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Supplier Relationships and Small Business Use of Trade Credit

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Abstract

This paper sheds some light on the empirical importance of supplier relationships, including ethnic ties, for the use of trade credit by minority-owned small businesses. Results based on the 1993 National Survey of Small Business Finance (NSSBF) indicate that ethnic differences in the use of trade credit are present after conditioning on an extensive list of control variables. This holds especially for Black-owned businesses, and we find that they use less trade credit, are less likely to take advantage of discounts for early payment, and are more likely to have payments past due.

We use neighborhood survey data to explore the importance of supplier relationships for the use of trade credit by Black- and Hispanic-owned businesses. Although Black and Hispanic owners are equally likely to be offered trade credit, the relationship effects vary by ethnicity. Closer relationships with suppliers as measured by ethnic ties and geographical proximity are associated with more trade credit for Hispanic-owned businesses. In contrast, this result does not hold for Black-owned firms.

The neighborhood survey results suggest the idea of looking for ethnic differences in the effects of relationships at the national level as well. Although good supplier-level measures of relationships are not available in the NSSBF, we use census data to construct MSA-level measures of the prevalence of minority-owned businesses. We then explore how location in an MSA with a higher proportion of businesses of the same ethnicity is associated with the use of trade credit by minority owners relative to White-owned firms. We find that a higher MSA share for Hispanic-owned businesses is generally associated with a reduction in differences in the use of trade credit by Hispanic owners relative to White owners. No clear association is apparent between the MSA share for Black-owned businesses and their use of trade credit.

Thus, the ethnic differences in the effects of relationships evident in the neighborhood surveys seem to be consistent with the results from the national survey.

Introduction

Understanding access to capital and credit for small businesses is not a simple matter because capital, credit, and insurance markets are not complete and frictionless. Thus, a great variety of contractual arrangements, explicit and implicit, formal and informal, are observed as economic agents and organizations devise ways of dealing with the frictions that hinder economic exchange. For example, a lender may monitor the borrower's operation, take an equity position, or require collateral. These varied ways of doing business may include a role for ongoing relationships between economic agents or perhaps networks of agents. Alongside this thicket of financial arrangements, there is a sense that race or ethnicity may play a role in how an owner finances the business. For example, self-employment rates vary across ethnic groups in ways that are not fully understood, ethnic networks may be important in some communities, and some ethnic groups may face discrimination. It is important that we know more about small business finance because of the importance of these businesses for the economy as a whole and because many policy efforts are aimed at promoting their access to capital and credit in one form or another.

However, we have much to learn, both empirically and theoretically, about the wide variety of ways entrepreneurs finance their businesses and the role played by relationships and networks, including ethnic connections. In order to further our understanding of these issues, researchers from the University of Chicago and the Federal Reserve Bank of Chicago have cooperated in surveying businesses and households in two neighborhoods in Chicago, one predominantly Hispanic and the other predominantly Black. A primary goal of these neighborhood studies is to measure financial arrangements and the relationships, ethnic and otherwise, among agents in order to better inform policy discussions and theoretical work in this field. This paper focuses on one source of credit for

businesses, trade credit, as part of a larger research agenda based on the neighborhood studies.[1]

Trade credit is an important part of the balance sheets of many small businesses.[2] Results of a national survey show that it accounted for 31.3 percent of the total debt for small businesses in 1993, and 60.8 percent of the firms had outstanding credit from suppliers.[3] Trade credit is also interesting because it is a good place to look for the effects of relationships and networks. For example, in a world of imperfect information, a supplier may learn about a firm's creditworthiness and future prospects in the course of their ongoing business relationship. Thus, the strength of the ties between a business and its suppliers may play a role in the terms upon which trade credit is offered or whether it is offered at all. Supplier relationships in the developing world have recently received some attention, as Fafchamps and Minten (1999) and McMillan and Woodruff (1999) find that relationships play an important role in access to trade credit in Madagascar and Vietnam, respectively. This finding is analogous to the result that relationship measures are related to the availability and terms of credit from U.S. financial institutions.[4]

The purpose of this paper is to report some empirical regularities in the use of trade credit and in the effects of some measures of supplier relationships on trade credit, paying particular attention to ethnic differences. We report results based on two sources of data. First, we establish an empirical picture of the use of trade credit using the 1993 National Survey of Small Business Finance (NSSBF), a nationally representative survey. For the first time, the NSSBF includes an oversample of minority businesses, so we are able to measure ethnic differences in the use of trade credit. Second, we use the neighborhood surveys to explore the empirical association between several measures of supplier relationships and the offer of trade credit. The national survey and the

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[1] See Huck, et al (1999) for a general overview and previous results of the neighborhood surveys.

[2] See Mian and Smith (1992), Petersen and Rajan (1997), and Ng et al (1999) for more discussion of the theory and practice of trade credit.

