20] And at the Department of Justice cutoff of 0.18, the differences in the probability of denial were 0.28 vs. 0.50 for White male- and African American-owned firms, respectively.

[21] Note that this information would also have to be correlated with lender market structure in order for it to have an impact on the results in Model 4.

[22] The results for African-American owned businesses varied across the samples used for sensitivity testing (Appendix B). African American interacted with HHI became insignificant when the sample was restricted to urban firms.

[23] These HHI levels reflect the 90th percentiles for African American male and White female-owned firms respectively.

[24] Varying the population of small businesses did not change key results. Coefficients on the interaction between African Americans, females, and HHI were large, positive, and for females, statistically significant at the one percent

level. Results using a binary HHI in place of the continuous measure still shared the same sign on the interaction terms, however, the reported level of significance was greatly diminished (see Appendix B for details).

[25] Presented results are based on a weighted least squares regression controlling for the sampling design of the NSSBF data set. We also estimated a two-stage Heckman type selection model (1979) with the first stage estimating the probability of having a loan. The correlation of the residuals between the two equations was insignificant suggesting the Heckman correction was unnecessary (Stromsdorfer and Farkas, 1980).

[26] A Wald test on the joint significance of the eight credit history variables indicated that the set of variables was statistically insignificant.

[27] Ten percent of African American-owned businesses were in banking markets with HHI equal to 0.0847 or less. Another 10 percent were located in markets with commercial bank concentration levels of 0.2245 or more.

[28] The behavior of interest rates across markets and demographic group in our battery of sensitivity tests followed a pattern similar to that in Column 4 of Table 9, but at varying levels of magnitude and statistical significance. Market concentration had a statistically positive effect on interest rates charged across all specifications. While African American- and female-owned businesses paid more than those owned by White males at high levels of competition, their rates declined as concentration increased (see Appendix B for details).

[29] We estimated these regressions twice, with and without MSA controls. Coefficients on the interaction terms were insensitive to the MSA controls.

[30] We tested the sensitivity of our equation to two alternative definitions of our dependent variable. In particular, we looked at whether the firm was more likely to stay in its local MSA or county, and the distance between a firm and its lending institution. None of these alternative specifications indicated that lender market concentration motivated minority or female owned businesses to obtain loans outside their local MSA or county, or at a greater distance than the firm's headquarters, than businesses owned by White males.

[31] EverDen is excluded from the line of credit analyses due to data limitations.

[32] Moreover, after removing rural markets (i.e., the most concentrated markets) from the estimation, evidence that interest rates were statistically related to market concentration vanished.

[33] We included loans from owners in our series of robustness checks. Reported results were insensitive to including owner loans in our definition of *Loan*.

[34] Although the Asian coefficient loses significance in Model 4, the Asian effect remains significant in a joint test of Asian and Asian interacted with the HHI.

[35] Though not presented in the tables, we also used a logarithmic specification of HHI. Results with the natural log of HHI were very similar to the untransformed value of HHI.

[36] We test the specification of PROFASST with PROFINT, defined as operating profits and interest expense relative to total assets, in our robustness checks. Including interest expense in the numerator of our profit measure controls for differences in profitability due to differences in capital structure across firms (Foster, 1986, p 67). Our results were insensitive to this alternative specification.

[37] Where appropriate, we adjust LNAGE to reflect the age of the firm at the particular event date. For example, in the analyses that focus on the most recent loan, we define age of the firm at the time of the most recent loan, rather than the survey date (LNAGE2).

[38] The 'length of relationship' variables are adjusted to reflect the relationship length at the time of the particular event, such as the date of the most recent loan (RELPRIM2). Relationship length is defined on the data set only for financial institutions. Firms with no relationship with financial institutions were set to zero and a shift term was included to identify these observations.

[39] Because of potential concerns with the independence of credit quality and market structure, we examine the relationship between the Dun & Bradstreet credit score (CREDSCR) and the level of bank competition (HHI). Although these variables are correlated, the correlation coefficient is only .0567. A regression model of HHI and CREDSCR predicts that a 100 percentage point increase in the CREDSCR variable (a change that spans the range of CREDSCR) is associated with only a .02132 increase in HHI.

[40] Some, but not all, of the variables in this section are also appropriate for the denied most recent loan analysis. See Table 8.

[41] In practice, many of the variable rate loans were also tied to the prime, making 80 percent of these values the prime rate.

[42] Due to the presence of outliers, POINTS and FEE_AMT were Winsorized at the 99th percentile (Andrews, et. al, 1972).

[43] Other loan variables related to the most recent loan include J5_ASST, the size of the firm's loan request relative to assets to control for the reasonableness of the request (only for DenMRL analysis), MRL_PRIM to control for whether the most recent loan was with the firm's primary institution, and MRL_9394, to control for whether the loan was granted in either 1993 or 1994.

[44] Robustness checks included using an indicator variable for HHI, with both 0.1800 and 0.2300 cut-offs, in addition to the log of HHI.

[45] The models use nine industry groups (IND_1-IND_9).

[46] We also estimated separate minority female indicators and interactions with HHI. There was no evidence of separate minority female effects.

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APPENDICES

Appendix A: Loan Analysis

We define *Loan* equal to one if a firm has at least one loan that was initiated under current ownership, zero otherwise. *Loan* includes lines of credit, capital leases, equipment loans, mortgages, motor vehicle loans and other loans the firm may have. Loans from owners are excluded.[33] Our loan analysis is intended to provide an initial look at the characteristics of firms that hold loans. Differences in the probability of holding a loan across demographic groups, all else equal, may be attributable to a variety of causes, including differences in preferences for financial risk that correlate with demographic characteristics, differences in owner expectations concerning the application process, or differences in lender willingness to extend credit, among others.

Findings

Table A-1 presents coefficients from a logit model that estimates the probability that a firm will hold a loan. All else equal, we find no statistically significant difference in the propensity of female-, Hispanic-, or African American-owned firms to hold loans relative to firms owned by White males. Using a ten-percent criterion for statistical significance, Asian-owned firms are less likely than others to have loans (*Loan* Models 1-3).[34] We find no overall effect of market concentration on the likelihood that small businesses hold loans; "HHI" is statistically insignificant. *Loan* Model 4 adds interaction terms between lender market concentration and the demographic variables. None of the interaction terms are significant. At this stage of our inquiry, we have little evidence to suggest that demographic attributes of the borrower limit access to credit.

Financial attributes that are positively associated with the likelihood that a firm will hold a loan include the level of assets, the level of employment, and the ratio of liabilities to assets. Among credit history variables, only firms with three or more delinquencies on business obligations in excess of 60 days is statistically associated with loan holdings. The addition of the Dun and Bradstreet credit score has no independent influence on the propensity that a firm will hold a loan. Likewise, having been denied trade credit has no independent influence on the propensity to hold a loan.

TABLE A-1

Dependent Variable

Loan: Firm Has Loans

	Model 1	Model 2	Model 3	Model 4	Model 5
Majority Ownership					
AFAM	-0.216	-0.156	-0.139	-0.107	-0.108
	(-1.365)	(-0.951)	(-0.846)	(-0.375)	(-0.378)
HISPANIC	0.134	0.153	0.163	0.520	0.517
	(0.654)	(0.741)	(0.789)	(1.532)	(1.525)
ASIAN	-0.397*	-0.374*	-0.370*	-0.270	-0.271
	(-1.885)	(-1.787)	(-1.761)	(-0.660)	(-0.663)
FEMALE	-0.006	-0.021	-0.018	-0.066	-0.065
	(-0.053)	(-0.169)	(-0.150)	(-0.262)	(-0.256)
Market Structure					
HHI	0.105	0.050	0.057	0.181	0.183
	(0.189)	(0.091)	(0.105)	(0.283)	(0.287)
AFAM*HHI				-0.166	-0.165
				(-0.126)	(-0.126)
HISP*HHI				-1.804	-1.796
				(-1.202)	(-1.198)
ASN*HHI				-0.542	-0.535
				(-0.254)	(-0.251)
FML*HHI				0.239	0.236
				(0.225)	(0.222)
Financial Characteristics					
ASSETS	0.342***	0.340***	0.337***	0.336***	0.336***
	(7.813)	(7.728)	(7.627)	(7.611)	(7.617)
EMPLOY	0.158**	0.147**	0.148**	0.149**	0.149**
	(2.468)	(2.294)	(2.308)	(2.322)	(2.321)
SALEASST	-0.004	-0.004	-0.004	-0.004	-0.004
	(-0.671)	(-0.659)	(-0.734)	(-0.730)	(-0.721)
LIABASST	0.361**	0.369**	0.372**	0.371**	0.370**
	(2.293)	(2.416)	(2.443)	(2.434)	(2.428)
PROFASST	-0.004	-0.004	-0.003	-0.003	-0.003
	(-0.388)	(-0.338)	(-0.288)	(-0.285)	(-0.285)
Credit History					
BANKRUPT		-0.452	-0.446	-0.447	-0.449
		(-1.353)	(-1.328)	(-1.324)	(-1.332)
PDELINQ1		-0.314	-0.295	-0.269	-0.268
		(-1.066)	(-1.008)	(-0.919)	(-0.916)
PDELINQ2		-0.239	-0.230	-0.225	-0.228
		(-0.730)	(-0.702)	(-0.687)	(-0.696)
PDELINQ3		-0.384	-0.378	-0.376	-0.377
		(-1.631)	(-1.609)	(-1.598)	(-1.600)
BDELINQ1		-0.066	-0.053	-0.065	-0.065
		(-0.225)	(-0.183)	(-0.223)	(-0.224)
BDELINQ2		0.283	0.304	0.299	0.297
		(1.055)	(1.136)	(1.118)	(1.110)
BDELINQ3		0.568***	0.598***	0.598***	0.595***
		(2.754)	(2.902)	(2.904)	(2.859)
JUDGMENT		-0.314	-0.306	-0.312	-0.314
		(-1.247)	(-1.223)	(-1.245)	(-1.252)
Credit Score					
CREDSCR			0.002	0.002	0.002
			(1.220)	(1.208)	(1.214)
Denied Trade Credit					
DENTC					0.051
					(0.202)
Number of obs	4570	4570	4570	4570	4570
F-statistic	11.22***	9.57***	9.45***	8.85***	8.73***

Other variables included in the analysis: PRIM_FIN, REL_PRIM, CCORP, SCORP, PARTNER, LNAGE, FRANCHIS, D6_NATN, D6_OUTSD, D6_REG, CHECKING, SAVING, NOT_HS, COLLEGE, EXPER, MANAGE, OWNSHR, TCUSE, IND_1, IND_3 - IND_9, MSA, REGION2 – REGION9, SOURCES, EDENALL, FEARDEN2

Key: ***Significance at the .01 level; **Significance at the .05 level; and *Significance at the .10 level.

Appendix B: Sensitivity Tests

In addition to the models described in the main text, we test the sensitivity of our results to inclusion of particular segments of the population in our sample. We present estimates of both Model 3 (without herf-demographic interactions) and Model 4 (the full specification) using several different criteria for sample selection. Using the full data set as a benchmark, we first exclude firms with over $10 million dollars in assets. One reason for this selection criterion is that while the NSSBF classifies small firms as those with fewer than 500 employees, our discussions with banks indicate that they consider firms with over $10 million in sales to be medium sized firms. As a result, these firms may face different benchmarks for credit approval than smaller firms. In addition, larger firms tend to have multiple owners, and these owners needn't be from the same demographic group. Finally, few minority- or female-owned firms in our sample have over $10 million dollars in sales. While this selection criterion reduces sample size by almost 10 percent, most of the omitted firms are owned by White males.

A second subsample considers only those firms that have their headquarters in a MSA. A drawback of this subsample is that it excludes all of the firms that operate in markets with commercial bank monopolies (i.e., those rural counties that have only one commercial bank). Although this exclusion weakens our ability to draw strong conclusions from our test for heightened levels of prejudicial discrimination in concentrated markets, this sample presents an interesting opportunity as well. Since lenders who operate in non-metropolitan areas are likely to be smaller, these institutions may provide managers with more freedom to exercise independent (and possibly discriminatory) rules or preferences in lending. In contrast, banks located in MSA's may be guided by more centralized (and presumably more objective) lending rules.

Our third subsample incorporates both of the criteria described above. A fourth set of results returns to the full sample, but uses a binary specification for HHI, where values of HHI equal to or greater than 0.18 are considered concentrated and set equal to one.[35] Our fifth set of results is based on the full *unweighted* sample. Unlike our previous analyses, which make use of weights that adjust for the stratified design of the survey, these results reflect the actual composition of firms in the sample. Predictions derived from this model are appropriate for the sample, but they cannot be generalized to the full population of small businesses.

Findings

This section explores the sensitivity of reported results to inclusion of specific segments of the population.

Ever Denied (EverDen)

Excluding firms with over $10 million dollars in sales, though reducing the sample by about 10%, did little to reduce the magnitude or significance of the race and gender coefficients, or the coefficients and their interaction with market concentration. Indeed, the significance of the coefficients of the interaction terms was actually greater in almost every case. In contrast, excluding firms located in non-metropolitan statistical areas did reduce the significance of the African American interaction term below commonly accepted levels of significance, though the signs of the coefficients were unaffected. However, the female interaction term (FML*HHI) remained significant. Eliminating firms with over $10 million in sales from the MSA subpopulation did little to alter the demographic coefficients or their significance levels relative to the full MSA sample.

The unweighted regression results are also fairly similar to the weighted results. However, many of the coefficients are larger and have higher levels of significance. For example in Models 1-3 (not shown in table), the coefficients on African American and Asian are always larger than in the weighted estimation, and the Asian coefficient is significant at the one percent level in every case. Regarding the HHI interaction terms (Model 4), while the gender interaction is still positive and significant at the one percent level, the African American interaction, though still large and positive, is now insignificant.

Credit Needs (EverDen2)

Asian-owned firms are more likely to be credit constrained than are firms owned by White males. This result is statistically significant at commonly accepted levels of significance in all five sample specifications. African American- and female-owned firms are more likely to be credit constrained as lender market concentration increases. The coefficients on the African American and female interaction terms (AFAM*HHI and FML*HHI) are large and positive across all sample specifications and are statistically significant in the sample restricted to businesses under $10 million in sales. African American interaction terms are not significant in the other robustness checks. The female interaction terms are significant in all but the binary HHI specification.

Denied Most Recent Loan (DenMRL)

We present additional sensitivity tests for the DenMRL analysis in Table B-3. Coefficients on the interaction between African Americans, females, and HHI are large, positive and for females, statistically significant at the one-percent level. Results using a binary HHI in place of the continuous measure still share the same sign on the interaction terms, however the reported level of significance is greatly diminished.

Unweighted results (Column 5), support findings reported in Columns 1-3 and Table 8.

Interest Rates (IntRate)

The behavior of interest rates across markets and demographic group in our battery of sensitivity tests (Table B-4) follows a pattern similar to that in Column 4 of Table 9, but at varying levels of magnitude and statistical significance. Market concentration has a statistically positive effect on interest rates charged across all specifications except those restricted to businesses located in MSAs. While African American- and female-owned businesses pay more than those owned by White males at high levels of competition, their rates decline significantly as concentration increases.

TABLE B-1: MODEL 3

Dependent Variable

EverDen: Firm Denied Credit Anytime Over the Past Three Years—Robustness Checks

	Sales <=$10M	MSA	MSA & Sales <=$10M	Binary HHI	Unweighted
Majority Ownership					
AFAM	1.085***	0.953***	0.952***	1.084***	1.105***
	(4.093)	(3.611)	(3.586)	(4.130)	(5.178)
HISPANIC	0.346	0.142	0.135	0.350	0.156
	(0.978)	(0.361)	(0.335)	(1.010)	(0.638)
ASIAN	0.653	0.657*	0.742*	0.567	0.800***
	(1.559)	(1.648)	(1.787)	(1.403)	(2.832)
FEMALE	-0.050	-0.143	-0.132	-0.059	0.135
	(-0.225)	(-0.588)	(-0.538)	(-0.269)	(0.775)
Market Structure					
HHI	-0.524	-1.029	-0.967	-0.123	0.008
	(-0.420)	(-0.589)	(-0.543)	(-0.702)	(0.062)
AFAM*HHI					
HISP*HHI					
ASN*HHI					
FML*HHI					
Financial Characteristics					
ASSETS	-0.163**	-0.254***	-0.235***	-0.191***	-0.205***
	(-2.188)	(-3.230)	(-2.842)	(-2.691)	(-3.772)
EMPLOY	-0.019	0.002	-0.003	-0.022	0.044
	(-0.198)	(0.020)	(-0.028)	(-0.230)	(0.646)
SALEASST	0.008	0.006	0.008	0.006	-0.013
	(0.836)	(0.651)	(0.813)	(0.614)	(-1.505)
LIABASST	-0.107	-0.063	-0.055	-0.116	-0.094
	(-1.482)	(-0.654)	(-0.565)	(-1.612)	(-1.537)
PROFASST	-0.019	-0.030	-0.031	-0.020	-0.015
	(-0.597)	(-0.881)	(-0.866)	(-0.642)	(-0.675)
Credit History					
BANKRUPT	1.248**	0.638	0.650	1.182**	0.819**
	(2.497)	(1.298)	(1.248)	(2.469)	(2.179)
PDELINQ1	0.535	0.594	0.572	0.556	0.342
	(0.900)	(0.945)	(0.898)	(0.954)	(0.779)
PDELINQ2	0.475	0.440	0.443	0.494	0.545
	(0.870)	(0.750)	(0.749)	(0.918)	(1.410)
PDELINQ3	0.924***	0.964***	0.910***	0.973***	0.483**
	(3.242)	(2.988)	(2.789)	(3.457)	(2.138)
BDELINQ1	0.416	0.227	0.267	0.373	0.243
	(0.987)	(0.468)	(0.545)	(0.896)	(0.738)
BDELINQ2	0.730*	0.716*	0.702*	0.739*	0.795**
	(1.900)	(1.693)	(1.650)	(1.936)	(2.339)
BDELINQ3	0.360	0.226	0.166	0.398*	0.797***
	(1.552)	(0.875)	(0.618)	(1.792)	(4.819)
JUDGMENT	0.698*	0.334	0.396	0.639*	0.584**
	(1.908)	(1.007)	(1.141)	(1.819)	(2.230)
Credit Score					
CREDSCR	-0.010***	-0.009***	-0.010***	-0.009***	-0.007***
	(-3.348)	(-2.833)	(-2.958)	(-3.279)	(-3.611)
Number of obs	1660	1594	1312	1985	1985
F-statistic	3.61***	3.15***	2.87***	3.92***	5.10***

Other variables included in the analysis are: PRIM_FIN, RELPRIM2, CCORP, SCORP, PARTNER, LNAGE2, FRANCHIS, D6_NATN, D6_OUTSD, D6_REG, CHECKING, SAVING, NOT_HS, COLLEGE, EXPER, MANAGE, OWNSHR, TCUSE, IND_1, IND_3 — IND_9, MSA, REGION2 — REGION9, SOURCES, LOAN4

Key: ***Significance at the .01 level; **Significance at the .05 level; and *Significance at the .10 level.