[3] The figures come from the 1993 National Survey of Small Business Finance, which defines small businesses as businesses with fewer than 500 employees. See Cole and Wolken [1995, Table A.2] and Berger and Udell [1998, Table 1] for the cited figures on the use of trade credit.

neighborhood surveys complement each other in that the NSSBF is designed to be representative of small businesses in the entire nation. On the other hand, the local focus of the neighborhood surveys provides more information about the relationships between business owners and their suppliers than is available in the national survey.

Briefly, the empirical results of the national survey section establish the fact that ethnic differences are present in the use of trade credit, even after conditioning on an extensive list of control variables. Although we find some differences for other minority groups, this finding especially holds for Black-owned businesses.[5] Some of the more striking results are that if we look at businesses that make at least some purchases on account, Black-owned businesses use less trade credit, are less likely to take advantage of discounts for early payment, and are more likely to have payments past due.[6]

We use the neighborhood survey data to explore the correlation between supplier relationships and the offer of trade credit for minority-owned small businesses. Although Black and Hispanic owners are equally likely to be offered credit, both with and without conditioning on control variables, the relationship effects vary by ethnicity. We find that working with a Hispanic supplier and working with a supplier relatively close to home are associated with more credit for Hispanic-owned businesses. In contrast, this result does not hold for Black-owned businesses.

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[4] Petersen and Rajan (1994), Berger and Udell (1995), and Uzzi (1999).

[5] There is also recent evidence that Black owners are more likely to be denied bank credit relative to White owners with comparable observable characteristics. See Cavalluzzo and Cavalluzzo (1998), Bostic and Lampani (1999), Cavalluzzo, Cavalluzzo, and Wolken (1999), and Blanchflower, Levine, and Zimmerman (1998).

[6] Businesses that do not take advantage of a discount for early payment pay a substantial implicit interest cost. Typical trade credit terms, such as the 2/10 net 30 contract, implies an implicit annual interest rate of 44 percent. Delaying payment after the due date may also entail a penalty, including perhaps a reputational cost, although the penalty for late payment varies by supplier and may not be substantial. It can be argued that firms that use such a high cost source of funds are constrained in their access to cheaper sources of funding, such as bank credit. Thus, not taking advantage of discounts for early payment is a good indicator that a business faces credit constraints (Peterson and Rajan 1994). Under this interpretation, our findings for early payment discounts indicate that Black (and Asian) owners face credit constraints for lower cost funding sources. However, we do not necessarily accept this interpretation because it depends on how one models the use of trade credit. It is possible to imagine models for which a supplier relationship involves some benefits that compensate for paying a high interest cost for trade credit.

The neighborhood survey results suggest looking for ethnic differences in the effects of relationships at the national level as well. Although good supplier-level measures of relationships are not available in the NSSBF, we use census data to construct MSA-level measures of the prevalence of minority-owned businesses. We then explore how location in an MSA with a higher proportion of businesses of the same ethnicity is associated with the use of trade credit by minority owners relative to White-owned firms. We find that a higher MSA share for Hispanic-owned businesses is generally associated with a reduction in differences in the use of trade credit by Hispanic owners relative to White owners. No clear association is apparent between the MSA share for Black-owned businesses and their use of trade credit. Thus, the ethnic differences in the effects of relationships evident in the neighborhood surveys seem to be consistent with the results from the national survey. Furthermore, differing prospects for developing financial ties help to explain part of the observed ethnic differences in trade credit usage.

Why do relationships arise?

Recent work on the theory of collective organizations suggests new ways to think about some questions related to the use of trade credit. Why might some businesses choose to operate without trade credit, whereas others form close-knit relationships with suppliers, including the extension of credit? If there is trade credit, should we expect to see homogeneity or heterogeneity in the characteristics of suppliers and creditors? One class of models, as exposited in the work of Prescott and Townsend (2000), builds on an earlier mechanism design literature and can help us to think through the many complicated forces that make all these forms of organization endogenous.

Suppose that a household can go into business and operate a technology producing output as a stochastic function of labor and capital -- either with the owner's own wealth or borrowed funds from a competing set of financial institutions. The firm can also purchase insurance to cover some

of the fluctuations in its output or sales. Within this basic set-up, we can imagine various impediments to production and exchange in financial, credit, and insurance markets. First, the labor input may be unobserved by outsiders in the market. This creates the usual moral hazard problem. Moral hazard would hinder full insurance of fluctuations in sales, for otherwise the owner has no incentive to be diligent. Moral hazard would also limit the amount of credit; an owner who has financed his operation with costly capital may need to use much of his revenue to repay, causing a decline in labor effort and an implicit increase in the interest rate. This would limit the scale of operations and conceivably preclude the operation of the potential business in the first place. A second impediment would be the possibility of default. If an owner with borrowed capital can default, that is, take off with revenues or direct too much compensation to the owner, this too would limit the firm's financing or again preclude production entirely.