TABLE B-1: MODEL 4

Dependent Variable

EverDen: Firm Denied Credit Anytime Over the Past Three Years—Robustness Checks

	Sales <=$10M	MSA	MSA & Sales <=$10M	Binary HHI	Unweighted
Majority Ownership					
AFAM	-0.348	-0.089	-0.109	0.776**	0.457
	(-0.497)	(-0.110)	(-0.134)	(2.573)	(0.847)
HISPANIC	0.004	0.551	0.567	0.453	-0.067
	(0.007)	(0.613)	(0.621)	(1.028)	(-0.145)
ASIAN	1.622	1.274	1.318	0.644	1.338*
	(1.417)	(1.218)	(1.198)	(1.232)	(1.824)
FEMALE	-1.339***	-1.622**	-1.546**	-0.302	-0.649
	(-2.710)	(-2.317)	(-2.183)	(-1.033)	(-1.642)
Market Structure					
HHI	-2.101*	-2.657	-2.559	-0.215	-0.470
	(-1.668)	(-1.408)	(-1.322)	(-1.091)	(-0.474)
AFAM*HHI	8.533**	6.722	6.822	0.802	4.176
	(1.996)	(1.333)	(1.344)	(1.480)	(1.324)
HISP*HHI	1.856	-2.065	-2.209	-0.204	1.263
	(0.637)	(-0.382)	(-0.404)	(-0.297)	(0.612)
ASN*HHI	-5.463	-3.224	-3.069	-0.151	-2.904
	(-0.907)	(-0.595)	(-0.528)	(-0.194)	(-0.775)
FML*HHI	6.292***	8.081**	7.701**	0.426	3.929**
	(2.918)	(2.166)	(2.045)	(1.032)	(2.250)
Financial Characteristics					
ASSETS	-0.164**	-0.259***	-0.242***	-0.191***	-0.204***
	(-2.188)	(-3.278)	(-2.914)	(-2.696)	(-3.751)
EMPLOY	-0.018	0.008	0.001	-0.021	0.046
	(-0.189)	(0.077)	(0.012)	(-0.221)	(0.689)
SALEASST	0.007	0.008	0.010	0.006	-0.013
	(0.685)	(0.735)	(0.865)	(0.633)	(-1.548)
LIABASST	-0.086	-0.056	-0.050	-0.109	-0.088
	(-1.189)	(-0.575)	(-0.506)	(-1.533)	(-1.422)
PROFASST	-0.018	-0.032	-0.033	-0.020	-0.016
	(-0.580)	(-0.941)	(-0.922)	(-0.676)	(-0.707)
Credit History					
BANKRUPT	1.244**	0.597	0.604	1.201**	0.842**
	(2.405)	(1.204)	(1.154)	(2.473)	(2.223)
PDELINQ1	0.581	0.574	0.557	0.570	0.346
	(0.944)	(0.890)	(0.856)	(0.969)	(0.757)
PDELINQ2	0.448	0.319	0.327	0.486	0.519
	(0.805)	(0.527)	(0.537)	(0.881)	(1.323)
PDELINQ3	0.998***	0.987***	0.933***	1.005***	0.527**
	(3.409)	(3.044)	(2.845)	(3.580)	(2.324)
BDELINQ1	0.261	0.076	0.121	0.328	0.182
	(0.625)	(0.157)	(0.248)	(0.783)	(0.553)
BDELINQ2	0.764**	0.759*	0.746*	0.740*	0.788**
	(1.973)	(1.806)	(1.767)	(1.951)	(2.329)
BDELINQ3	0.354	0.264	0.206	0.395*	0.767***
	(1.516)	(1.029)	(0.773)	(1.778)	(4.603)
JUDGMENT	0.683*	0.285	0.344	0.613*	0.577**
	(1.786)	(0.832)	(0.969)	(1.691)	(2.144)
Credit Score					
CREDSCR	-0.010***	-0.009***	-0.010***	-0.009***	-0.007***
	(-3.361)	(-2.857)	(-2.975)	(-3.322)	(-3.562)
Number of obs	1660	1594	1312	1985	1985
F-statistic	3.50***	3.09***	2.79***	3.67***	4.95***

Other variables included in the analysis are: PRIM_FIN, REL_PRIM2, CCORP, SCORP, PARTNER, LNAGE2, FRANCHIS, D6_NATN, D6_OUTSD, D6_REG, CHECKING, SAVING, NOT_HS, COLLEGE, EXPER, MANAGE, OWNSHR, TCUSE, IND_1, IND_3 - IND_9, MSA, REGION2 – REGION9, SOURCES, LOAN4

Key: ***Significance at the .01 level; **Significance at the .05 level; and *Significance at the .10 level.

TABLE B-2: MODEL 3

Dependent Variable

EverDen2: Whether Firms Faced Credit Constraints Anytime Over the Past Three Years—Robustness Checks

	Sales <=$10M	MSA	MSA & Sales <=$10M	Binary HHI	Unweighted
Majority Ownership					
AFAM	1.100***	0.899***	0.891***	1.093***	1.077***
	(4.419)	(3.672)	(3.608)	(4.442)	(5.651)
HISPANIC	0.630**	0.418	0.421	0.619**	0.561***
	(2.316)	(1.459)	(1.447)	(2.298)	(3.051)
ASIAN	0.840**	0.766**	0.825**	0.766**	0.880***
	(2.564)	(2.336)	(2.406)	(2.439)	(4.034)
FEMALE	-0.094	-0.219	-0.215	-0.089	0.103
	(-0.498)	(-1.051)	(-1.016)	(-0.472)	(0.734)
Market Structure					
HHI	0.239	-0.325	-0.303	-0.132	0.570
	(0.236)	(-0.245)	(-0.224)	(-0.860)	(0.768)
AFAM*HHI					
HISP*HHI					
ASN*HHI					
FML*HHI					
Financial Characteristics					
ASSETS	-0.262***	-0.318***	-0.302***	-0.281***	-0.288***
	(-4.639)	(-5.255)	(-4.796)	(-5.172)	(-6.639)
EMPLOY	-0.067	-0.094	-0.095	-0.076	-0.005
	(-0.876)	(-1.163)	(-1.131)	(-1.023)	(-0.085)
SALEASST	0.009	0.008	0.010	0.008	-0.007
	(1.442)	(1.192)	(1.383)	(1.198)	(-1.396)
LIABASST	-0.097***	-0.067	-0.067	-0.096***	-0.060**
	(-2.797)	(-1.544)	(-1.454)	(-2.753)	(-2.429)
PROFASST	-0.021	-0.029	-0.029	-0.021	-0.015
	(-0.753)	(-0.978)	(-0.945)	(-0.801)	(-1.114)
Credit History					
BANKRUPT	1.342***	1.046***	1.042***	1.304***	0.971***
	(3.606)	(3.006)	(2.916)	(3.600)	(3.069)
PDELINQ1	0.596	0.724	0.698	0.623	0.418
	(1.173)	(1.334)	(1.269)	(1.259)	(1.232)
PDELINQ2	0.515	0.478	0.471	0.538	0.523
	(0.975)	(0.847)	(0.823)	(1.023)	(1.403)
PDELINQ3	1.042***	1.081***	1.027***	1.082***	0.617***
	(4.012)	(3.825)	(3.654)	(4.162)	(3.001)
BDELINQ1	0.335	0.114	0.130	0.296	0.162
	(0.932)	(0.289)	(0.323)	(0.847)	(0.598)
BDELINQ2	0.731**	0.606*	0.596	0.746**	0.784**
	(2.069)	(1.659)	(1.606)	(2.155)	(2.439)
BDELINQ3	0.401**	0.280	0.249	0.427**	0.685***
	(2.017)	(1.320)	(1.139)	(2.196)	(4.555)
JUDGMENT	0.973***	0.679**	0.749**	0.916***	0.617***
	(3.183)	(2.334)	(2.460)	(3.155)	(2.700)
Credit Score					
CREDSCR	-0.009***	-0.008***	-0.009***	-0.008***	-0.007***
	(-3.252)	(-2.926)	(-3.053)	(-3.129)	(-3.548)
Number of obs	2280	2162	1877	2609	2609
F-statistic	6.46***	5.62***	5.05***	7.03***	9.12***

Other variables included in the analysis are: PRIM_FIN, RELPRIM2, CCORP, SCORP, PARTNER, LNAGE2, FRANCHIS, D6_NATN, D6_OUTSD, D6_REG, CHECKING, SAVING, NOT_HS, COLLEGE, EXPER, MANAGE, OWNSHR, TCUSE, IND_1, IND_3 — IND_9, MSA, REGION2 — REGION9, SOURCES, LOAN4

Key: ***Significance at the .01 level; **Significance at the .05 level; and *Significance at the .10 level.

TABLE B-2: MODEL 4

Dependent Variable

EverDen2: Whether Firms Faced Credit Constraints Anytime Over the Past Three Years—Robustness Checks

	Sales <=$10M	MSA	MSA & Sales <=$10M	Binary HHI	Unweighted
Majority Ownership					
AFAM	-0.114	0.380	0.368	0.793***	0.542
	(-0.182)	(0.588)	(0.565)	(2.691)	(1.208)
HISPANIC	0.349	0.630	0.627	0.509	0.496
	(0.727)	(0.876)	(0.864)	(1.581)	(1.399)
ASIAN	1.686**	1.637**	1.664**	0.761*	1.356***
	(2.458)	(2.165)	(2.101)	(1.926)	(2.727)
FEMALE	-1.460***	-1.319**	-1.283**	-0.315	-0.633*
	(-3.153)	(-2.284)	(-2.221)	(-1.283)	(-1.795)
Market Structure					
HHI	-1.653	-2.075	-2.053	-0.251	-0.346
	(-1.464)	(-1.290)	(-1.245)	(-1.489)	(-0.384)
AFAM*HHI	7.251*	3.348	3.365	0.756	3.470
	(1.921)	(0.860)	(0.860)	(1.499)	(1.318)
HISP*HHI	1.517	-1.151	-1.120	0.291	0.415
	(0.630)	(-0.261)	(-0.253)	(0.541)	(0.234)
ASN*HHI	-4.816	-4.947	-4.812	0.045	-2.675
	(-1.434)	(-1.218)	(-1.124)	(0.073)	(-1.106)
FML*HHI	6.788***	6.117*	5.925*	0.408	3.760**
	(3.027)	(1.823)	(1.773)	(1.178)	(2.216)
Financial Characteristics					
ASSETS	-0.263***	-0.320***	-0.305***	-0.282***	-0.288***
	(-4.631)	(-5.274)	(-4.834)	(-5.200)	(-6.652)
EMPLOY	-0.066	-0.096	-0.098	-0.077	-0.002
	(-0.860)	(-1.177)	(-1.158)	(-1.035)	(-0.028)
SALEASST	0.009	0.009	0.010	0.008	-0.007
	(1.350)	(1.250)	(1.428)	(1.201)	(-1.469)
LIABASST	-0.095***	-0.065	-0.065	-0.095***	-0.063***
	(-2.780)	(-1.290)	(-1.226)	(-2.895)	(-2.616)
PROFASST	-0.020	-0.029	-0.029	-0.022	-0.015
	(-0.734)	(-0.986)	(-0.954)	(-0.824)	(-1.133)
Credit History					
BANKRUPT	1.332***	1.022***	1.017***	1.313***	0.969***
	(3.422)	(2.897)	(2.808)	(3.588)	(3.033)
PDELINQ1	0.646	0.719	0.694	0.634	0.430
	(1.230)	(1.280)	(1.223)	(1.271)	(1.247)
PDELINQ2	0.453	0.386	0.383	0.511	0.501
	(0.854)	(0.688)	(0.673)	(0.974)	(1.342)
PDELINQ3	1.084***	1.066***	1.012***	1.091***	0.649***
	(4.061)	(3.751)	(3.582)	(4.195)	(3.136)
BDELINQ1	0.220	0.025	0.043	0.270	0.104
	(0.615)	(0.065)	(0.109)	(0.769)	(0.383)
BDELINQ2	0.740**	0.632*	0.621*	0.753**	0.776**
	(2.069)	(1.733)	(1.681)	(2.164)	(2.418)
BDELINQ3	0.401**	0.302	0.271	0.427**	0.667***
	(1.981)	(1.408)	(1.229)	(2.189)	(4.418)
JUDGMENT	0.976***	0.678**	0.747**	0.907***	0.615***
	(3.093)	(2.246)	(2.372)	(3.069)	(2.676)
Credit Score					
CREDSCR	-0.009***	-0.008***	-0.009***	-0.008***	-0.007***
	(-3.282)	(-2.981)	(-3.099)	(-3.192)	(-3.531)
Number of obs	2280	2162	1877	2609	2609
F-statistic	6.23***	5.55***	4.99***	6.61***	8.69***

Other variables included in the analysis are: PRIM_FIN, RELPRIM2, CCORP, SCORP, PARTNER, LNAGE2, FRANCHIS, D6_NATN, D6_OUTSD, D6_REG, CHECKING, SAVING, NOT_HS, COLLEGE, EXPER, MANAGE, OWNSHR, TCUSE, IND_1, IND_3 - IND_9, MSA, REGION2 — REGION9, SOURCES, LOAN4

Key: ***Significance at the .01 level; **Significance at the .05 level; and *Significance at the .10 level.

TABLE B-3: MODEL 3

Dependent Variable

DenMRL: Firm Denied for Most Recent Loan Application—Robustness Checks

	Sales <=$10M	MSA	MSA & Sales <=$10M	Binary HHI	Unweighted
Majority Ownership					
AFAM	0.655**	0.557*	0.546*	0.645**	0.804***
	(2.416)	(1.827)	(1.784)	(2.392)	(3.394)
HISPANIC	-0.113	-0.147	-0.143	-0.093	-0.404
	(-0.273)	(-0.320)	(-0.309)	(-0.229)	(-1.183)
ASIAN	0.474	0.622	0.597	0.488	0.652*
	(1.048)	(1.353)	(1.286)	(1.096)	(1.929)
FEMALE	0.201	0.060	0.085	0.193	-0.050
	(0.800)	(0.217)	(0.308)	(0.758)	(-0.236)
Market Structure					
HHI	0.914	0.834	0.829	0.010	1.055
	(0.635)	(0.440)	(0.435)	(0.046)	(0.930)
AFAM*HHI					
HISP*HHI					
ASN*HHI					
FML*HHI					
Financial Characteristics					
ASSETS	-0.175*	-0.282***	-0.255**	-0.197**	-0.250***
	(-1.848)	(-2.757)	(-2.419)	(-2.147)	(-3.444)
EMPLOY	-0.034	0.003	0.025	-0.060	-0.098
	(-0.246)	(0.019)	(0.155)	(-0.444)	(-1.044)
SALEASST	0.008	0.009	0.010	0.006	-0.016
	(0.695)	(0.803)	(0.965)	(0.551)	(-0.816)
LIABASST	-0.125	0.022	0.030	-0.124	-0.071
	(-1.588)	(0.210)	(0.288)	(-1.603)	(-1.004)
PROFASST	-0.060*	-0.106**	-0.114**	-0.057*	0.022
	(-1.907)	(-2.097)	(-2.048)	(-1.861)	(1.139)
Credit History					
BANKRUPT	1.594***	1.270***	1.335***	1.512***	0.978**
	(2.945)	(2.729)	(2.702)	(2.874)	(2.285)
PDELINQ1	-0.231	-0.114	-0.111	-0.195	-0.049
	(-0.433)	(-0.180)	(-0.175)	(-0.371)	(-0.124)
PDELINQ2	0.468	0.406	0.392	0.496	0.298
	(1.023)	(0.753)	(0.725)	(1.087)	(0.741)
PDELINQ3	0.762**	0.756*	0.719*	0.798**	0.447
	(2.284)	(1.909)	(1.799)	(2.403)	(1.642)
BDELINQ1	1.060**	1.123*	1.135*	1.055**	0.702*
	(1.972)	(1.723)	(1.721)	(1.995)	(1.872)
BDELINQ2	0.669	0.658	0.624	0.705*	0.675*
	(1.605)	(1.372)	(1.313)	(1.665)	(1.719)
BDELINQ3	0.675**	0.596*	0.552*	0.704***	0.907***
	(2.482)	(1.940)	(1.763)	(2.629)	(4.339)
JUDGMENT	0.503	0.495	0.513	0.500	0.450*
	(1.352)	(1.124)	(1.142)	(1.377)	(1.686)
Credit Score					
CREDSCR	-0.009**	-0.008**	-0.009**	-0.008**	-0.009***
	(-2.437)	(-2.008)	(-2.131)	(-2.301)	(-3.257)
Number of obs	1660	1594	1312	1985	1985
F-statistic	3.34***	3.38***	3.16***	3.60***	5.21

Other variables included in the analysis are: FIN_JBNK, REL_JBNK, CCORP, SCORP, PARTNER, LNAGE2, FRANCHIS, D6_NATN, D6_OUTSD, D6_REG, CHECKING, SAVING, NOT_HS, COLLEGE, EXPER, MANAGE, OWNSHR, TCUSE, IND_1, IND_3 – IND_9, MSA, REGION2 – REGION9, LOAN4, J5_ASST, MRL_LOC, MRL_MV, MRL_OTH, MRL_LEAS, MRL_MRTG, USE_MRL, LEND_SRC, MRL_PRIM, MRL_9394

Key: ***Significance at the .01 level; **Significance at the .05 level; and *Significance at the .10 level.

TABLE B-3: MODEL 4

Dependent Variable

DenMRL: Firm Denied for Most Recent Loan Application—Robustness Checks

	Sales <=$10M	MSA	MSA & Sales <=$10M	Binary HHI	Unweighted
Majority Ownership					
AFAM	-0.147	-0.404	-0.437	0.431	0.287
	(-0.243)	(-0.481)	(-0.517)	(1.340)	(0.526)
HISPANIC	-0.157	0.117	0.094	-0.093	-0.173
	(-0.230)	(0.125)	(0.099)	(-0.174)	(-0.257)
ASIAN	2.993**	2.599**	2.559**	0.875	2.387***
	(2.441)	(2.034)	(1.966)	(1.615)	(2.931)
FEMALE	-1.209**	-2.049***	-1.996***	-0.052	-1.059**
	(-2.457)	(-2.830)	(-2.736)	(-0.159)	(-2.446)
Market Structure					
HHI	-0.993	-1.850	-1.873	-0.076	0.122
	(-0.682)	(-0.794)	(-0.792)	(-0.314)	(0.090)
AFAM*HHI	4.617	6.027	6.162	0.544	3.216
	(1.432)	(1.236)	(1.255)	(1.077)	(1.092)
HISP*HHI	0.353	-0.841	-0.692	0.021	-1.183
	(0.119)	(-0.157)	(-0.127)	(0.026)	(-0.413)
ASN*HHI	-14.699**	-11.283*	-11.223	-1.064	-9.874**
	(-2.217)	(-1.664)	(-1.623)	(-1.324)	(-2.189)
FML*HHI	6.721***	11.183***	11.022***	0.424	4.867***
	(3.305)	(2.995)	(2.936)	(0.905)	(2.696)
Financial Characteristics					
ASSETS	-0.188*	-0.311***	-0.286***	-0.202**	-0.256***
	(-1.933)	(-2.967)	(-2.653)	(-2.185)	(-3.500)
EMPLOY	-0.031	0.020	0.039	-0.062	-0.094
	(-0.221)	(0.125)	(0.238)	(-0.454)	(-1.003)
SALEASST	0.005	0.009	0.010	0.006	-0.015
	(0.439)	(0.828)	(0.972)	(0.527)	(-0.844)
LIABASST	-0.109	0.029	0.036	-0.122	-0.070
	(-1.357)	(0.281)	(0.354)	(-1.552)	(-0.970)
PROFASST	-0.057*	-0.108**	-0.116**	-0.056*	0.021
	(-1.802)	(-2.096)	(-2.030)	(-1.839)	(1.107)
Credit History					
BANKRUPT	1.630***	1.257***	1.316***	1.552***	1.013**
	(2.932)	(2.732)	(2.689)	(2.927)	(2.379)
PDELINQ1	-0.223	-0.124	-0.118	-0.197	-0.067
	(-0.439)	(-0.211)	(-0.201)	(-0.384)	(-0.165)
PDELINQ2	0.432	0.215	0.204	0.479	0.227
	(0.951)	(0.402)	(0.380)	(1.036)	(0.550)
PDELINQ3	0.825**	0.792**	0.753*	0.829**	0.500*
	(2.390)	(1.976)	(1.860)	(2.468)	(1.821)
BDELINQ1	0.954*	0.960	0.975	0.999*	0.673*
	(1.810)	(1.479)	(1.488)	(1.862)	(1.811)
BDELINQ2	0.710	0.732	0.699	0.703*	0.672**
	(1.644)	(1.485)	(1.432)	(1.646)	(1.719)
BDELINQ3	0.699**	0.700**	0.657**	0.703***	0.890***
	(2.571)	(2.327)	(2.141)	(2.624)	(4.219)
JUDGMENT	0.507	0.465	0.484	0.499	0.446
	(1.317)	(1.008)	(1.032)	(1.331)	(1.634)
Credit Score					
CREDSCR	-0.009**	-0.008*	-0.008**	-0.009**	-0.009***
	(-2.436)	(-1.916)	(-2.037)	(-2.359)	(-3.191)
Number of obs	1660	1594	1312	1985	1985
F-statistic	3.24***	3.16***	2.94***	3.40***	5.04***

Other variables included in the analysis are: FIN_JBNK, REL_JBNK, CCORP, SCORP, PARTNER, LNAGE2, FRANCHIS, D6_NATN, D6_OUTSD, D6_REG, CHECKING, SAVING, NOT_HS, COLLEGE, EXPER, MANAGE, OWNSHR, TCUSE, IND_1, IND_3 - IND_9, MSA, REGION2 – REGION9, LOAN4, J5_ASST, MRL_LOC, MRL_MV, MRL_OTH, MRL_LEAS, MRL_MRTG, USE_MRL, LEND_SRC, MRL_PRIM, MRL_9394

Key: ***Significance at the .01 level; **Significance at the .05 level; and *Significance at the .10 level.

TABLE B-4: MODEL 3

Dependent Variable

IntRate: Interest on Most Recent Loan—Robustness Checks

	Sales <=$10M	MSA	MSA & Sales <=$10M	Binary HHI	Unweighted
Majority Ownership					
AFAM	0.176	0.290	0.266	0.189	0.118
	(0.404)	(0.637)	(0.579)	(0.438)	(0.348)
HISPANIC	0.049	-0.249	-0.270	0.057	0.082
	(0.147)	(-0.905)	(-0.958)	(0.172)	(0.269)
ASIAN	0.159	0.132	0.069	0.220	0.108
	(0.522)	(0.443)	(0.214)	(0.777)	(0.371)
FEMALE	-0.273	-0.249	-0.262	-0.284	-0.152
	(-1.317)	(-1.032)	(-1.042)	(-1.397)	(-1.071)
Market Structure					
HHI	1.411	1.065	1.125	0.182	0.724
	(1.612)	(0.753)	(0.754)	(1.118)	(1.265)
AFAM*HHI					
HISP*HHI					
ASN*HHI					
FML*HHI					
Financial Characteristics					
ASSETS	0.048	0.033	0.024	0.052	-0.028
	(0.472)	(0.307)	(0.201)	(0.557)	(-0.425)
EMPLOY	-0.096	-0.072	-0.059	-0.098	-0.089
	(-1.083)	(-0.749)	(-0.580)	(-1.175)	(-1.487)
SALEASST	0.000	0.014	0.013	0.000	-0.003
	(0.005)	(0.994)	(0.912)	(0.051)	(-0.487)
LIABASST	0.238***	-0.024	-0.018	0.241**	0.140
	(2.601)	(-0.218)	(-0.156)	(2.569)	(1.525)
PROFASST	-0.005	-0.032	-0.039	-0.004	0.010
	(-0.233)	(-1.110)	(-1.241)	(-0.184)	(0.590)
Credit History					
BANKRUPT	0.427	0.498	0.456	0.434	0.717
	(0.761)	(0.913)	(0.772)	(0.838)	(1.439)
PDELINQ1	-1.744**	-2.044**	-2.134**	-1.663**	-0.670
	(-2.328)	(-2.278)	(-2.366)	(-2.206)	(-1.544)
PDELINQ2	0.253	-0.043	-0.087	0.260	0.747*
	(0.566)	(-0.086)	(-0.169)	(0.597)	(1.649)
PDELINQ3	-0.311	-0.527	-0.662*	-0.214	0.176
	(-0.872)	(-1.320)	(-1.663)	(-0.596)	(0.595)
BDELINQ1	0.068	0.151	0.129	0.079	-0.058
	(0.112)	(0.246)	(0.204)	(0.134)	(-0.157)
BDELINQ2	-0.657*	-0.600	-0.648	-0.608*	-0.137
	(-1.755)	(-1.407)	(-1.447)	(-1.699)	(-0.308)
BDELINQ3	-0.086	0.009	-0.024	-0.051	-0.034
	(-0.361)	(0.036)	(-0.089)	(-0.220)	(-0.235)
JUDGMENT	0.557	0.502	0.648	0.414	0.569
	(0.628)	(0.550)	(0.651)	(0.501)	(1.335)
Credit Score					
CREDSCR	-0.010***	-0.011***	-0.011***	-0.010***	-0.006***
	(-3.711)	(-3.489)	(-3.438)	(-3.680)	(-3.608)
Number of obs	1364	1331	1055	1682	1682
F-statistic	3.37***	3.14***	2.94***	3.58***	6.46***
Adjusted R2	0.21	0.25	0.24	0.21	0.21

Other variables included in the analysis are: FIN_JBNK, REL_JBNK, CCORP, SCORP, PARTNER, LNAGE2, FRANCHIS, D6_NATN, D6_OUTSD, D6_REG, CHECKING, SAVING, NOT_HS, COLLEGE, EXPER, MANAGE, OWNSHR, TCUSE, IND_1, IND_3 - IND_9, MSA, REGION2 - REGION9, BONDSPRD, TERMPREM, MRL_INDX, FIXED, PCOL, BCOL, GUAR, MRL_LOC, MRL_LEAS, MRL_MRTG, MRL_MV, MRL_OTH, LEND_SRC, LOAN4, MRL_9394, MRL_PRIM, EDENALL, INVMAT, LNAMTERR, POINTS, FEE_AMT

Key: ***Significance at the .01 level; **Significance at the .05 level; and *Significance at the .10 level.

TABLE B-4: MODEL 4

Dependent Variable

IntRate: Interest on Most Recent Loan—Robustness Checks

	Sales <=$10M	MSA	MSA & Sales <=$10M	Binary HHI	Unweighted
Majority Ownership					
AFAM	1.956	3.258**	3.292**	0.498	2.119**
	(1.583)	(2.056)	(2.054)	(0.820)	(2.185)
HISPANIC	-1.281	-0.231	-0.390	-0.236	-0.445
	(-1.618)	(-0.245)	(-0.401)	(-0.659)	(-0.573)
ASIAN	0.033	-0.382	-0.102	0.208	-0.309
	(0.047)	(-0.557)	(-0.139)	(0.620)	(-0.594)
FEMALE	0.882*	0.845	0.903	0.292	0.384
	(1.951)	(1.412)	(1.442)	(0.922)	(0.982)
Market Structure					
HHI	1.836**	2.365	2.544	0.326*	1.067*
	(1.976)	(1.441)	(1.454)	(1.727)	(1.931)
AFAM*HHI	-10.724*	-19.311**	-19.609**	-0.861	-13.133**
	(-1.781)	(-2.194)	(-2.206)	(-1.169)	(-2.558)
HISP*HHI	6.755	-0.281	0.512	0.607	2.600
	(1.503)	(-0.051)	(0.090)	(0.978)	(0.666)
ASN*HHI	0.535	2.598	0.777	-0.075	2.015
	(0.140)	(0.687)	(0.183)	(-0.134)	(0.752)
FML*HHI	-5.658***	-6.167*	-6.550*	-0.952**	-2.723
	(-2.870)	(-1.870)	(-1.906)	(-2.270)	(-1.567)
Financial Characteristics					
ASSETS	0.057	0.033	0.026	0.055	-0.031
	(0.570)	(0.308)	(0.217)	(0.601)	(-0.473)
EMPLOY	-0.111	-0.071	-0.060	-0.109	-0.096
	(-1.269)	(-0.755)	(-0.594)	(-1.317)	(-1.611)
SALEASST	0.003	0.013	0.013	0.001	-0.002
	(0.329)	(0.976)	(0.911)	(0.094)	(-0.403)
LIABASST	0.230**	-0.044	-0.038	0.231**	0.133
	(2.532)	(-0.404)	(-0.338)	(2.462)	(1.439)
PROFASST	-0.006	-0.031	-0.037	-0.005	0.011
	(-0.258)	(-1.087)	(-1.212)	(-0.207)	(0.711)
Credit History					
BANKRUPT	0.420	0.500	0.459	0.430	0.630
	(0.752)	(0.905)	(0.766)	(0.830)	(1.242)
PDELINQ1	-1.695**	-1.982**	-2.079**	-1.671**	-0.568
	(-2.339)	(-2.371)	(-2.474)	(-2.273)	(-1.349)
PDELINQ2	0.332	0.124	0.079	0.363	0.881**
	(0.741)	(0.258)	(0.157)	(0.846)	(1.975)
PDELINQ3	-0.308	-0.570	-0.708*	-0.270	0.133
	(-0.873)	(-1.399)	(-1.738)	(-0.744)	(0.452)
BDELINQ1	0.110	0.223	0.199	0.146	-0.069
	(0.182)	(0.368)	(0.318)	(0.250)	(-0.185)
BDELINQ2	-0.673*	-0.680	-0.735*	-0.621*	-0.210
	(-1.809)	(-1.638)	(-1.686)	(-1.763)	(-0.504)
BDELINQ3	-0.077	0.016	-0.018	-0.042	-0.000
	(-0.323)	(0.064)	(-0.066)	(-0.181)	(-0.000)
JUDGMENT	0.622	0.528	0.688	0.482	0.621
	(0.694)	(0.573)	(0.684)	(0.576)	(1.444)
Credit Score					
CREDSCR	-0.010***	-0.010***	-0.011***	-0.009***	-0.006***
	(-3.679)	(-3.422)	(-3.374)	(-3.529)	(-3.642)
Number of obs	1364	1331	1055	1682	1682
F-statistic	3.37***	3.14***	2.96***	3.63***	6.27***
Adjusted R2	0.21	0.25	0.25	0.22	0.22

Other variables included in the analysis are: FIN_JBNK, REL_JBNK, CCORP, SCORP, PARTNER, LNAGE2, FRANCHIS, D6_NATN, D6_OUTSD, D6_REG, CHECKING, SAVING, NOT_HS, COLLEGE, EXPER, MANAGE, OWNSHR, TCUSE, IND_1, IND_3 - IND_9, MSA, REGION2 - REGION9, BONDSPRD, TERMPREM, MRL_INDX, FIXED, PCOL, BCOL, GUAR, MRL_LOC, MRL_LEAS, MRL_MRTG, MRL_MV, MRL_OTH, LEND_SRC, LOAN4, MRL_9394, MRL_PRIM, EDENALL, INVMAT, LNAMTBRR, POINTS, FEE_AMT

Key: ***Significance at the .01 level; **Significance at the .05 level; and *Significance at the .10 level.

Appendix C: Statistical Controls

Firm Characteristics:

Financial Indicators of Firm Risk

According to Foster (1986), financial indicators of firm risk are especially important in the loan granting decision. Gibson (1983) surveys lending institutions and finds that the debt-to-asset ratio is one of the most prevalent ratios that banks use to evaluate firm risk. We include LIABASST, the ratio of debt to total assets, in each of our analyses.

Firm Profits

Profit controls for a firm's ability to generate internal funds and its demand for external funds, in addition to firm specific risk. As such, Myers and Majluf (1984) and Munnell et al. (1996), suggest that profits play a key role in the credit process. We include PROFASST, the ratio of operating profits to total assets in each aspect of our analysis and SALEASST, the ratio of sales to total assets.[36]

Firm Size

A number of theories (e.g., Jovanovic, 1982) and empirical studies (e.g., Evans, 1987) suggest that firm behavior changes with firm size. We use the log of the firm's total assets (LNASSET) and the log of the number of full time equivalent employees (LNTOTEMP) to measure firm size.

Firm Age

Foster (1986) argues that information about the client can be critical in assessing the probability of default on a loan. The age of a firm can act as a proxy for the amount of information available on the firm, and thus the ability to evaluate a firm's credit history, a factor stressed by creditors (Munnell et al., 1996). In addition, Dennis, Dunkelberg, and Van Hulle (1988) find that young firms tend to pay higher interest rates on loans than other firms. We include the natural log of firm age (LNAGE, LNAGE2) in years in each aspect of our analysis.[37]

Banking Relationships

Strong relationships between banks and small businesses have been shown to increase the availability of funds and reduce the cost of capital to small businesses (Petersen and Rajan, 1994; Berger and Udell, 1995). These relationships also provide banks with relatively easy access to information on the credit history of the firm. Because relationship lending has been shown to be an important characteristic in small business lending, it is possible that differences in behavior across demographic groups are attributable to differences in relationships.

We include the length of the relationship with the firm's primary lending institution (REL_PRIM) along with the number of institutions that the firm uses (SOURCES) to control for cross-sectional differences in the strength of these relationships. For the denial and interest rate models, we use the length of the relationship with the lender for the most recent loan (REL_JBNK) and the number of distinct lending sources that the firm uses (LEND_SRC) to measure relationship strength with the creditor.[38] Finally, we include indicator variables on whether the firm had any checking (CHECKING) or savings (SAVING) accounts.

Relationships With Suppliers

A firm's relationship with its suppliers helps to characterize its demand for credit and may provide information about a firm's credit worthiness to banks (Petersen and Rajan, 1994). We include whether the firm uses trade credit (TCUSE). We also make cautious use of DENTC, which equals one if a firm has been denied trade credit in the last three years, and zero otherwise. This variable can act as a signal to lenders that a firm may face serious cash-flow problems. The variable also has the ability to capture economically relevant information that may be observed both by suppliers and lenders, but is unavailable to researchers. But because the variable is not a direct measure of firm performance, it may also reflect discriminatory treatment on the part of suppliers. Moreover, to the extent that suppliers and lending institutions consider many of the same fundamental factors in their assessment of the credit worthiness of firms, DENTC undercuts our ability to get a precise measure of the influence of these underlying factors on firm experiences in credit markets. Because of the ambiguous role played by this variable, we estimate our equations with and without this variable.

Owner Characteristics:

We control for a variety of owner characteristics including the percentage of ownership of the principal owner (OWNSHR), the years of managerial experience of the owner (EXPER), the education level of the owner (NOT_HS, COLLEGE), where NOT_HS indicates that the owner does not hold a high school degree and COLLEGE indicates that the owner has at least some college credit. In addition, we include a control variable (MANAGE) that we set equal to one if the firm is owner-managed, zero otherwise.

Credit History:

Self Reported Information

A firm's credit history may be the most important indicator of firm risk (Foster, 1986; Munnell et al., 1996). NSSBF provides us with multiple measures of firm credit history, none of which have been available to

past researchers. These variables are of particular interest because they are commonly used in credit-scoring models. BANKRUPT is an indicator variable that is set equal to one if the firm or its principal owner declared bankruptcy within the past seven years, and zero otherwise. A set of 6 indicator variables, PDELINQ1-3, BDELINQ1-3 are set equal to one if the principal owner (firm) has been delinquent on one, two, or three or more personal (business) obligations in excess of 60 days within the past three years. We also include the variable JUDGMENT, equal to one if there have been any judgements rendered against the principal owner within the past three years.

External Information

We supplement the NSSBF with credit scores from Dun and Bradstreet. D&B provides credit scores and evaluations on privately held companies in much the same way that Standard and Poor's or Moody's provide credit ratings on publicly held corporations. Banks can purchase this information from Dun & Bradstreet to augment or verify information on loan applications. (Firms also may be aware of their D&B credit score). CREDSCR is an overall evaluation of the firm's credit worthiness that ranges from zero to one hundred (one hundred being the best) at year-end 1993.[39] Because this is a constructed variable that likely considers many of the firm attributes and credit history information already contained in our model, we estimate equations with and without this variable. This approach allows us to observe the full effect of the underlying factors that influence credit market experiences.

Loan Characteristics:

We expect interest rates to be sensitive to market conditions at the time of the loan and the characteristics of the loan.[40] MRL_INDX is equal to the prime rate at the time of issue of the loan for fixed rate loans, or the rate of the appropriate index for variable rate loans.[41] POINTS is the number of percentage points the firm had to pay to close the loan. FEE_AMT is the ratio of fees to the amount borrowed.[42] FIXED equals one if the interest rate is fixed, zero otherwise. TERMPREM is defined as the yield on a government bond with a maturity similar to the firm's loan, minus the treasury bill yield (Petersen and Rajan, 1994). INVMAT is the inverse of the maturity of the loan (in months). LNAMTBRR is the natural log of the amount borrowed; it controls for the size of the loan. BONDSPRD is a small firm premium defined as the difference between the yield on Moody's corporate bonds rated BAA and the yield on ten year government bonds at the time of the loan (Petersen and Rajan, 1994). FIN_JBNK equals one if the most recent loan came from any financial institution, zero otherwise. GUAR equals one if the firm was required to have a personal guaranty, cosigner, or other

guarantor for the most recent loan. Two indicator variables control for a requirement for business (BCOL) or personal (PCOL) collateral. Finally, we include a set of controls for type of loan, including line of credit, lease, mortgage, motor vehicle, or other, with equipment loans acting as the omitted loan type.[43]

Market Characteristics:

Because small businesses tend to do their banking locally rather than nationally, we are able to use cross-sectional data to compare lending practices across banking markets. We supplement the NSSBF data set with the Herfindahl-Hirschman Index (HHI) for each county or metropolitan statistical area in which the firm's headquarters is located. The measure is computed based on June 1993 FDIC summary of deposit data and ranges from one to 10,000.[44] We rescale this index, placing it on a zero to one scale to ease interpretability. The rescaled mean value of HHI in the banking markets used by small businesses in our data set is 0.2018, and ranges from 0.0661 to 0.8215 in MSAs and from 0.1005 to 1 in non-metropolitan areas. We also control for MSA and rural counties.

Other Controls:

In addition, we control for industry specific differences,[45] organizational form (PROP, PARTNER, SCORP, CCORP, FRANCHIS; see Cavalluzzo and Geczy, 1998), area of sales (D6_SAME, D6_REG, D6_NATN, and D6_OUTSD), and regional differences (REGION2-REGION9).

Minority and Gender:

After controlling for relevant economic factors, the analyses control for race (AFAM and ASIAN), ethnicity (HISPAN), gender (FEMALE), and the interaction of each with commercial bank concentration (AFAM*HHI, ASN*HHI, HISP*HHI, FML*HHI).[46] Implicit in the model specification is the comparison to businesses owned by White males.

APPENDIX D

Joint Tests of Significance for Demographic, HHI, and Demographic Interaction Variables

Panel A: Main Models

Apply	Model 1	Model 2	Model 3	Model 4	Model 5
Herf	---	---	---	---	---
Main Race (4)	*	*	*	---	---
Race Int (4)	NA	NA	NA	---	---
Black (1/2)	---	---	---	---	---
Hispan (1/2)	---	---	---	---	---
Asian (1/2)	***	**	**	**	**
Women (1/2)	---	---	--	---	---

Fear	Model 1	Model 2	Model 3	Model 4	Model 5
Herf	---	---	---	---	---
Main Race (4)	***	***	***	---	---
Race Int (4)	NA	NA	NA	---	---
Black (1/2)	***	***	***	***	***
Hispan (1/2)	***	**	**	**	**
Asian (1/2)	---	---	---	---	---
Women (1/2)	---	---	---	---	---

EverDen	Model 1	Model 2	Model 3	Model 4	Model 5
Herf	---	---	---	*	*
Main Race (4)	***	***	***	**	*
Race Int (4)	NA	NA	NA	***	***
Black (1/2)	***	***	***	***	***
Hispan (1/2)	---	---	---	---	---
Asian (1/2)	*	---	---	---	---
Women (1/2)	---	---	---	***	**

EverDen2	Model 1	Model 2	Model 3	Model 4	Model 5
Herf	---	---	---	---	---
Main Race (4)	***	***	***	***	***
Race Int (4)	NA	NA	NA	***	***
Black (1/2)	***	***	***	***	***
Hispan (1/2)	**	**	**	*	*
Asian (1/2)	***	***	**	**	**
Women (1/2)	---	---	---	***	***

KEY: * (10%); ** (5%); ***(1%); NA – not applicable; --- p level >0.10; AFAM, HISPAN, ASIAN, FEMALE either 1 (for models 1-3) or 2 (models 4,5) degrees of freedom.

APPENDIX D (continued)

Panel A: Main Models - continued

DenMRL	Model 1	Model 2	Model 3	Model 4	Model 5
Herf	---	---	---	---	---
Main Race (4)	***	*	---	**	**
Race Int (4)	NA	NA	NA	***	***
Black (1/2)	***	***	**	**	**
Hispan (1/2)	---	---	---	---	---
Asian (1/2)	---	---	---	**	*
Women (1/2)	---	---	---	***	**

IntRate	Model 1	Model 2	Model 3	Model 4	Model 5
Herf	---	---	---	*	*
Main Race (4)	---	---	---	*	*
Race Int (4)	NA	NA	NA	***	***
Black (1/2)	---	---	---	---	---
Hispan (1/2)	---	---	---	---	---
Asian (1/2)	---	---	---	---	---
Women (1/2)	---	---	---	***	***

Panel B: Line of Credit Analysis

	HaveLOC	**ApplyLOC**	**DenLOC**	**RateLOC**
Herf	---	---	---	---
Main Race (4)	---	---	---	---
Race Int (4)	*	NA	**	---
Black (1/2)	---	---	***	---
Hispan (1/2)	*	---	---	*
Asian (1/2)	***	**	---	---
Women (1/2)	*	---	---	---

Panel C: Have Loan, full sample

	Model 1	Model 2	Model 3	Model 4	Model 5
Herf (1/5)	---	---	---	---	---
Main Race (4)	---	---	---	---	---
Race Int (4)	NA	NA	NA	---	---
Black (1/2)	---	---	---	---	---
Hispan (1/2)	---	---	---	---	---
Asian (1/2)	*	*	*	---	---
Women (1/2)	---	---	---	---	---

KEY: * (10%); ** (5%); ***(1%); NA – not applicable; --- p level >0.10; AFAM, HISPAN, ASIAN, FEMALE either 1 (for models 1-3) or 2 (models 4,5) degrees of freedom.

APPENDIX D (continued)

Panel D: Robustness Checks

EverDen	<$10 Mil	MSA	MSA&<$10M	Binary HHI	Unweighted
Herf (1/5)	*	---	---	---	---
Main Race (4)	*	---	---	*	---
Race Int (4)	***	---	---	---	---
Black (1/2)	***	**	***	***	***
Hispan (1/2)	---	---	---	---	---
Asian (1/2)	---	---	---	---	**
Women (1/2)	**	*	*	---	*

EverDen2	<$10 Mil	MSA	MSA&<$10M	Binary HHI	Unweighted
Herf (1/5)	---	---	---	---	---
Main Race (4)	***	**	*	**	**
Race Int (4)	***	---	---	---	*
Black (1/2)	***	***	***	***	***
Hispan (1/2)	*	---	---	*	***
Asian (1/2)	**	**	**	**	***
Women (1/2)	***	**	*	---	*

DenMRL Unweighted	<$10 Mil	MSA	MSA&<$10M	Binary HHI	
Herf (1/5)	---	---	---	---	---
Main Race (4)	**	**	**	---	***
Race Int (4)	***	***	***	*	***
Black (1/2)	**	*	*	**	***
Hispan (1/2)	---	---	---	---	---
Asian (1/2)	**	*	---	---	***
Women (1/2)	***	**	**	---	**

IntRATE Unweighted	<$10 Mil	MSA	MSA&<$10M	Binary HHI	
Herf (1/5)	**	--	--	*	*
Main Race (4)	**	---	---	---	*
Race Int (4)	***	**	**	---	**
Black (1/2)	---	*	*	---	**
Hispan (1/2)	---	---	---	---	---
Asian (1/2)	---	---	---	---	---
Women (1/2)	***	---	---	**	---

KEY: * (10%); ** (5%); ***(1%); NA – not applicable; --- p level >0.10; AFAM, HISPAN, ASIAN, FEMALE either 1 (for models 1-3) or 2 (models 4,5) degrees of freedom.

APPENDIX E

Estimated Coefficients for Model 4 of Main Models

***Apply*: Firm Applied for a Loan or Line of Credit Within the Past Three Years—Model 4-a**

```
Survey logistic regression

pweight:  new_wgt                                 Number of obs    =      4570
Strata:   newstrat                                Number of strata =        65
PSU:      <observations>                          Number of PSUs   =      4570
                                                  Population size  = 4.898e+08
                                                  F(  59,    4447) =      8.98
                                                  Prob > F         =    0.0000
```

apply	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
afam	.437691	.3110838	1.407	0.160	-.1721858	1.047568
hispan	-.024881	.314299	-0.079	0.937	-.6410612	.5912992
asian	-.4668187	.3218934	-1.450	0.147	-1.097888	.1642502
female	-.1060071	.2408804	-0.440	0.660	-.5782508	.3662366
hhi	-.2557543	.5466889	-0.468	0.640	-1.327533	.8160241
afam*hhi	-2.137582	1.598938	-1.337	0.181	-5.272285	.9971212
hisp*hhi	.643577	1.390289	0.463	0.643	-2.082071	3.369225
asn*hhi	.032049	1.469993	0.022	0.983	-2.849858	2.913956
fml*hhi	.0461582	1.017296	0.045	0.964	-1.94824	2.040557
lnasset	.282212	.0377972	7.466	0.000	.2081109	.3563132
lntotemp	.1139479	.0503178	2.265	0.024	.0153003	.2125955
saleasst	-.0000938	.00423	-0.022	0.982	-.0083867	.0081992
liabasst	.2407888	.0818834	2.941	0.003	.0802572	.4013204
profasst	.0024224	.0138423	0.175	0.861	-.0247153	.0295601
bankrupt	.0047225	.2997699	0.016	0.987	-.5829734	.5924185
pdelinq1	-.5352452	.2960199	-1.808	0.071	-1.115589	.045099
pdelinq2	-.0171948	.2935465	-0.059	0.953	-.59269	.5583005
pdelinq3	.0642244	.1859347	0.345	0.730	-.3002989	.4287477
bdelinq1	.0955051	.241506	0.395	0.693	-.3779652	.5689754
bdelinq2	-.0474461	.2257824	-0.210	0.834	-.4900904	.3951982
bdelinq3	.2866027	.1623432	1.765	0.078	-.0316696	.6048751
judgment	-.208374	.2136198	-0.975	0.329	-.6271736	.2104257
credscr	-.0007929	.0016904	-0.469	0.639	-.0041069	.0025212
prim_fin	.4926221	.2919589	1.687	0.092	-.0797606	1.065005
rel_prim	-.0118197	.0072418	-1.632	0.103	-.0260173	.0023778
ccorp	-.11537	.1332528	-0.866	0.387	-.3766108	.1458709
scorp	.1334588	.1428032	0.935	0.350	-.1465055	.4134231
partner	-.1049939	.2070371	-0.507	0.612	-.5108883	.3009004
lnage	-.0225942	.0792746	-0.285	0.776	-.1780113	.1328229
franchis	-.1155504	.2477877	-0.466	0.641	-.6013358	.370235
d6_natn	.094225	.1530574	0.616	0.538	-.2058425	.3942925
d6_outsd	-1.162642	.3792758	-3.065	0.002	-1.906209	-.4190756
d6_reg	.2070049	.1022731	2.024	0.043	.0064995	.4075103
checking	.1545732	.3575409	0.432	0.666	-.5463825	.8555288
saving	-.0238947	.1048368	-0.228	0.820	-.2294262	.1816368
not_hs	-.1964095	.2647934	-0.742	0.458	-.7155346	.3227155
college	.274572	.1096468	2.504	0.012	.0596104	.4895336
exper	-.0138119	.0050018	-2.761	0.006	-.0236179	-.004006
manage	.1517527	.118986	1.275	0.202	-.0815183	.3850236
ownshr	.00062	.0020939	0.296	0.767	-.0034851	.0047251
tcuse	.3815513	.0982086	3.885	0.000	.1890142	.5740884
ind_1	.2674217	.2324698	1.150	0.250	-.1883331	.7231765
ind_3	-.0478625	.2811349	-0.170	0.865	-.5990249	.5032999
ind_4	.0989348	.3109191	0.318	0.750	-.5106192	.7084888
ind_5	.1422572	.2435276	0.584	0.559	-.3351764	.6196908
ind_6	-.0120587	.2214486	-0.054	0.957	-.4462066	.4220892
ind_7	-.2965544	.2666058	-1.112	0.266	-.8192325	.2261237
ind_8	-.0059705	.2235739	-0.027	0.979	-.4442851	.4323441
ind_9	.055153	.2269301	0.243	0.808	-.3897414	.5000474
msa	-.5581457	.1361127	-4.101	0.000	-.8249935	-.291298
region2	.0964751	.2185933	0.441	0.659	-.332075	.5250252
region3	-.4223352	.1613907	-2.617	0.009	-.7387401	-.1059304
region4	-.1126265	.2113778	-0.533	0.594	-.5270307	.3017777
region5	-.4368398	.2067273	-2.113	0.035	-.8421267	-.0315529
region6	-.5310731	.1553083	-3.419	0.001	-.8355536	-.2265927
region7	-.2736738	.1513839	-1.808	0.071	-.5704606	.0231129
region8	.0612844	.180855	0.339	0.735	-.29328	.4158489
region9	.0068579	.1770345	0.039	0.969	-.3402165	.3539324
sources	.3108031	.0365586	8.502	0.000	.2391303	.3824759
_cons	-1.075657	.5702322	-1.886	0.059	-2.193592	.0422775

FearDen: Firm Did Not Apply, Fearing Denial—Model 4-b

```
Survey logistic regression

pweight:  new_wgt                                 Number of obs    =      2609
Strata:   newstrat                                Number of strata =        65
PSU:      <observations>                          Number of PSUs   =      2609
                                                  Population size  = 2.392e+08
                                                  F(  61,    2484) =      6.71
                                                  Prob > F         =    0.0000

------------------------------------------------------------------------------
    fearden |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
       afam |    .663036   .5107544     1.298   0.194    -.3385006    1.664573
     hispan |   1.086219   .5669278     1.916   0.055    -.0254676    2.197906
      asian |    .5947314  .7685041     0.774   0.439    -.9122258    2.101689
     female |  -.5990599   .3885196    -1.542   0.123    -1.360907    .1627868
        hhi |  -.2001328   1.019738    -0.196   0.844    -2.199734    1.799469
   afam*hhi |   2.815516   2.724151     1.034   0.301    -2.526262    8.157295
   hisp*hhi |  -1.885843   2.638341    -0.715   0.475    -7.059358    3.287673
    asn*hhi |  -.5649416   3.899693    -0.145   0.885    -8.211837    7.081954
    fml*hhi |   2.756637   1.549034     1.780   0.075      -.28086    5.794133
    lnasset |  -.3507682   .0683359    -5.133   0.000    -.4847678   -.2167686
   lntotemp |  -.0399073   .0856508    -0.466   0.641    -.2078596    .128045
   saleasst |  -.0099495   .0058963    -1.687   0.092    -.0215115    .0016125
   liabasst |  -.0255743   .0906153    -0.282   0.778    -.2032615    .1521129
   profasst |  -.0422923   .0500403    -0.845   0.398    -.1404161    .0558316
   bankrupt |   .8879008   .3475789     2.555   0.011     .2063345    1.569467
   pdelinq1 |   .7079629   .3998376     1.771   0.077    -.0760773    1.492003
   pdelinq2 |  -.0434857   .4368206    -0.100   0.921    -.9000458    .8130743
   pdelinq3 |   .9195927   .2674246     3.439   0.001     .3952005    1.443985
   bdelinq1 |   .2174668   .3285251     0.662   0.508    -.4267371    .8616707
   bdelinq2 |   1.69281    .3586414     4.720   0.000     .9895508    2.396068
   bdelinq3 |   .9158672   .1953573     4.688   0.000     .5327918    1.298943
   judgment |   .7101421   .3282621     2.163   0.031     .0664539    1.35383
    credscr |  -.0096402   .0025319    -3.807   0.000    -.0146051   -.0046753
  prim_fin  |  -.3344678   .4846923    -0.690   0.490    -1.284899    .6159638
  rel_prim  |  -.0192434   .0125831    -1.529   0.126    -.0439176    .0054307
      ccorp |   .2726388   .2254651     1.209   0.227     -.169475    .7147525
      scorp |   .2081743   .2237087     0.931   0.352    -.2304953    .6468439
    partner |  -.1067405   .3419467    -0.312   0.755    -.7772626    .5637817
      lnage |  -.078308    .1246236    -0.628   0.530    -.3226819    .166066
   franchis |   .1970332   .4466906     0.441   0.659     -.678881    1.072947
    d6_natn |   .2976593   .2404053     1.238   0.216    -.1737506    .7690692
   d6_outsd |   .4639853   .4307478     1.077   0.282    -.3806667    1.308637
     d6_reg |   .0171834   .1605977     0.107   0.915    -.2977321    .332099
   checking |   .9218242   .7713073     1.195   0.232    -.5906298    2.434278
     saving |  -.3661318   .1659895    -2.206   0.027     -.69162    -.0406436
     not_hs |   .5146032   .3855258     1.335   0.182    -.2413731    1.27058
    college |  -.216263    .1735881    -1.246   0.213    -.5566514    .1241254
      exper |   .0081333   .0079672     1.021   0.307    -.0074896    .0237562
     manage |  -.0748126   .1849669    -0.404   0.686    -.4375137    .2878885
     ownshr |   .0010889   .0032923     0.331   0.741    -.0053671    .0075448
      tcuse |  -.0930439   .1697563    -0.548   0.584    -.4259185    .2398308
      ind_1 |  -.530223    .4004996    -1.324   0.186    -1.315561    .2551153
      ind_3 |  -.4084318   .4176937    -0.978   0.328    -1.227486    .4106224
      ind_4 |  -.0049359   .4401732    -0.011   0.991    -.8680702    .8581984
      ind_5 |  -.3861265   .3908144    -0.988   0.323    -1.152473    .3802202
      ind_6 |  -.4227756   .3752377    -1.127   0.260    -1.158578    .3130268
      ind_7 |   .0358379   .454308     0.079   0.937    -.8550133    .9266891
      ind_8 |  -.401926    .3766257    -1.067   0.286     -1.14045    .3365982
      ind_9 |  -.7280116   .3866276    -1.883   0.060    -1.486149    .0301253
        msa |   .7175332   .2220337     3.232   0.001      .282148    1.152918
   region2  |  -.1699024   .3349737    -0.507   0.612    -.8267513    .4869465
   region3  |   .374759    .2738079     1.369   0.171     -.16215     .911668
   region4  |   .2977784   .3352614     0.888   0.375    -.3596347    .9551914
   region5  |   .5607614   .3140658     1.785   0.074    -.0550892    1.176612
   region6  |   .5778946   .253987      2.275   0.023     .0798523    1.075937
   region7  |   .3772537   .2423465     1.557   0.120    -.0979628    .8524702
   region8  |  -.0491951   .2800222    -0.176   0.861    -.5982897    .4998994
   region9  |   .2621824   .2741902     0.956   0.339    -.2754763    .7998411
     loan2  |  -3.388246   .3605612    -9.397   0.000    -4.095269   -2.681223
   sources  |   .114303    .0475047     2.406   0.016     .0211512    .2074547
   edenall  |   .5794576   .1869325     3.100   0.002     .2129023    .946013
      _cons |   1.194129   1.220642     0.978   0.328    -1.199424    3.587681
------------------------------------------------------------------------------
```

***EverDen*: Firm Denied Credit Anytime Over the Past Three Years—Model 4-c**

```
Survey logistic regression

pweight:  new_wgt                                 Number of obs    =      1985
Strata:   newstrat                                Number of strata =        65
PSU:      <observations>                          Number of PSUs   =      1985
                                                  Population size  = 1.690e+08
                                                  F(  60,   1861)  =      3.75
                                                  Prob > F         =    0.0000

------------------------------------------------------------------------------
 everden |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
---------+--------------------------------------------------------------------
    afam |  -.3146192   .6932678    -0.454  0.650    -1.674256    1.045018
  hispan |  -.0119192   .6360845    -0.019  0.985    -1.259408     1.23557
   asian |   1.576638   1.084609     1.454  0.146     -.550498    3.703775
  female |  -1.389181   .4848468    -2.865  0.004    -2.340063    -.4382992
     hhi |  -2.143778   1.244714    -1.722  0.085     -4.58491     .2973549
afam*hhi |   8.345672   4.230668     1.973  0.049     .0484855    16.64286
hisp*hhi |   1.975196   2.922235     0.676  0.499    -3.755893    7.706284
 asn*hhi |  -5.548594   5.583076    -0.994  0.320    -16.49813    5.400937
 fml*hhi |   6.481088   2.114854     3.065  0.002     2.333436    10.62874
 lnasset |   -.189305   .0715613    -2.645  0.008     -.329651    -.048959
lntotemp |  -.0186351   .0942871    -0.198  0.843    -.2035509    .1662808
saleasst |   .0046813   .0095218     0.492  0.623    -.0139928    .0233555
liabasst |  -.0936714   .0724501    -1.293  0.196    -.2357605    .0484176
profasst |   -.018312   .0299968    -0.610  0.542    -.0771417    .0405177
bankrupt |   1.196255   .4969774     2.407  0.016     .2215832    2.170928
pdelinq1 |   .5985744    .606649     0.987  0.324    -.5911858    1.788334
pdelinq2 |   .4517929   .5499868     0.821  0.411    -.6268414    1.530427
pdelinq3 |   1.046667   .2904779     3.603  0.000     .4769811    1.616352
bdelinq1 |   .2223973   .4144858     0.537  0.592    -.5904923    1.035287
bdelinq2 |   .7841021   .3848726     2.037  0.042     .0292899    1.538914
bdelinq3 |   .3947217   .2254992     1.750  0.080    -.0475275    .8369709
judgment |   .6208068   .3667512     1.693  0.091    -.0984657    1.340079
 credscr |   -.009263   .0028407    -3.261  0.001    -.0148341    -.0036919
prim_fin |  -1.125175   .4917761    -2.288  0.022    -2.089647    -.1607041
relprim2 |  -.0291519   .0172074    -1.694  0.090    -.0628992    .0045953
   ccorp |  -.1410809   .2416778    -0.584  0.559    -.6150595    .3328976
   scorp |  -.1234382   .2456597    -0.502  0.615    -.6052261    .3583497
 partner |  -.8654036   .4413173    -1.961  0.050    -1.730915     .000108
  lnage2 |  -.3403329   .1201482    -2.833  0.005    -.5759677    -.1046982
franchis |   .5910389   .4323314     1.367  0.172    -.2568497    1.438927
 d6_natn |   .0925224   .2655314     0.348  0.728    -.4282378    .6132827
d6_outsd |  -.6816087   .7536889    -0.904  0.366    -2.159744    .7965261
  d6_reg |  -.1899332   .1811238    -1.049  0.294    -.5451532    .1652868
checking |  -.4685479   .6020719    -0.778  0.437    -1.649331    .7122357
  saving |  -.2213375   .1771294    -1.250  0.212    -.5687237    .1260488
  not_hs |   .9342699   .4502011     2.075  0.038     .0513354    1.817204
 college |  -.0040139   .2191183    -0.018  0.985    -.4337489     .425721
   exper |    .016814   .0089887     1.871  0.062    -.0008145    .0344426
  manage |  -.2391525   .2076135    -1.152  0.250    -.6463242    .1680191
 ownshr  |  -.0018842   .0035762    -0.527  0.598    -.0088978    .0051293
   tcuse |  -.2348881   .1863363    -1.261  0.208    -.6003309    .1305548
   ind_1 |   .5464176   .4679903     1.168  0.243    -.3714052     1.46424
   ind_3 |   .2897125   .5277204     0.549  0.583    -.7452529    1.324678
   ind_4 |   .3698727   .5208555     0.710  0.478    -.6516293    1.391375
   ind_5 |   .1914087   .4825261     0.397  0.692    -.7549217    1.137739
   ind_6 |   .2969666   .4437586     0.669  0.503     -.573333    1.167266
   ind_7 |   .2875391   .5255002     0.547  0.584    -.7430721     1.31815
   ind_8 |   .3169155   .4516166     0.702  0.483     -.568795    1.202626
   ind_9 |  -.1921658   .4715568    -0.408  0.684    -1.116983    .7326515
     msa |   .5100928   .2542821     2.006  0.045     .0113947    1.008791
 region2 |  -.4991767   .3918647    -1.274  0.203    -1.267702    .2693484
 region3 |   .4989364   .3151094     1.583  0.114    -.1190562    1.116929
 region4 |   .8210317   .3713988     2.211  0.027     .0926443    1.549419
 region5 |   .7524533   .3834111     1.963  0.050     .0005074    1.504399
 region6 |   .5516079   .3130625     1.762  0.078    -.0623704    1.165586
 region7 |   .4690972   .3007724     1.560  0.119    -.1207778    1.058972
 region8 |  -.0244323   .3406451    -0.072  0.943    -.6925055     .643641
 region9 |   .2714836   .3314859     0.819  0.413    -.3786266    .9215938
   loan4 |   .4889536   .2049285     2.386  0.017     .0870477    .8908595
 sources |   .0778036   .0499921     1.556  0.120    -.020241     .1758482
   _cons |   .5961835   1.074171     0.555  0.579    -1.510481    2.702848
------------------------------------------------------------------------------
```

***EverDen2*: Whether Firms Expressed Credit Needs Anytime Over the Past Three Years—Model 4-d**

```
Survey logistic regression

pweight:  new_wgt                                 Number of obs    =      2609
Strata:   newstrat                                Number of strata =        65
PSU:      <observations>                          Number of PSUs   =      2609
                                                  Population size  = 2.392e+08
                                                  F(  60,   2485)  =      6.71
                                                  Prob > F         =    0.0000

------------------------------------------------------------------------------
everden2 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
---------+--------------------------------------------------------------------
    afam |  -.0950153   .6174294    -0.154   0.878    -1.305731     1.1157
  hispan |   .3474578   .4761194     0.730   0.466    -.5861632    1.281079
   asian |   1.666616   .6575189     2.535   0.011     .3772896    2.955943
  female |  -1.478615   .4570512    -3.235   0.001    -2.374845    -.582385
     hhi |  -1.649723   1.113725    -1.481   0.139    -3.833623    .5341764
afam*hhi |   7.186176    3.73587     1.924   0.055     -.139479    14.51183
hisp*hhi |   1.501007   2.407959     0.623   0.533    -3.220752    6.222766
 asn*hhi |  -4.975638   3.189824    -1.560   0.119    -11.23055    1.279277
 fml*hhi |   6.846739   2.220077     3.084   0.002     2.493397    11.20008
 lnasset |  -.2831692   .0548267    -5.165   0.000    -.3906788   -.1756596
lntotemp |  -.0696042   .0737594    -0.944   0.345    -.2142387    .0750304
saleasst |   .0069539   .0062416     1.114   0.265    -.0052851     .019193
liabasst |  -.0957086   .0333672    -2.868   0.004    -.1611383   -.0302788
profasst |  -.0202146   .0263005    -0.769   0.442    -.0717873     .031358
bankrupt |   1.313492   .3770521     3.484   0.001     .5741315    2.052852
pdelinq1 |   .6698104   .5181286     1.293   0.196    -.3461863    1.685807
pdelinq2 |   .4623844   .5235095     0.883   0.377    -.5641638    1.488933
pdelinq3 |   1.126346   .2671951     4.215   0.000     .6024035    1.650288
bdelinq1 |   .2001223   .3509911     0.570   0.569    -.4881351    .8883796
bdelinq2 |   .7528339   .3525038     2.136   0.033     .0616104    1.444057
bdelinq3 |   .4247898    .198061     2.145   0.032     .0364127    .8131669
judgment |   .9047911   .3002005     3.014   0.003      .316129    1.493453
 credscr |  -.0082427   .0025982    -3.173   0.002    -.0133374    -.003148
prim_fin |  -.6222266    .460078    -1.352   0.176    -1.524392    .2799389
relprim2 |  -.1818168   .025228    -7.207   0.000    -.2312863   -.1323474
   ccorp |   .0763917   .2014935     0.379   0.705    -.3187162    .4714996
   scorp |   .0061364   .2052012     0.030   0.976    -.3962421    .4085148
 partner |  -.6186119   .3130677    -1.976   0.048    -1.232505   -.0047184
  lnage2 |   .1881377    .093588     2.010   0.045     .0046213    .371654
franchis |   .5618193   .3794453     1.481   0.139    -.1822339    1.305872
 d6_natn |   .1077351   .2174017     0.496   0.620    -.3185672    .5340374
d6_outsd |   .0974585   .4534883     0.215   0.830    -.7917852    .9867022
  d6_reg |  -.2351969   .1530466    -1.537   0.124    -.5353055    .0649117
checking |  -.4552862   .7394383    -0.616   0.538    -1.905248    .9946759
  saving |  -.3233179   .1590621    -2.033   0.042    -.6352223   -.0114135
  not_hs |   .8488081   .4348583     1.952   0.051    -.0039041    1.70152
 college |   -.06025   .1784011    -0.338   0.736    -.4100761    .2895761
   exper |   .0183964   .0080509     2.285   0.022     .0026094    .0341833
  manage |  -.0556488   .1881676    -0.296   0.767     -.424626    .3133285
 ownshr  |  -.0025595   .0030436    -0.841   0.400    -.0085278    .0034087
   tcuse |  -.2290429   .1486099    -1.541   0.123    -.5204516    .0623658
   ind_1 |    .359546   .3999676     0.899   0.369    -.4247491    1.143841
   ind_3 |  -.1684235    .452329    -0.372   0.710    -1.055394    .718547
   ind_4 |   .5176285   .4475321     1.157   0.248    -.3599359    1.395193
   ind_5 |   .2406664   .3920916     0.614   0.539    -.5281848    1.009518
   ind_6 |   .2085552   .3780794     0.552   0.581    -.5328194    .9499298
   ind_7 |   .1745938   .4410603     0.396   0.692    -.6902798    1.039468
   ind_8 |   .3841554   .3793288     1.013   0.311    -.3596692     1.12798
   ind_9 |  -.2645722   .3912395    -0.676   0.499    -1.031752    .5026081
     msa |   .6957813   .2452843     2.837   0.005     .2148041    1.176759
 region2 |  -.2854556   .3302533    -0.864   0.387    -.9330483    .3621371
 region3 |   .4817944   .2656267     1.814   0.070     -.039072    1.002661
 region4 |   .5664193    .332733     1.702   0.089    -.0860358    1.218874
 region5 |   .7178775   .3365627     2.133   0.033     .0579128    1.377842
 region6 |   .5020063   .2452354     2.047   0.041      .021125    .9828877
 region7 |   .3454707   .2403431     1.437   0.151    -.1258173    .8167586
 region8 |  -.1354179   .2945949    -0.460   0.646     -.713088    .4422522
 region9 |  -.0502363   .2756542    -0.182   0.855    -.5907658    .4902932
   loan4 |    .180327   .1626616     1.109   0.268    -.1386357    .4992897
 sources |  -.0140793    .047539    -0.296   0.767    -.1072983    .0791397
   _cons |   .3488017   .9588392     0.364   0.716    -1.531383    2.228986
------------------------------------------------------------------------------
```

***DenMRL*: Firm Denied for Most Recent Loan Application—Model 4-e**

```
Survey logistic regression

pweight:  new_wgt                                 Number of obs    =      1985
Strata:   newstrat                                Number of strata =        65
PSU:      <observations>                          Number of PSUs   =      1985
                                                  Population size  = 1.690e+08
                                                  F(  69,   1852)  =      3.46
                                                  Prob > F         =    0.0000

------------------------------------------------------------------------------
      denmrl |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        afam |   -.1219004   .6021046    -0.202   0.840    -1.302748    1.058947
      hispan |   -.1371871    .681315    -0.201   0.840    -1.473382    1.199008
       asian |    3.017853   1.199174     2.517   0.012     .6660315    5.369674
      female |   -1.240643   .4858862    -2.553   0.011    -2.193563   -.2877225
         hhi |   -.9525467   1.448338    -0.658   0.511    -3.793027    1.887934
    afam*hhi |      4.5196   3.207525     1.409   0.159    -1.770999     10.8102
    hisp*hhi |    .2643577   2.967939     0.089   0.929    -5.556366    6.085081
     asn*hhi |    -14.6457   6.476067    -2.262   0.024    -27.34656   -1.944832
     fml*hhi |    6.777387   2.005596     3.379   0.001     2.844012    10.71076
     lnasset |   -.2145738   .0946306    -2.267   0.023    -.4001632   -.0289843
    lntotemp |    -.050854   .1380573    -0.368   0.713     -.321612     .219904
    saleasst |    .0038636   .0122528     0.315   0.753    -.0201667    .0278939
    liabasst |   -.1121298     .07931    -1.414   0.158    -.2676725    .0434129
    profasst |   -.0555997    .030994    -1.794   0.073    -.1163852    .0051857
    bankrupt |    1.566217   .5359387     2.922   0.004     .5151341     2.6173
    pdelinq1 |   -.2196239   .5057288    -0.434   0.664    -1.211459    .7722115
    pdelinq2 |    .4389214    .449558     0.976   0.329    -.4427518    1.320595
    pdelinq3 |    .8596831   .3432916     2.504   0.012     .1864195    1.532947
    bdelinq1 |    .9401343   .5227193     1.799   0.072    -.0850228    1.965292
    bdelinq2 |    .7362493   .4359525     1.689   0.091    -.1187409     1.59124
    bdelinq3 |     .727736   .2675317     2.720   0.007     .2030526    1.252419
    judgment |    .5020597    .377676     1.329   0.184    -.2386386    1.242758
     credscr |   -.0083806   .0036132    -2.319   0.020    -.0154667   -.0012944
    fin_jbnk |    .9879594   .4727981     2.090   0.037     .0607077    1.915211
    rel_jbnk |    .0009773   .0176022     0.056   0.956    -.0335441    .0354988
       ccorp |   -.1222908   .3024522    -0.404   0.686    -.7154603    .4708786
       scorp |   -.0876665   .3042896    -0.288   0.773    -.6844393    .5091062
     partner |   -1.017542   .5560802    -1.830   0.067    -2.108127    .0730424
      lnage2 |   -.4722045    .139645    -3.381   0.001    -.7460764   -.1983327
    franchis |    1.253185   .4586491     2.732   0.006     .3536825    2.152688
     d6_natn |    .3665204   .3222839     1.137   0.256     -.265543    .9985837
    d6_outsd |   -.0858181   .9110794    -0.094   0.925    -1.872627    1.700991
      d6_reg |    .0080242   .2195339     0.037   0.971    -.4225257    .4385741
    checking |   -1.353957   .6568556    -2.061   0.039    -2.642182   -.0657318
      saving |   -.4069935   .2255334    -1.805   0.071    -.8493096    .0353227
      not_hs |    .7955468   .6081443     1.308   0.191    -.3971461     1.98824
     college |    .0136841   .2541173     0.054   0.957    -.4846909    .5120591
       exper |    .0101591   .0114793     0.885   0.376    -.0123541    .0326723
      manage |   -.5209372     .25504    -2.043   0.041    -1.021122   -.0207527
      ownshr |   -.0040735   .0046495    -0.876   0.381    -.0131922    .0050451
       tcuse |   -.5534379   .2271503    -2.436   0.015    -.9989252   -.1079506
       ind_1 |    .3189728   .5967099     0.535   0.593    -.8512947     1.48924
       ind_3 |    .2657084    .699294     0.380   0.704    -1.105747    1.637164
```

***DenMRL*: Firm Denied for Most Recent Loan Application—Model 4-e (continued)**

ind_4	.259972	.6610977	0.393	0.694	-1.036573	1.556517
ind_5	.3513362	.6002206	0.585	0.558	-.8258166	1.528489
ind_6	.3952232	.5626849	0.702	0.483	-.7083146	1.498761
ind_7	-.3866415	.6864648	-0.563	0.573	-1.732936	.9596535
ind_8	.1309859	.5708241	0.229	0.819	-.9885145	1.250486
ind_9	-.3660153	.6148469	-0.595	0.552	-1.571853	.8398226
msa	.7409081	.3349395	2.212	0.027	.0840246	1.397792
region2	-.7115811	.5368343	-1.326	0.185	-1.764421	.3412585
region3	.6090493	.3793167	1.606	0.109	-.1348667	1.352965
region4	.9787503	.4593923	2.131	0.033	.0777901	1.879711
region5	.5597462	.4895452	1.143	0.253	-.40035	1.519842
region6	.7523908	.3757695	2.002	0.045	.0154316	1.48935
region7	.84173	.3769745	2.233	0.026	.1024075	1.581053
region8	.115045	.4553621	0.253	0.801	-.7780113	1.008101
region9	.0604895	.3944588	0.153	0.878	-.7131233	.8341023
loan4	1.19942	.2723704	4.404	0.000	.6652474	1.733593
j5_asst	.1020683	.0349473	2.921	0.004	.0335297	.170607
mrl_loc	-.2436519	.3349521	-0.727	0.467	-.9005601	.4132563
mrl_mv	-1.127251	.4971096	-2.268	0.023	-2.102183	-.1523199
mrl_oth	.577051	.3538774	1.631	0.103	-.1169735	1.271075
mrl_leas	-.2531498	.6378409	-0.397	0.691	-1.504084	.997784
mrl_mrtg	-.2615629	.4433307	-0.590	0.555	-1.131023	.6078975
use_mrl	.227217	.2308115	0.984	0.325	-.2254505	.6798846
lend_src	-.4079752	.1416348	-2.880	0.004	-.6857494	-.1302011
mrl_prim	-.5028819	.2172298	-2.315	0.021	-.928913	-.0768508
mrl_9394	-.7655829	.2516407	-3.042	0.002	-1.259101	-.2720651
_cons	.1408846	1.359658	0.104	0.917	-2.525676	2.807446

IntRate: Interest Rate on Most Recent Loan—Model 4-f

```
Survey linear regression

pweight:  new_wgt                                 Number of obs    =      1682
Strata:   newstrat                                Number of strata =        65
PSU:      <observations>                          Number of PSUs   =      1682
                                                  Population size  = 1.378e+08
                                                  F(  79,   1539)  =      3.60
                                                  Prob > F         =    0.0000
                                                  R-squared        =    0.2587

------------------------------------------------------------------------------
     intrate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        afam |    1.965187   1.221429     1.609   0.108    -.4305625    4.360936
      hispan |     -1.1771   .7902371    -1.490   0.137    -2.727096    .3728964
       asian |   -.1209118   .6397868    -0.189   0.850     -1.37581    1.133986
      female |    .8536133   .4403557     1.938   0.053    -.0101145    1.717341
         hhi |    1.739021   .8948311     1.943   0.052    -.0161293    3.494172
    afam*hhi |   -10.71536   5.952226    -1.800   0.072    -22.39024    .9595287
    hisp*hhi |    6.28796   4.498685     1.398   0.162    -2.535905    15.11183
     asn*hhi |    1.586062   3.242807     0.489   0.625    -4.774484    7.946607
     fml*hhi |   -5.504027   1.933482    -2.847   0.004    -9.296421   -1.711632
     lnasset |    .0545042   .0916844     0.594   0.552    -.1253285    .2343368
    lntotemp |   -.1097438   .0822553    -1.334   0.182     -.271082    .0515944
    saleasst |    .0029083   .0095439     0.305   0.761    -.0158115    .0216281
    liabasst |     .229378   .0920049     2.493   0.013     .0489166    .4098395
    profasst |   -.0054794    .022603    -0.242   0.808    -.0498137    .0388549
    bankrupt |    .4407684   .5191697     0.849   0.396    -.5775477    1.459084
    pdelinq1 |   -1.642902   .7170258    -2.291   0.022    -3.049299   -.2365043
    pdelinq2 |     .346727   .4364106     0.794   0.427    -.5092627    1.202717
    pdelinq3 |   -.2154166   .3547189    -0.607   0.544    -.9111737    .4803404
    bdelinq1 |    .1328155   .5855173     0.227   0.821    -1.015637    1.281268
    bdelinq2 |   -.6383573   .3596754    -1.775   0.076    -1.343836    .0671216
    bdelinq3 |   -.0564221   .2288497    -0.247   0.805    -.5052953    .3924511
    judgment |    .4789663   .8350824     0.574   0.566    -1.158991    2.116924
     credscr |   -.0096765   .0025959    -3.728   0.000    -.0147682   -.0045847
    fin_jbnk |    1.611566   .7218182     2.233   0.026     .1957682    3.027363
    rel_jbnk |    .0068947   .0103793     0.664   0.507    -.0134637     .027253
       ccorp |   -.1935731    .238917    -0.810   0.418    -.6621926    .2750464
       scorp |   -.3186858   .2376431    -1.341   0.180    -.7848066     .147435
     partner |    .0021701   .3427628     0.006   0.995    -.6701358     .674476
      lnage2 |   -.0342034   .0986036    -0.347   0.729    -.2276076    .1592009
    franchis |     .072631   .2606944     0.279   0.781    -.4387033    .5839653
     d6_natn |    .0366255   .2100213     0.174   0.862    -.3753171     .448568
    d6_outsd |    .7135379   .3708593     1.924   0.055    -.0138775    1.440953
      d6_reg |    .2394296    .178321     1.343   0.180     -.110335    .5891942
    checking |   -1.347802   .6774614    -1.989   0.047    -2.676596   -.0190073
      saving |   -.0432293   .1537486    -0.281   0.779    -.3447967     .258338
      not_hs |    .5739139   1.143105     0.502   0.616    -1.668209    2.816037
     college |   -.1849878   .1923747    -0.962   0.336    -.5623176    .1923421
       exper |   -.0097392   .0075462    -1.291   0.197    -.0245405    .0050621
      manage |   -.1165896   .2088233    -0.558   0.577    -.5261824    .2930031
      ownshr |    .0018198   .0027106     0.671   0.502    -.0034968    .0071364
       tcuse |   -.1114754   .1961322    -0.568   0.570    -.4961754    .2732247
       ind_1 |   -.4386528    .610568    -0.718   0.473     -1.63624    .7589348
       ind_3 |   -.8067279   .5398658    -1.494   0.135    -1.865638    .2521822
       ind_4 |    .0600128   .6837102     0.088   0.930    -1.281038    1.401064
```

***IntRate*: Interest Rate on Most Recent Loan—Model 4-f (continued)**

ind_5	-.9638946	.6507715	-1.481	0.139	-2.240339	.3125494
ind_6	-.5506744	.5820286	-0.946	0.344	-1.692284	.5909352
ind_7	-.9348553	.6548937	-1.427	0.154	-2.219385	.3496743
ind_8	-.5765067	.5916162	-0.974	0.330	-1.736922	.5839084
ind_9	-.6228811	.5768509	-1.080	0.280	-1.754335	.5085728
msa	.1120929	.1949558	0.575	0.565	-.2702996	.4944854
region2	-.0538695	.2999968	-0.180	0.858	-.6422929	.5345538
region3	-.1674271	.3014785	-0.555	0.579	-.7587568	.4239026
region4	-.3490097	.3051099	-1.144	0.253	-.9474621	.2494427
region5	.3709809	.3843284	0.965	0.335	-.3828532	1.124815
region6	.7861103	.3277695	2.398	0.017	.1432127	1.429008
region7	.0568088	.2586393	0.220	0.826	-.4504946	.5641122
region8	.1011155	.2618709	0.386	0.699	-.4125264	.6147574
region9	-.0348252	.2460431	-0.142	0.887	-.517422	.4477717
bondsprd	.2432411	.3738255	0.651	0.515	-.4899923	.9764744
termprem	-.1949671	.1437865	-1.356	0.175	-.4769944	.0870603
mrl_indx	.6312593	.1419134	4.448	0.000	.3529059	.9096128
fixed	.5174601	.2538401	2.039	0.042	.01957	1.01535
pcol	-.0700024	.1604657	-0.436	0.663	-.3847449	.2447402
bcol	.1429574	.1445824	0.989	0.323	-.1406311	.4265459
guar	-.0815881	.1707471	-0.478	0.633	-.416497	.2533207
mrl_loc	-.0721576	.3184487	-0.227	0.821	-.6967731	.5524579
mrl_leas	.4613541	.5687721	0.811	0.417	-.6542536	1.576962
mrl_mrtg	.2548781	.3458926	0.737	0.461	-.4235669	.933323
mrl_mv	-.6821979	.3761729	-1.814	0.070	-1.420036	.0556398
mrl_oth	.9582798	.4187784	2.288	0.022	.1368745	1.779685
lend_src	.086702	.076378	1.135	0.256	-.0631083	.2365123
loan4	.0828621	.1820873	0.455	0.649	-.2742898	.4400139
mrl_9394	-.0147437	.2072976	-0.071	0.943	-.4213438	.3918564
mrl_prim	-.3711326	.212113	-1.750	0.080	-.7871779	.0449126
edenall	.5886543	.2838718	2.074	0.038	.031859	1.14545
invmat	-.7543634	.6287386	-1.200	0.230	-1.987592	.4788647
lnamtbrr	-.3078303	.0876563	-3.512	0.000	-.4797623	-.1358984
points	-.0588935	.0889554	-0.662	0.508	-.2333734	.1155863
fee_amt	.9863132	1.478274	0.667	0.505	-1.91322	3.885846
_cons	8.36461	2.202552	3.798	0.000	4.044453	12.68477

Estimated Coefficient for Line of Credit Analysis

***HaveLOC*: Firm Has a Line of Credit—Model 4-g**

```
Survey logistic regression

pweight:  new_wgt                                 Number of obs    =      4570
Strata:   newstrat                                Number of strata =        65
PSU:      <observations>                          Number of PSUs   =      4570
                                                  Population size  = 4.898e+08
                                                  F(  61,    4445) =      9.09
                                                  Prob > F         =    0.0000

------------------------------------------------------------------------------
 haveloc |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
---------+--------------------------------------------------------------------
    afam |  -.1657937   .2995411    -0.553   0.580    -.7530412    .4214537
  hispan |   .9329805   .4311089     2.164   0.031     .0877956    1.778166
   asian |  -.2138098   .3876909    -0.551   0.581    -.9738743    .5462546
  female |   .4003241   .2745959     1.458   0.145    -.1380185    .9386667
     hhi |   .8116375   .5873009     1.382   0.167    -.3397604    1.963035
afam*hhi |   .8757198   1.468067     0.597   0.551    -2.002412    3.753852
hisp*hhi |  -2.956606   2.108317    -1.402   0.161    -7.089942    1.176731
 asn*hhi |  -2.449537    1.77397    -1.381   0.167    -5.927388    1.028313
 fml*hhi |   -2.47597   1.166086    -2.123   0.034     -4.76207   -.1898695
 lnasset |   .3323905   .0427038     7.784   0.000     .2486701    .416111
lntotemp |   .1943599   .0544103     3.572   0.000     .087689    .3010307
saleasst |   .0065027   .0049871     1.304   0.192    -.0032744    .0162798
liabasst |   .1523841   .0702381     2.170   0.030     .0146829    .2900853
profasst |  -.0111386   .0200984    -0.554   0.579    -.0505414    .0282643
bankrupt |  -.5346259   .3634832    -1.471   0.141    -1.247231    .1779794
pdelinq1 |  -.6906822   .3636415    -1.899   0.058    -1.403598    .0222336
pdelinq2 |  -.1189769   .3251791    -0.366   0.714    -.7564874    .5185336
pdelinq3 |  -.4312232   .2151657    -2.004   0.045    -.8530536   -.0093928
bdelinq1 |  -.0619224    .277495    -0.223   0.823    -.6059486    .4821039
bdelinq2 |  -.0946755   .2629964    -0.360   0.719    -.6102776    .4209265
bdelinq3 |   .3199439   .1746199     1.832   0.067    -.0223966    .6622845
judgment |    -.16585   .2431246    -0.682   0.495    -.6424935    .3107935
 credscr |   .0016532   .0017949     0.921   0.357    -.0018656    .0051721
prim_fin |   .2756322   .3260816     0.845   0.398    -.3636477    .9149121
rel_prim |  -.0139825   .0069474    -2.013   0.044    -.0276028   -.0003622
   ccorp |   .0316321   .1464173     0.216   0.829    -.2554176    .3186818
   scorp |  -.0612551   .1568936    -0.390   0.696    -.3688435    .2463334
 partner |  -.2404166   .2241806    -1.072   0.284    -.6799206    .1990875
   lnage |  -.0196393   .0832528    -0.236   0.814    -.1828556     .143577
franchis |  -.3839942   .2898196    -1.325   0.185    -.9521828    .1841943
 d6_natn |   .3696878   .1652119     2.238   0.025     .0457914    .6935842
d6_outsd |    .052367   .3688438     0.142   0.887    -.6707479    .7754818
  d6_reg |   .4536512   .1086901     4.174   0.000     .2405653    .6667371
checking |   1.289831   .5776127     2.233   0.026     .1574268    2.422235
  saving |  -.0539082   .1111984    -0.485   0.628    -.2719116    .1640952
  not_hs |   -.419602   .2617832    -1.603   0.109    -.9328256    .0936216
 college |   .0664889   .1208151     0.550   0.582     -.170368    .3033458
   exper |  -.0129729   .0051896    -2.500   0.012    -.0231471   -.0027986
  manage |  -.0285285   .1275574    -0.224   0.823    -.2786035    .2215466
  ownshr |   .0018936   .0022038     0.859   0.390    -.0024269    .0062142
   tcuse |   .2944086   .1083353     2.718   0.007     .0820183    .5067989
   ind_1 |   .1191704   .2531151     0.471   0.638    -.3770595    .6154003
   ind_3 |  -.1200202   .2940572    -0.408   0.683    -.6965166    .4564763
   ind_4 |  -.4953797   .3414271    -1.451   0.147    -1.164744    .1739849
   ind_5 |   .2911938   .2583156     1.127   0.260    -.2152316    .7976191
   ind_6 |   .0041607   .2432083     0.017   0.986    -.4726468    .4809682
   ind_7 |  -.6263324   .3043254    -2.058   0.040    -1.222959   -.0297054
   ind_8 |   -.328419   .2521057    -1.303   0.193      -.82267    .1658319
   ind_9 |   .0454959   .2509825     0.181   0.856    -.4465529    .5375448
     msa |  -.3339829   .1442487    -2.315   0.021    -.6167812   -.0511846
 region2 |   .3047788   .2360886     1.291   0.197    -.1580708    .7676284
 region3 |  -.1244739   .1853198    -0.672   0.502    -.4877918    .2388439
 region4 |   .2737534   .2274743     1.203   0.229    -.1722079    .7197147
 region5 |  -.0137734   .2153596    -0.064   0.949    -.4359838    .4084371
 region6 |   .1037156   .1694858     0.612   0.541    -.2285597     .435991
 region7 |   .1094074   .1688053     0.648   0.517    -.2215338    .4403486
 region8 |   .6106629   .1932666     3.160   0.002     .2317655    .9895603
 region9 |   .3140703   .1951177     1.610   0.108    -.0684561    .6965966
 sources |   .2071534   .0362327     5.717   0.000     .1361195    .2781873
 edenall |   .2120359   .1667033     1.272   0.203    -.1147843     .538856
fearden2 |   -.369996   .1402033    -2.639   0.008    -.6448632   -.0951289
   _cons |    -2.7055   .7037607    -3.844   0.000    -4.085217   -1.325784
------------------------------------------------------------------------------
```

***ApplyLOC*: Firm Applied for a Line of Credit Within the Past Three Years—Model 4-h**

```
Survey logistic regression

pweight:  new_wgt                                 Number of obs    =      4570
Strata:   newstrat                                Number of strata =        65
PSU:      <observations>                          Number of PSUs   =      4570
                                                  Population size  = 4.898e+08
                                                  F(  55,   4451)  =      8.60
                                                  Prob > F         =    0.0000

------------------------------------------------------------------------------
applyloc |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
---------+--------------------------------------------------------------------
    afam |   .0174866   .1793758     0.097   0.922    -.3341779    .3691511
  hispan |  -.0718439   .2384791    -0.301   0.763      -.53938    .3956922
   asian |  -.5264758   .2276274    -2.313   0.021    -.9727372   -.0802144
  female |  -.1104649    .144737    -0.763   0.445    -.3942204    .1732907
     hhi |  -.0537694   .5696732    -0.094   0.925    -1.170608     1.06307
 lnasset |    .319439   .0449241     7.111   0.000     .2313657    .4075124
lntotemp |   .1436296   .0590497     2.432   0.015     .0278633    .2593959
saleasst |   .0089945   .0049546     1.815   0.070    -.000719    .0187081
liabasst |   .2042971   .0740381     2.759   0.006     .0591461    .3494481
profasst |   -.001299    .010822    -0.120   0.904    -.0225154    .0199174
bankrupt |   -.156983   .3800853    -0.413   0.680    -.9021366    .5881706
pdelinq1 |  -.7777756   .4060641    -1.915   0.056     -1.57386    .0183093
pdelinq2 |  -.4558454    .367689    -1.240   0.215    -1.176696    .2650055
pdelinq3 |   .1822651   .2193775     0.831   0.406    -.2478224    .6123526
bdelinq1 |   .0495153   .2867692     0.173   0.863     -.512693    .6117237
bdelinq2 |   .1527077   .2670996     0.572   0.568    -.3709385    .6763538
bdelinq3 |   .0374587   .1833517     0.204   0.838    -.3220006    .3969179
judgment |  -.4781599   .2813671    -1.699   0.089    -1.029777    .0734577
 credscr |   .0000527   .0020164     0.026   0.979    -.0039005    .0040059
prim_fin |   .1900029   .3350254     0.567   0.571    -.4668113    .8468171
rel_prim |  -.0136504   .0084546    -1.615   0.106    -.0302254    .0029247
   ccorp |   .2694689   .1656426     1.627   0.104    -.0552719    .5942098
   scorp |   .1016938   .1759285     0.578   0.563    -.2432123    .4465999
 partner |  -.1146086   .2555696    -0.448   0.654    -.6156505    .3864332
   lnage |   .0865681   .0928506     0.932   0.351    -.0954647     .268601
franchis |  -.3728059   .3384191    -1.102   0.271    -1.036273    .2906616
 d6_natn |   .8114255   .1719172     4.720   0.000     .4743835    1.148468
d6_outsd |  -.1400369   .3677601    -0.381   0.703    -.8610271    .5809532
  d6_reg |    .500986   .1205225     4.157   0.000     .2647028    .7372691
checking |   .4535472   .5062865     0.896   0.370    -.5390228    1.446117
  saving |  -.0095869   .1222364    -0.078   0.937    -.2492303    .2300565
 not_hs  |  -.3772527   .3692846    -1.022   0.307    -1.101232    .3467263
 college |   .1236929   .1381455     0.895   0.371      -.14714    .3945257
   exper |  -.0242754   .0059917    -4.051   0.000    -.0360221   -.0125287
  manage |   .0006498   .1358579     0.005   0.996    -.2656984    .2669979
  ownshr |   .0011242   .0022944     0.490   0.624     -.003374    .0056224
   tcuse |   .3251594    .122771     2.649   0.008     .084468    .5658508
   ind_1 |   .0323999   .2653953     0.122   0.903    -.4879051    .5527049
   ind_3 |   -.075767   .3032703    -0.250   0.803    -.6703256    .5187917
   ind_4 |  -.2946383   .3562571    -0.827   0.408     -.993077    .4038005
   ind_5 |   .3953228   .2649619     1.492   0.136    -.1241325     .914778
   ind_6 |   .1592373   .2512395     0.634   0.526    -.3333154     .65179
   ind_7 |   -.435652    .326052    -1.336   0.182    -1.074874    .2035699
   ind_8 |  -.1440837   .2611776    -0.552   0.581     -.65612    .3679526
   ind_9 |   .2186486   .2584567     0.846   0.398    -.2880533    .7253504
     msa |  -.3079686   .1562655    -1.971   0.049    -.6143255   -.0016116
 region2 |    .202593   .2552318     0.794   0.427    -.2977865    .7029725
 region3 |  -.1560803    .197908    -0.789   0.430    -.5440771    .2319165
 region4 |   .0577387   .2581235     0.224   0.823     -.44831    .5637874
 region5 |  -.3592622   .2546866    -1.411   0.158    -.8585729    .1400485
 region6 |   -.237225   .1852476    -1.281   0.200    -.6004012    .1259513
 region7 |   -.149878   .1819647    -0.824   0.410    -.5066181    .2068621
 region8 |   .2050528   .2109798     0.972   0.331    -.2085711    .6186768
 region9 |    .230033   .2103045     1.094   0.274     -.182267     .642333
 sources |   .1300756   .0359837     3.615   0.000     .0595299    .2006213
   _cons |  -2.250442   .7474527    -3.011   0.003    -3.715817   -.7850685
------------------------------------------------------------------------------
```

DenLOC: Firm Denied for Most Recent Line of Credit Application—Model 4-i

```
Survey logistic regression

pweight:  new_wgt                                 Number of obs    =      1985
Strata:   newstrat                                Number of strata =        65
PSU:      <observations>                          Number of PSUs   =      1985
                                                  Population size  = 1.690e+08
Subpopulation no. of obs =      1126              F(  64,    1857)  =      3.01
Subpopulation size       =  84960462              Prob > F         =    0.0000

------------------------------------------------------------------------------
  denmrl |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
---------+--------------------------------------------------------------------
    afam |  -2.038159   1.227675    -1.660   0.097    -4.445876    .3695586
  hispan |  -.2397445   1.240953    -0.193   0.847    -2.673503    2.194014
   asian |    3.40153   2.754008     1.235   0.217    -1.999632    8.802692
  female |  -1.647549   .9397444    -1.753   0.080    -3.490576    .1954782
     hhi |  -2.227937    2.17806    -1.023   0.306    -6.499549    2.043676
afam*hhi |   17.41808   6.760742     2.576   0.010     4.158915    30.67725
hisp*hhi |   -2.86094   6.903151    -0.414   0.679      -16.3994    10.67752
 asn*hhi |  -17.70938   15.98663    -1.108   0.268    -49.06235     13.6436
 fml*hhi |   6.760142   4.080287     1.657   0.098    -1.242117    14.7624
 lnasset |  -.4953449    .188166    -2.632   0.009     -.864376   -.1263138
lntotemp |   .0901167   .2376006     0.379   0.705    -.3758657    .5560991
saleasst |   .0037953   .0144758     0.262   0.793    -.0245947    .0321853
liabasst |  -.0568826   .1254353    -0.453   0.650    -.3028863    .1891211
profasst |  -.0317495   .0509276    -0.623   0.533    -.1316287    .0681296
bankrupt |   1.421161   1.297188     1.096   0.273    -1.122885    3.965206
pdelinq1 |   1.364864   .8049785     1.696   0.090    -.2138596    2.943588
pdelinq2 |  -.1052338   .7149554    -0.147   0.883    -1.507404    1.296937
pdelinq3 |   .9678693   .5393092     1.795   0.073    -.0898239    2.025563
bdelinq1 |   1.563188   .8676887     1.802   0.072     -.138523      3.2649
bdelinq2 |   1.405856   .5243426     2.681   0.007     .3775147    2.434197
bdelinq3 |   .6183585    .437131     1.415   0.157     -.238943     1.47566
judgment |  -.5400308   .5824127    -0.927   0.354    -1.682259    .6021972
 credscr |  -.0119555   .0059174    -2.020   0.043    -.0235608   -.0003502
fin_jbnk |   4.309286    .971297     4.437   0.000     2.404378    6.214194
rel_jbnk |  -.0342945   .0347147    -0.988   0.323     -.102377    .033788
    ccorp |  -.4937811   .4528595    -1.090   0.276    -1.381929    .3943671
    scorp |   .2241021   .5147429     0.435   0.663    -.7854119    1.233616
  partner |  -1.473948   1.096869    -1.344   0.179    -3.625128    .6772321
   lnage2 |  -.4121524   .2283919    -1.805   0.071    -.8600746    .0357699
franchis |   1.222556   .7038222     1.737   0.083    -.1577804    2.602892
 d6_natn |   .0356342   .4472692     0.080   0.937    -.8415502    .9128186
d6_outsd |  -1.379139   .9881705    -1.396   0.163    -3.317139    .5588613
  d6_reg |  -.5291335   .3826942    -1.383   0.167    -1.279673    .2214064
checking |  -5.103903   1.311141    -3.893   0.000    -7.675313   -2.532493
  saving |  -.5208617   .4138354    -1.259   0.208    -1.332476    .2907524
  not_hs |   1.361571    1.10739     1.230   0.219    -.8102417    3.533385
 college |   .0126631   .5135404     0.025   0.980    -.9944924    1.019819
   exper |   .0160317    .019087     0.840   0.401    -.0214017     .053465
  manage |   .0361907   .4407311     0.082   0.935    -.8281712    .9005526
  ownshr |  -.0093616   .0074957    -1.249   0.212    -.0240622     .005339
   tcuse |  -.5912233   .3540416    -1.670   0.095     -1.28557    .1031232
   ind_1 |   .5349364   1.133446     0.472   0.637    -1.687978    2.757851
   ind_3 |   1.274546   1.095538     1.163   0.245    -.8740234    3.423115
   ind_4 |   1.104027   1.175258     0.939   0.348    -1.200888    3.408943
   ind_5 |   .6646666   1.085321     0.612   0.540    -1.463864    2.793198
   ind_6 |   .6230336   1.094444     0.569   0.569    -1.523391    2.769458
   ind_7 |   1.777271   1.122648     1.583   0.114    -.4244676    3.979009
   ind_8 |   .3845042   1.094064     0.351   0.725    -1.761174    2.530182
   ind_9 |  -.2761231   1.103191    -0.250   0.802    -2.439701    1.887455
     msa |   .6310185   .6750473     0.935   0.350    -.6928845    1.954921
 region2 |  -6.806569   1.574168    -4.324   0.000    -9.893828   -3.719311
 region3 |   .3845067   .6905469     0.557   0.578    -.9697941    1.738808
 region4 |   1.036104   .7547769     1.373   0.170    -.4441649    2.516373
 region5 |    .610915   .7501525     0.814   0.416    -.8602843    2.082114
 region6 |   .1387811   .6585128     0.211   0.833    -1.152694    1.430257
 region7 |   1.149356   .7030087     1.635   0.102    -.2293845    2.528097
 region8 |  -.2443715    .770941    -0.317   0.751    -1.756341    1.267598
 region9 |  -.3225525   .6745395    -0.478   0.633    -1.645459    1.000354
   loan4 |   1.356737   .4827203     2.811   0.005     .4100261    2.303449
 j5_asst |   .0424198   .0434634     0.976   0.329    -.0428207    .1276603
 use_mrl |   .8555328   .3939477     2.172   0.030     .0829224    1.628143
lend_src |   -.278055   .2010744    -1.383   0.167    -.6724022    .1162923
mrl_prim |  -.6330746   .3681434    -1.720   0.086    -1.355078    .0889284
mrl_9394 |  -1.068593   .4551489    -2.348   0.019    -1.961231   -.1759548
    _cons |  -.3460168   2.459082    -0.141   0.888     -5.16877    4.476736
------------------------------------------------------------------------------
```

***RateLOC*: Interest Rate on Most Recent Line of Credit—Model 4-j**

```
Survey linear regression

pweight:  new_wgt                                 Number of obs    =      1682
Strata:   newstrat                                Number of strata =        65
PSU:      <observations>                          Number of PSUs   =      1682
                                                  Population size  = 1.378e+08
                                                  F(  73,   1545)  =      8.77
Subpopulation no. of obs =      1001              Prob > F         =    0.0000
Subpopulation size       =  71902374              R-squared        =    0.3641

------------------------------------------------------------------------------
 intrate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
---------+--------------------------------------------------------------------
    afam |  -.6560109   .6187905    -1.060   0.289    -1.869726    .5577046
  hispan |  -2.123856   .9851314    -2.156   0.031    -4.056124   -.1915875
   asian |   .6051959   .6496487     0.932   0.352    -.6690459    1.879438
  female |   .3298722   .5175852     0.637   0.524    -.6853361     1.34508
     hhi |  -.9951155   .8040823    -1.238   0.216    -2.572268    .5820373
afam*hhi |   1.601559   2.909409     0.550   0.582     -4.10505    7.308167
hisp*hhi |   12.39563   5.606299     2.211   0.027     1.399256    23.39201
 asn*hhi |  -1.017043   4.020739    -0.253   0.800    -8.903448    6.869363
 fml*hhi |  -1.432557    2.43404    -0.589   0.556    -6.206762    3.341647
 lnasset |   .0036621   .1031739     0.035   0.972    -.1987064    .2060306
lntotemp |  -.1393115   .0824975    -1.689   0.091    -.3011248    .0225018
saleasst |  -.0058321   .0067987    -0.858   0.391    -.0191672     .007503
liabasst |   .3347048   .0828702     4.039   0.000     .1721605    .4972492
profasst |  -.0104409   .0193518    -0.540   0.590    -.0483982    .0275164
bankrupt |   1.204694   .6225928     1.935   0.053    -.0164791    2.425868
pdelinq1 |   .1296381   .5499143     0.236   0.814    -.9489814    1.208258
pdelinq2 |   .9158282   .3668132     2.497   0.013      .196349    1.635308
pdelinq3 |   .3552549   .3384186     1.050   0.294    -.3085303     1.01904
bdelinq1 |  -.1993436   .5103212    -0.391   0.696    -1.200304    .8016168
bdelinq2 |   .0515464   .3222174     0.160   0.873    -.5804612    .6835539
bdelinq3 |  -.4281183   .2083355    -2.055   0.040    -.8367543   -.0194823
judgment |  -.4952485   .5038323    -0.983   0.326    -1.483481    .4929844
 credscr |   -.006761   .0023168    -2.918   0.004    -.0113052   -.0022168
fin_jbnk |    2.53207   .8947086     2.830   0.005       .77716    4.28698
rel_jbnk |   .0082579   .0091103     0.906   0.365    -.0096113    .0261271
   ccorp |  -.1707104   .2643272    -0.646   0.518    -.6891703    .3477494
   scorp |  -.2705093   .2684065    -1.008   0.314    -.7969704    .2559518
 partner |  -.2532384   .3522313    -0.719   0.472    -.9441161    .4376393
  lnage2 |   .0083528   .0968138     0.086   0.931    -.1815409    .1982464
franchis |   .2637244   .3167857     0.833   0.405    -.3576292    .8850781
 d6_natn |   .2049917   .2007292     1.021   0.307    -.1887249    .5987084
d6_outsd |   .7693182   .4287744     1.794   0.073    -.0716936     1.61033
  d6_reg |   .4116687   .1812026     2.272   0.023     .0562521    .7670853
checking |  -2.185741   .6671172    -3.276   0.001    -3.494246   -.8772358
  saving |   .2335393   .1483574     1.574   0.116    -.0574537    .5245322
  not_hs |  -.1734908   .4083704    -0.425   0.671    -.9744817       .6275
 college |    -.04014   .2054633    -0.195   0.845    -.4431424    .3628623
   exper |   -.000837   .0073599    -0.114   0.909    -.0152731    .013599
  manage |  -.3223913   .1903447    -1.694   0.091    -.6957396    .050957
  ownshr |  -.0004231   .0027408    -0.154   0.877     -.005799    .0049527
   tcuse |  -.1612073   .1703936    -0.946   0.344    -.4954229    .1730082
   ind_1 |   .4529234   .3709717     1.221   0.222    -.2747125    1.180559
```

RateLOC: Interest Rate on Most Recent Line of Credit—Model 4-j (continued)

ind_3	-.0527458	.326003	-0.162	0.871	-.6921786	.5866871
ind_4	.1437242	.4329702	0.332	0.740	-.7055174	.9929658
ind_5	-.5830754	.360975	-1.615	0.106	-1.291103	.1249526
ind_6	-.039323	.3348181	-0.117	0.907	-.696046	.6174
ind_7	-.0250409	.3897296	-0.064	0.949	-.7894691	.7393873
ind_8	.0022949	.3188308	0.007	0.994	-.62307	.6276597
ind_9	.1229478	.3291272	0.374	0.709	-.5226129	.7685085
msa	-.2800313	.1963642	-1.426	0.154	-.6651864	.1051237
region2	-.1671431	.3000498	-0.557	0.578	-.7556705	.4213843
region3	-.1816678	.2416445	-0.752	0.452	-.6556371	.2923016
region4	-.2189838	.3266158	-0.670	0.503	-.8596185	.4216509
region5	-.3070251	.3342644	-0.919	0.358	-.962662	.3486118
region6	.91789	.2537269	3.618	0.000	.4202219	1.415558
region7	-.3288677	.2123095	-1.549	0.122	-.7452984	.0875631
region8	.911531	.2856032	3.192	0.001	.3513397	1.471722
region9	.1448836	.247126	0.586	0.558	-.3398372	.6296045
bondsprd	-.02616	.3256476	-0.080	0.936	-.6648957	.6125757
termprem	-.2289627	.164169	-1.395	0.163	-.5509692	.0930437
mrl_indx	.7237643	.1010647	7.161	0.000	.5255329	.9219958
fixed	.3290422	.255195	1.289	0.197	-.1715054	.8295898
pcol	-.0349054	.1623716	-0.215	0.830	-.3533862	.2835754
bcol	.4283849	.1492447	2.870	0.004	.1356515	.7211183
guar	-.0578959	.1610784	-0.359	0.719	-.3738402	.2580484
lend_src	.0214961	.0530574	0.405	0.685	-.0825724	.1255646
loan4	.0617827	.1806012	0.342	0.732	-.2924543	.4160198
mrl_9394	-.505437	.2777224	-1.820	0.069	-1.050171	.0392966
mrl_prim	-.1664903	.2215859	-0.751	0.453	-.601116	.2681355
edenall	.3856946	.264888	1.456	0.146	-.1338653	.9052544
invmat	.1630452	.701796	0.232	0.816	-1.21348	1.53957
lnamtbrr	-.2201448	.0910297	-2.418	0.016	-.3986934	-.0415962
points	.0051971	.0950354	0.055	0.956	-.1812084	.1916026
fee_amt	1.068651	1.606493	0.665	0.506	-2.082375	4.219677
_cons	7.26014	2.298427	3.159	0.002	2.75193	11.76835

Estimated Coefficients for Loan Analysis—Model 4

***Loan*: Firm Has Loans—Model 4-k**

Survey logistic regression

pweight: new_wgt — Number of obs = 4570
Strata: newstrat — Number of strata = 65
PSU: <observations> — Number of PSUs = 4570
Population size = 4.898e+08
F(61, 4445) = 8.85
Prob > F = 0.0000

loan	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
afam	-.1066299	.2846705	-0.375	0.708	-.6647237	.451464
hispan	.5198318	.33925	1.532	0.126	-.1452646	1.184928
asian	-.269711	.4088522	-0.660	0.509	-1.071262	.5318399
female	-.0659963	.2522783	-0.262	0.794	-.5605856	.4285929
hhi	.1805816	.6385655	0.283	0.777	-1.07132	1.432483
afam*hhi	-.1656297	1.310497	-0.126	0.899	-2.734847	2.403588
hisp*hhi	-1.80436	1.500708	-1.202	0.229	-4.746484	1.137763
asn*hhi	-.5421558	2.130546	-0.254	0.799	-4.71907	3.634759
fml*hhi	.2388213	1.062363	0.225	0.822	-1.843932	2.321575
lnasset	.3360547	.0441561	7.611	0.000	.2494871	.4226223
lntotemp	.148892	.0641233	2.322	0.020	.0231789	.2746052
saleasst	-.0043073	.0058998	-0.730	0.465	-.0158737	.0072592
liabasst	.3706168	.1522642	2.434	0.015	.0721042	.6691293
profasst	-.0031909	.0111929	-0.285	0.776	-.0251344	.0187526
bankrupt	-.4465806	.3373745	-1.324	0.186	-1.108	.214839
pdelinq1	-.2693831	.2930867	-0.919	0.358	-.8439768	.3052106
pdelinq2	-.225176	.3278059	-0.687	0.492	-.8678364	.4174844
pdelinq3	-.3761533	.2354101	-1.598	0.110	-.8376726	.0853661
bdelinq1	-.064725	.2906556	-0.223	0.824	-.6345526	.5051026
bdelinq2	.2994027	.2678076	1.118	0.264	-.2256316	.8244369
bdelinq3	.597937	.2059071	2.904	0.004	.1942581	1.001616
judgment	-.3115386	.2502453	-1.245	0.213	-.8021422	.179065
credscr	.002362	.001955	1.208	0.227	-.0014707	.0061946
prim_fin	.237265	.3083673	0.769	0.442	-.3672862	.8418163
rel_prim	-.0169584	.0076695	-2.211	0.027	-.0319944	-.0019223
ccorp	-.2471284	.154792	-1.597	0.110	-.5505967	.0563398
scorp	-.1057385	.172252	-0.614	0.539	-.4434369	.2319599
partner	-.0094836	.2351132	-0.040	0.968	-.4704208	.4514535
lnage	-.0649613	.0893638	-0.727	0.467	-.2401581	.1102356
franchis	-.0292559	.3108318	-0.094	0.925	-.6386387	.580127
d6_natn	.1231179	.1957733	0.629	0.529	-.2606937	.5069295
d6_outsd	-.563373	.429375	-1.312	0.190	-1.405159	.2784126
d6_reg	.2553822	.1192382	2.142	0.032	.0216168	.4891476
checking	-.4619435	.3918986	-1.179	0.239	-1.230257	.3063701
saving	-.5297935	.1364577	-3.882	0.000	-.7973177	-.2622694
not_hs	-.1780722	.242628	-0.734	0.463	-.6537421	.2975978
college	-.1242897	.1179613	-1.054	0.292	-.3555517	.1069723
exper	-.0133301	.005676	-2.348	0.019	-.0244579	-.0022023
manage	.1183073	.1567332	0.755	0.450	-.1889666	.4255812
ownshr	.005174	.0027912	1.854	0.064	-.0002981	.010646
tcuse	.1653406	.1066945	1.550	0.121	-.043833	.3745143

Estimated Coefficients for Loan Analysis—Model 4

***Loan*: Firm Has Loans—Model 4-k (continued)**

ind_1	-.001419	.2589949	-0.005	0.996	-.5091762	.5063381
ind_3	-.3589117	.3240423	-1.108	0.268	-.9941936	.2763702
ind_4	.0893526	.3941012	0.227	0.821	-.6832792	.8619843
ind_5	-.5729263	.2839115	-2.018	0.044	-1.129532	-.0163204
ind_6	-.4418969	.2513694	-1.758	0.079	-.9347042	.0509104
ind_7	-.6652789	.3037321	-2.190	0.029	-1.260743	-.0698149
ind_8	-.3616315	.2458773	-1.471	0.141	-.8436716	.1204086
ind_9	-.6269715	.2631277	-2.383	0.017	-1.142831	-.1111122
msa	-.5332129	.1518103	-3.512	0.000	-.8308356	-.2355901
region2	.4685657	.294039	1.594	0.111	-.1078949	1.045026
region3	-.137883	.1831924	-0.753	0.452	-.4970301	.221264
region4	.1971285	.2453462	0.803	0.422	-.2838704	.6781275
region5	-.3134327	.2350897	-1.333	0.183	-.7743238	.1474584
region6	-.3355326	.173413	-1.935	0.053	-.6755072	.004442
region7	-.0550128	.1766935	-0.311	0.756	-.4014186	.2913931
region8	.584098	.2074995	2.815	0.005	.1772971	.9908989
region9	.1052458	.1891913	0.556	0.578	-.265662	.4761535
sources	1.442791	.0941195	15.329	0.000	1.258271	1.627311
edenall	.8327435	.2048551	4.065	0.000	.431127	1.23436
fearden2	.0516637	.1359893	0.380	0.704	-.2149419	.3182694
_cons	-.3826566	.6124468	-0.625	0.532	-1.583353	.8180397

Available Evidence Indicates that Black-Owned Firms are Often Denied Equal Access to Credit

Discussion Comments
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Introduction

In 1992, the Roper Organization polled 472 Black-business owners nationwide to gauge how they viewed their own firms, as well as Black businesses generally. Asked why there were so few Black-owned firms in the nation, 84 percent responded that "Black-owned businesses are impeded by a lack of access to financing" (Carlson, 1992, R 16).

The fact that Black-owned firms have less access to financing than Whites is well established and not controversial (Pierce, 1947; Bates, 1973; Bates, 1991; Cavalluzzo and Cavalluzzo, 1998). The interesting issue is whether Black-owned firms possessing identical firm and owner traits (other than race) have less access to credit than their twin White-owned firms. An impressive and growing body of evidence, including the conference papers by Cavalluzzo et al., (1999); Blanchflower et al., (1998); and Bostic and Lampani (1999), powerfully suggests that the answer is "yes."

The conclusions of individual studies of Black/White loan access disparities are not decisive because each of the relevant studies of small business borrowing has its own peculiarities, rooted in differing methodologies and data bases that imperfectly represent the broader small business universe. The findings of the studies gain credibility collectively because 1) they were conducted at different points in time, 2) they utilized data bases from widely varying sources, and, 3) despite their methodological differences, extremely consistent findings demonstrate large Black-White gaps in access to small business financing.

Faced with the totality of evidence, the obvious and non-controversial conclusion to be drawn is that Black-business borrowers have less access to credit than White firms with identical owner and business traits. Yet the important task of pinning down the sources of this apparent discriminatory access presents us with a research agenda that needs to be spelled out concretely. Furthermore, it is quite possible for

credible scholars to question whether discrimination has been indisputably demonstrated because the research agenda indeed is far from completion. The underlying data bases examined by researchers studying lending discrimination are not perfect. Absent the *very* large Black/White financing gaps repeatedly found in existing studies, the conclusion that data base improvements *alone* might be sufficient to demonstrate equal access to small business credit would be reasonable. But survey data will never give us perfect data, nor will prevailing research methodology permit all interested parties to reach complete agreement on the precise nature and magnitude of Black/White credit access issues. Disagreement will remain, but that is not important. What *is* important is that sufficient evidence of differential Black/White access to borrowing exists so that we can all agree upon the necessity of pinning down the nature of the processes that are producing this result. Those who would choose to ignore the prevailing evidence, dismissing discrimination because it is "unproven," are choosing to sanction profoundly unequal outcomes in small business credit availability. Ignoring the issue is no longer a reasonable option for a society committed to open, fair access to opportunities.

The New Evidence: Its Strengths and Weaknesses

Papers on access to credit for minority-owned business that were presented at the Federal Reserve System's March 1999 conference, Business Access to Credit and Capital, all utilize the same primary data base—the 1993 National Survey of Small Business Finances (NSSBF). The NSSBF, designed and overseen by the Board of Governors of the Federal Reserve System (the Board) and the U.S. Small Business Administration (SBA), was constructed by surveying 4,637 firms having less than 500 employees. Among these firms, analyses of credit access focused upon those that had sought loans (just over 2,000 firms) in the previous three years.

Common findings across the three studies that utilized the 1993 NSSBF data—Blanchflower et al. (1998); Cavalluzzo et al. (1999); and Bostic and Lampani (1999)—are twofold. First, financial institutions are extraordinarily important sources of credit for small businesses, accounting for the vast majority of debt financing flowing to small firms, whether minority or majority owned. Second, Black-owned firms have significantly less access to that debt financing than White-owned firms: "Businesses owned by African Americans were over two-and one-half times as likely to be denied credit on their most recent loan request than were businesses owned by White males" (Cavalluzzo et al. 1999, p.15). The key question is "why"?

All of the NSSBF-based studies agree that Black loan applicants were riskier, as a group, than the White firms: on average, they were

smaller and younger firms, and they reported higher incidences of weak business and owner personal credit histories. The Black loan applicants, furthermore, were more likely to have declared bankruptcy in the past, relative to Whites, and judgements had been rendered against the principle owner with greater frequency. Comparative loan denial rates—26.9 percent for Whites versus 65.9 percent for Blacks—may simply be a reflection of credit worthiness: the fact that Black-business applicants collectively are less creditworthy than Whites is not in dispute.

All of the NSSBF-based studies then proceed to control statistically for differences in traits of business owners, their firms, and the environments in which they operate: well over 100 control variables are utilized. In the numerous, creative statistical models that are introduced to explain denial of loan applications, one constant finding is that being Black, other things equal, is associated with having one's loan application rejected.

From the starting point of a 65.9 percent Black loan denial rate, for example, Blanchflower et al. (1998), like the other studies, find that the very high denial rate can be partially explained by the weaker credit histories of the generally smaller and younger Black firms. After including their "extensive list of control variables," Blanchflower et al. conclude that Black loan applicants "are still about 25 percentage points more likely to have their applications denied compared with White-owned firms" (1998, p.11).

The empirical findings of the Cavalluzzo and the Bostic, Lampani studies add their own distinctive and imaginative twists but their statistical findings broadly confirm Blanchflower: credit history, firm and owner traits notwithstanding, being Black is strongly linked to business loan application rejection. Bostic and Lampani's variable definition list (Table 1) documents the range of factors that they have explored in their attempt to explain loan denial patterns: 29 business characteristics, 15 owner traits, 20 most recent loan application characteristics, and, finally 53 banking market and local geographic characteristics (1999).

In their logistic regression analyses of likelihood of approval using all most recent loan applicants, Bostic and Lampani (1999) find that Blacks are only 45.4 percent as likely as Whites to have their applications approved; this is the approval differential remaining *after* controlling statistically for owner traits, business characteristics, broad geographic traits, banking market traits, and the specific nature of the loan application, including the history of the relationship of the applicant to the institution evaluating the loan. Bostic and Lampani then add another twist, thus defining their particular contribution: "our results show that the economic and demographic characteristics of a firm's *local geography* should be considered if a more accurate quantification of these racial disparities and understanding of their

underlying sources is desired." In brief, they add still more variables to their statistical analysis of loan approval. When they add these additional local geography traits, their findings indicate that Black firms are 56.3 percent as likely as Whites to have their loan applications approved. This wide differential is actually larger than the Black/White approval differential identified by the Blanchflower study.

What Do We Make of These Findings?

The findings of disproportionate loan denial among Black business applicants, based upon the 1993 NSSBF data base, simply reinforce conclusions of earlier studies. Ando (1988), using SBA survey data, found the same pattern of Black business loan denial that was reported by Blanchflower et al. (1998) and the other papers discussed above. Black borrowers were much less likely than Whites to have their business loan applications approved; Ando (1988) demonstrated more than a decade ago that the approval rate differentials persisted when various measures of business (and owner) credit risk were added to the econometric analysis. Ando looked solely at business loans.

My study of business startup financing revealed that Blacks are more likely than Whites to finance business formation with forms of consumer credit—home equity loans, credit cards, and the like (Bates, 1997b). Getter's recent study of consumer lending, utilizing the Federal Reserve Board's 1995 Survey of Consumer Finances, suggests that Blacks and Hispanics are nearly twice as likely as Whites to have their credit applications rejected by banks. Getter then introduced controls for applicant income, net worth, credit history, age, current monthly debt payment obligations, self-employment status, and various other factors; Blacks and Hispanics, other factors constant, were more likely to be turned down than Whites (1998). Of greatest relevance to this study, Getter found that self-employed Black and Hispanic loan applicants were more likely to be turned down than other Blacks and Hispanics. Among Whites, disproportionate rejection of self-employed applicants was not observed.

Once approved, the next issue is loan terms. I used Characteristics of Business Owners (CBO) data from the U.S. Bureau of the Census to investigate financial institution loan amounts received by small business startups, looking first at firms active in 1982 and, secondly, at firms active in 1987 (Bates, 1990; Bates, 1991; Bates, 1997a). Irrespective of the year or the precise business subset under consideration , several patterns recur constantly: 1) the average White loan recipient borrows over twice as much as the Black business startup; 2) the average White loan recipient more effectively leverages his/her equity. Among firms nationwide and active in 1987, for example, the mean debt/equity ratios for White and Black business startups

tapping financial institution credit were 2.99 and 2.38 respectively. Controlling for borrower demographic traits, borrower human capital, firm traits, borrower equity investment in the firm, and other factors, Blacks were found to receive smaller loan amounts than Whites having identical measured traits (Bates, 1991; Bates, 1997b).

The findings of the individual studies discussed throughout this paper are reinforced by the broad consistency of empirical results across studies. While it is difficult to infer probable discrimination against Black business borrowers based upon any individual study, it becomes difficult not to infer discrimination when a variety of studies conducted in different years, based upon different data bases, employing various methodologies, all produce consistent empirical evidence of Black loan applicant disadvantage.

The totality of the evidence points toward discriminatory treatment of Black business borrowers, as Blanchflower et al. (1998) note, not only because the normal tests of regression coefficient statistical significance are consistent with the hypothesis of discrimination. In addition, "the *magnitude* of the racial difference in small business loan approval rates is substantial, even after controlling for observed differences in credit-worthiness, and considerably larger than that found in the analysis of discrimination in mortgage markets" (Blanchflower, et al. 1998, p.23). Yet Bostic and Lampani (1999) are clearly unwilling to draw inferences of discriminatory treatment, even though their econometric analyses of loan approval produce the same "large and statistically significant Black/White difference" (p. 16) as the other studies of loan approval and denial.

Suggesting that no survey of loan applicants is *ever* likely to demonstrate discrimination, quite irrespective of its empirical content, Bostic and Lampani conclude that "drawing firm conclusions about the sources of differences in the credit market experiences of small businesses with owners of different races is difficult" (1999, p.17). Their implication is that we can never be sure that we have collected all of the relevant information: "missing variables may be relevant to a potential lender..."(p.16).

The 1993 NSSBF data base is certainly capable of being improved, but the notion that every possible variable that could conceivably be of interest to potential lenders has to be included in one's data base is profoundly incorrect. Consider, for example, the 53 banking market and local geographic characteristics that were analyzed in the Bostic, Lampani study. These include such factors as neighborhood median household income, poverty rate, unemployment rate, home values, and so forth. Claiming that business location in a healthy local market encourages banks to approve loans, Bostic and Lampani state that "lenders are concerned about local conditions when evaluating firm loan applications" (1999, p.15). This seems plausible, although hardly in the spirit of the community reinvestment act.

Yet there are important reasons why Bostic and Lampani gain little, if any, insight into loan approval dynamics when they add dozens geographic characteristics to their empirical analysis. Simply stated, the impacts of such factors have already been embodied in the balance sheets, income statements, and credit histories of small businesses that are beyond their startup phase of operations. Indeed, if firm location in a poor neighborhood creates a net disadvantage, then that net disadvantage will manifest itself as reduced sales revenues or increased operating costs, or both. Reduced sales and, or increased costs rooted in locational disadvantages, in turn, will be reflected in the net income statement of the applicable small business, in the form of reduced profits. Over time a reduced profit flow will reshape the firm's balance sheet, hurting factors like liquidity and net worth, relative to firms not suffering from locational disadvantages (Bates, 1973). Such factors as reduced profits and liquidity, in turn, are likely to impact negatively upon a firm's credit rating if they persist, because they are a concrete reflection of the firm's capacity to pay its bills on a timely basis. The credit history, balance sheet, and profit/loss statement of a small business, in fact, are more likely to reflect accurately the operating milieu of the firm than the various geographic factors that Bostic and Lampani have introduced. They are simply trying to measure the impact of factors that have already been captured by the operating statements and credit history of established, ongoing firms. That is why banks focus upon these factors, not neighborhood poverty rates, when they evaluate loan applications from small businesses.

Identifying the Processes that Handicap Black Business Access to Credit

Access to financing for small businesses generally, as well as possible barriers disproportionately impacting Black loan applicants, are best investigated in the context where they are most relevant. Some firms need financing more than others. At the points of firm formation and early growth, for example, businesses in capital-intensive fields have a particularly acute need to have access to financial capital (Bates, 1997a). As firms mature, establishment of an operational track record eases capital access constraints for the viable small businesses.

Black-owned businesses, on average, begin operations with less than half the capitalization of White-owned firms (Bates, 1997a). The gap is even wider in capital-intensive industries. The two most capital-intensive lines of small business are manufacturing and wholesaling. Among young firms operating nationwide in 1987 in these fields, average startup capitalization (debt and equity) was $37,571 and $92,935, respectively, for the Black- and White-owned businesses; corresponding means for leverage (debt divided by equity) were 0.96 and 1.41 respectively (Bates, 1999). Low startup capitalization results in stunted

firms in fields like manufacturing, and the predictable consequence is higher rates of business closure for Black owners, relative to Whites (Bates, 1991; Bates, 1997a).

Instead of concentrating upon the younger small firms most vulnerable to restricted capital accessibility, the 1993 NSSBF data analyzed by Blanchflower et al. (1998) and others focuses disproportionately upon loan accessibility for the older, more established small firms. Among the firms in the NSSBF data base, 4.1 percent had been in operation for less than three years; 14.5 percent were less than five years old (Blanchflower et al. 1998). Indeed, the median age for these 4,637 NSSBF firms was 14.3 years (Cavalluzzo et al. 1999). Nationwide, the median age for all minority-owned firms is five to six years (five years for Asians and Hispanics, six years for Blacks), according to Census Bureau data.

Many of the Black-owned businesses most vulnerable to loan access difficulties were dead and gone before they were sufficiently mature to be likely candidates for inclusion in the NSSBF data base. Among the young firms actually appearing in the NSSBF data, Blanchflower et al. (1998) found that they were much more likely to have their loan applications denied, other factors constant, than older firms. The NSSBF, in brief, simply is not an appropriate data base for investigating the problems of the types of small businesses that are most vulnerable to credit access constraints. An appropriate data base would oversample the younger firms in operation for less than five years, not the older, more established small businesses.

In addition to creating a data base in which small business credit access could be investigated in the context where barriers to credit are most applicable, an improved data base needs to be applicant oriented. Applicant acceptance and rejection are best investigated by studying traits of businesses at the point when their loan applications are submitted. The NSSBF data, in contrast, mix loan proceeds into the business traits recorded for successful loan applicants. It is therefore impossible to sort out what the traits of loan applicants really were at the point of loan application. Firms in the NSSBF data in many instances received loans several years before the point of data collection. Thus, a firm's most recent loan application could have been funded in 1991. The loan proceeds, at the time of NSSBF survey data collection, would have been absorbed into the firm for several years, impacting a wide range of firm traits, such as profitability, liquidity, and credit rating. Yet this firm is treated no differently than one denied a loan when loan approval is modeled econometrically. This detracts from the validity of the econometric findings reported by Blanchflower et al. (1998), Cavalluzzo et al. (1999) and Bostic and Lampani (1999). All of these studies call for additional research on small business borrowing. Such additional research would be

particularly valuable if it could be undertaken utilizing small business data that are appropriate for studying the issues at hand.

Improved survey data are only one of the promising approaches available for furthering our understanding of the barriers facing Black-owned firms seeking financing. Carefully designed audit studies have been utilized, to date, largely to measure differential treatment of minorities seeking jobs and housing (Fix and Struyk, 1993). Auditing for discrimination should be tried out to expand our understanding of the barriers facing minorities, particularly Black Americans, seeking to borrow money to create and expand small businesses. Existing studies provide guidance about how to structure a pilot study of small business borrowing, and our knowledge to date suggests that measurement of discrimination in business finance would be a feasible undertaking. Drawing upon the findings of pilot studies using testers to investigate discrimination in home mortgage lending, it will be necessary first to test for discrimination at the pre-application stage (Galster, 1993). Small-business borrowers are most commonly seeking either term loans or lines of credit when they inquire about bank loan availability. At this pre-application state of inquiry, a potential borrower may be steered to a government guarantee form of loan (most commonly a term loan carrying a default guarantee issued by the SBA), a regular business loan, or a form of consumer credit. Minority business borrowers disproportionately utilize SBA loans (Bates, 1984) and consumer credit (Bates, 1997b) to finance small businesses. Alternatively, borrowing in any form may be discouraged and this may be more prominent among minority than White borrowers (Galster, 1993).

A pilot study that looked solely at Black/White potential borrower treatment at the pre-application stage of small business lending would be appropriate. Moving on to the actual process of filing loan applications would perhaps be feasible, but pragmatic design of such an audit study would require the insights from the results of a study of the pre-application process. If actual loan applications were to be filed by paired testers in a future audit study, then the ensuing analysis would focus upon differential Black/White treatment in loan approval and, for approved loans, loan amount (dollar amount), loan interest rate, loan maturity (in months), type of loan, and collateral requirements. Findings to date indicate that Black business borrowers receive less favorable treatment than Whites possessing identical measured traits. Yet, these findings tell us very little about how the loan application and approval processes differ for White and Black business borrowers, and they are too broad to guide enforcement efforts seeking to reduce Black/White differentials rooted in discriminatory treatment. Audit studies are needed to fine-tune our understanding of bank small-business lending practices.

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Access to Credit for Minority-Owned Businesses

Discussion Comments
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The subject matter of this session concerns an important and socially charged issue: the access to credit for minority- and women-owned small businesses. The fact that all the papers in this session use the same data set reflects the paucity of hard information in this area. This, coupled with the social importance of the subject matter, places an extra burden of responsibility on the authors to be open about their process and measured in their conclusions. It is important to let the data speak. The authors must take particular care to separate their reporting of the data from their personal views and speculation about things that the data cannot resolve.

Unfortunately, in my view, not enough such care was taken by the authors of the "Boston Fed" study of mortgage lending (see Munnel, Tootell, Browne, and McEneaney, 1996). Advocacy and overstatement of their results were used by critics (with equal overstatement) to dismiss evidence which was indeed valid and robust (see Horne, 1997; Day and Leibowitz, 1998). We must not allow that to happen here. The authors of two of the three papers presented in this session appear to have exercised appropriate caution; however, the line is much more blurred in the Blanchflower, Levine, and Zimmerman paper.

What things can we say with these data and what things can't we say? The 1993 National Survey of Small Business Finance (NSSBF) data give us hard information on credit market experiences. That is, for small businesses in existence in the middle of 1994, it tells us, for example, what percentage had been denied at least once in the previous three years in an application for credit (or denied in their last application or discouraged from applying). Since we have information on the race and gender of the firm owners, we can compute gross differences in outcomes for different groups. The contribution, and the sole contribution, of the three papers presented in this session is to show how racial and gender disparities in outcomes change when firm characteristics and other factors are taken into account.

Blanchflower et al. want to speculate on that which the data cannot readily address—that is, the model residual. They assert that the remaining unexplained Black-White outcome residual is "most likely due to discrimination." Is there a valid basis for their assertion?

To understand this issue, consider the simple framework used by most people who work in this area. The outcome of a credit decision for the ith applicant will be a function of four information sources:

(1) X_1, which are borrower, loan and market characteristics used by the lender and collected in the NSSBF survey (such as firm assets and industry);

(2) X_2, which are borrower, loan and market characteristics used by the lender and not collected in the survey or imperfectly measured by it (such as the business owner's personal wealth);

(3) X_3, which are borrower, loan and market characteristics not observed by the lender or collected in the survey which the lender proxies by the applicant's race;

(4) X_4, a negative penalty potentially assigned to minorities.

The use of either X_3 or X_4 is discriminatory and illegal. The use of X_3 is termed "statistical discrimination," and X_4 is termed "non-economic discrimination."

Average racial differences in the outcomes of credit decisions will be attributable to average differences in these four variables for the populations that apply for credit. What the papers presented in this session have done is to control for X_1. Thus, the remaining average racial differences are due to differences in X_2, X_3, X_4—the latter two representing discrimination and the former legal omitted variables. For Blanchflower et al. to be correct, either X_2 must be empty or there must be no difference in the average Black-White values of X_2. The question is, are either of these reasonable assumptions?

Lets start with the first. Here, the evidence argues strongly against Blanchflower et al. Their best model of denial (Blanchflower et al. Table 5, column 4, 1999) has a R^2 fit of only .194. To understand this, realize that 28.8 percent of the firms in the NSSBF had been denied credit at least once in the previous three years. Thus, a model with no variables would assign everyone a probability of denial of 28.8 percent. A perfect model would assign all denials a probability of One and all acceptances a probability of Zero. Blanchflower et al.'s best model, which I reestimated, assigns an average probability of denial of 42.7 percent to the firms that were denied in the sample and 23.2 percent to those who were accepted. Thus, the model predicts that almost one-quarter of the firms that actually were accepted would have been denied and that almost 60 percent of the firms that were denied would

have been accepted. The lack of model fit is seen graphically in Chart 1. This chart shows the distribution of the model's estimated denial probabilities for all firms in the NSSBF sample which were actually denied. As can be seen, the probabilities are widely distributed. Only one-third of the firms that suffered a denial had a model denial probability above 50 percent and only 7 percent had a model denial probability above 80 percent.

Would Blanchflower et al. really have us believe (as they say) that all creditworthy information is in their model? If so, what information are lenders using to differentiate among these firms? In the Boston Fed study, the study authors' model basically separated likely acceptances from marginal ones. The decision as to which marginal applicants were accepted, however, often depended importantly on idiosyncratic factors (see Horne, 1994). The same may be happening here. Moreover, remember that the sample consists of 2,000 different firms recording their credit experiences over a three-year period with at least 2,000 different lenders. The outcome variable reflects experience on all loan applications ranging from $10,000 car loans to $10,000,000 lines of credit. The firm size and financial variables that are reported in the survey are for one point in time, which may have been before or after the loan application date. No one can seriously believe that the function that Blanchflower et al. estimate accurately represents the true underwriting function.

It might be the case, though, that there are many omitted variables, but that there are no differences in the average values for these variables between Blacks and Whites. Is this likely? Let's consider one example. Owner wealth is perhaps the most conspicuous variable missing from the NSSBF, and there is strong evidence from other surveys that Blacks and Whites have substantially different levels of personal wealth even after controlling for education and income (see Blau and Graham, 1990; Avery and Rendall, 1997). Blanchflower et al. claim that personal wealth should not matter for corporate borrowers because of limited liability, and therefore, because there is little difference in the disparity between the corporate and non-corporate samples, personal wealth cannot be an important omitted variable.

For Blanchflower et al.'s argument to hold, three things must be true. First, the racial disparity should be the same for corporate and non-corporate borrowers (which it is); second, personal wealth should not be a factor in underwriting to corporate firms; and third, the overall fit of the corporate model should be better since a conspicuous omitted variable, personal wealth, is assumed to not affect corporate underwriting. However, the overall model fit of the corporate firms (which I reestimated) is actually worse than that of the non-corporate firms. Moreover, there is strong reason to believe that the personal wealth of the firm owner plays a significant role in underwriting even

with corporate borrowers. Almost two-thirds of the corporate line of credit borrowers in the NSSBF sample gave personal guarantees (see Avery, Bostic, and Samolyk, 1998). The value of these guarantees surely depends on the owner's wealth. An owner with substantial wealth can give a guarantee and get a loan they otherwise wouldn't. Thus, only one of the three assumptions Blanchflower et al. need to support their argument is supported by the data.

More direct evidence about Blanchflower et al.'s argument that there should be no significant Black-White difference in the omitted variables is shown in Chart 2. This chart shows the distribution of model denial probabilities using values of X_1 (excluding race) from the Blanchflower et al. model for the Black and White business populations. Clearly, there is a significant difference in the denial probability distribution between the two groups. If there are differences like these in the variables reported in the survey can we be sure that there aren't similar differences in the variables which are not? Or, if we think that it is statistical discrimination, why should we believe that lenders use race as a proxy for racial differences they believe exist for variables they don't collect, but that there are no racial differences in the variables that lenders use but that are not in the survey?

Additional evidence on this point arises from a comparison of the Blanchflower et al. and Cavalluzzo et al. results. Cavalluzzo et al. include several proprietary variables in their models, which Blanchflower et al. do not (access to these variables is limited to Federal Reserve Staff). Two such variables—locational market information and the Dun and Bradstreet credit score—show significant variation across racial groups and statistical significance in denial rate models estimated by Cavalluzzo et al. As a consequence the overall Black-White difference is somewhat smaller in the Cavalluzzo et al. model than in the Blanchflower et al. model. More dramatically, in measuring disparities in interest rates, Cavalluzzo et al. control for loan type and macroeconomic conditions at the time the loan was taken out while Blanchflower et al. do not (although such information is not proprietary). These controls prove critical to the Black-White disparity issue, as the disparity disappears in the Cavalluzzo et al. paper while it is statistically significant in the Blanchflower et al. paper. The measured impact of including these "omitted variables" should give us pause in concluding that there are no more additional variables which, if available and controlled for, might change our assessment of racial disparities.

Overstatement of results should not detract from the value of the evidence that these papers do present. It is clear that observed differences in firm characteristics can explain a lot of the average differences in credit market outcomes between racial and gender groups. Indeed, essentially all average differences between women-owned and

other firms can be explained. However, a substantial difference in outcomes between Black-owned and other firms remains, even after many firm and owner characteristics are accounted for. This difference is persistent and robust. This finding can have great social importance even if we cannot definitively pinpoint its cause. If Black firms receive less credit than other firms of comparable size, industry, and age do, this may concern us as a society irrespective of the reason. Moreover, pinpointing where these differences are greatest, such as the finding of Cavalluzzo et al. that market structure appears to matter, can help focus further work. Indeed, an unfortunate shortcoming of all three papers in this session is that they do not do enough of this. It would be instructive to know, for example, what kinds of businesses show the largest (or smallest) Black-White disparities. Descriptive evidence of this type would be most useful.

A model of how research might proceed is suggested by the process we follow in fair lending enforcement at the Federal Reserve. We use widely reported, albeit limited, data, such as that collected under the Home Mortgage Disclosure Act (HMDA), to determine which lenders have large unexplained pricing or denial rate disparities and in which product and market areas the disparity is greatest. We target these particular lender/product/market areas with an expanded data collection effort, paying particular attention to variables that lenders say they use in underwriting. If a disparity persists we have examiners pull files and look for idiosyncratic information. If a disparity still persists we would look for corroborative direct evidence of treatment differences from surveys and interviews. Only then would a Justice department referral be considered. The first stage analysis using HMDA data is used only to focus the next stage, and is never sufficient to "prove discrimination."

In finishing, let me remind you that just because the NSSBF survey data cannot be used to prove discrimination, it can't be used to dismiss it either. We are only beginning to gather information and understanding of this important subject. Despite what some may contend, resolution of the root causes of these disparities is still far away.

Robert Avery rejoined the Board of Governors staff in 1994. His research interests span topics related to regulation of the banking system, including the assessment of credit risk, the role of bank capital, and the Community Reinvestment Act. Avery has a B.A. from the University of Pennsylvania and a Ph.D. from the University of Wisconsin–Madison.

CHART 1

Distribution of Model Probabilities for Denials

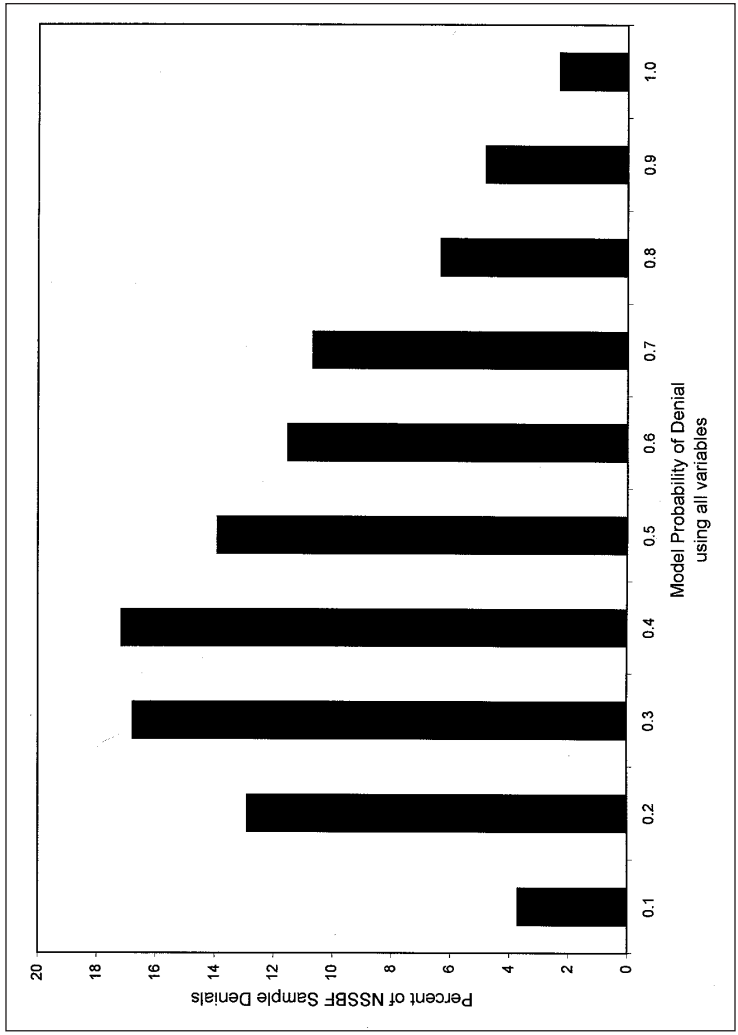
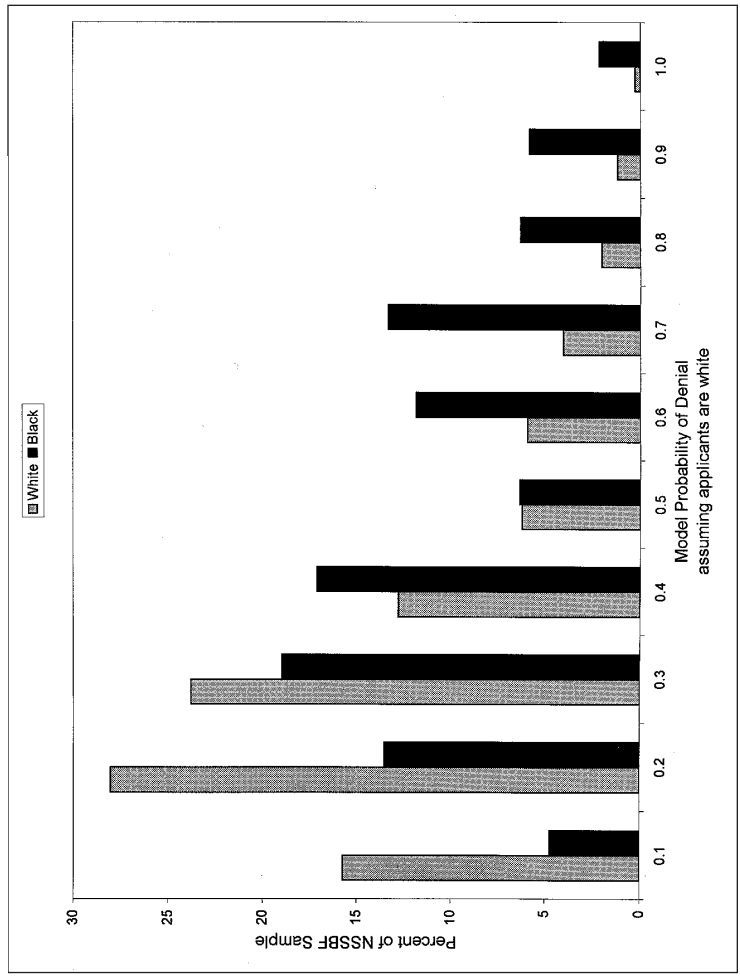


CHART 2

Black and White Model Probability Distribution for All Applicants



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