Within this basic set-up, we can imagine alternative forms of organization. For example, another household can form a close-knit relationship with a proprietor, possibly monitoring the diligence of the proprietor at the cost of some labor effort. In the limit, suppliers may almost appear to be partners, fully engaged in input decisions, the financing of those decisions, and the sharing of output fluctuations. This third aspect has an interesting interpretation -- the supplier absorbs the "internal" default of the proprietor, lessening the likelihood of external default to the market. More generally, the advantage of network relationships is that they can mitigate impediments to exchange. That is, the supplier, partner, or network member not only has better information on the diligence of the proprietor, but also can in one way or another supply that information to the larger credit and insurance market. Similarly, the supplier, partner, or network member can make default on the part of the proprietor more difficult, or can make better use of the proprietor's capital given that the latter does default. One caveat, however, is that trade credit and other close-knit

relationships do not allow full recovery of the usual neoclassical efficiency properties. Indeed, internal relationships may appear constraining relative to those neoclassical norms. Access to outside credit and insurance on the part of the proprietor may appear to be overpriced or otherwise constrained. For example, the proprietor might need to pay the supplier more, depending on the circumstances of the latter.

Modest variations in the underlying characteristics of households or business owners can produce large variations in organizational outcomes. We provide an example using the ideas from Prescott and Townsend (2000) where wealth varies within an otherwise homogenous population. Single proprietorships engaged in the larger credit and insurance market but without close-knit suppliers are more likely to emerge for relatively wealthy entrepreneurs. These firms can finance much of their own operation and hence for them moral hazard is less severe. They reap most of the benefits of their own high efforts. However, a relatively wealthy firm may take the benefits of their wealth by reducing work effort. This lowers the moral hazard problem, making partnerships less fruitful but increases the probability of default. More generally, however, high economy-wide wealth makes labor the limiting factor, but this also makes single proprietorships more likely, as less labor is expended in supervisory or joint-production relationships.

In economies where capital is scarce, it makes more sense to use labor in monitoring. Hence, collective network forms are more likely to emerge there. However, holding economy-wide wealth constant, the distribution of wealth can be associated with the existence and nature of these networks. Results here are sensitive to specific assumptions. We can show that higher inequality in the wealth distribution can be associated with either an increased or a decreased likelihood of network organization, depending on whether networks or collective organizations are defined by collusion, coordination, risk-sharing, or by the joint operation of technologies. Increased inequality

in the wealth distribution can lead to homogenous matching in multi-agent networks, of poor to poor for example, where one agent will be the proprietor and the other supplier/creditor. Decreased wealth inequality can lead to heterogeneous matching, with the relatively wealthy taking their utility benefit in the form of less onerous supervision and increased consumption compensation.

Other than wealth, we might imagine that households and (potential) firms vary in talent or (potential) productivity, either in production directly or in the efficiency of supervision. Similarly, households and (potential) firms may vary in preferences for the disutility of work effort or in aversion to risk. Indeed, households or (potential) firms may vary in their aversion to being paired with others, according to the characteristics of others, as in the literature on clubs. In this regard, space and ethnicity may enter the picture. Proximity in space may facilitate the mitigation of impediments to trade. Information and the ability to inflect penalties on default may be better locally, in which case we might imagine that networks would be more likely within rather than across neighborhoods. Finally, ethnicity may also be correlated contemporaneously with some of the above-mentioned attributes: risk aversion, work aversion, or affinity aversion. The point is that relatively simple considerations can lead to a great variety of endogenous outcomes. That is, models may produce a variety of correlations between space, ethnicity, and other observables on the one hand, and network relationships or more autarkic arrangements on the other.

National Use of Trade Credit Among Ethnic Groups

The relevance of ethnic relationships takes on particular consequence in an environment where ethnic disparities in access to credit exist. In terms of trade credit, no such evidence has been recorded. Therefore, this section briefly describes some facts about the use of trade credit among a nationally representative sample of small businesses.

The data comes from the National Survey of Small Business Finances (NSSBF), a survey

conducted periodically by the Board of Governors of the Federal Reserve and the Small Business Administration of for-profit, nonfarm, nonfinancial businesses with fewer than 500 employees. The latest survey, conducted in 1994 and 1995 to approximate the population of businesses in operation in 1993, includes a minority oversample, allowing us to more precisely account for the business practices of Hispanic, Black, and Asian-owned firms. After excluding firms in the finance, real estate, and insurance industries, our final sample includes 4,318 firms, of which approximately 9.7 percent are primarily owned by Blacks, 6.7 percent by Hispanics, and 6.8 percent by Asians.[7] When weighted to represent a national sample, Black, Hispanic, and Asian-owned businesses account for 3.0, 4.5 and 3.6 percent, respectively, of all small nonfinancial, nonfarm firms.

The NSSBF contains detailed information about the primary owner and the firm. Firm characteristics include finances, performance, financial relationships, industry, organizational form, and location. Owner information includes education, experience, gender, past financial problems, and race. The survey also reports a rich set of trade credit questions, including:

- Did the firm purchase any goods or services on account in the last year?
- Has any supplier that offers trade credit denied a request by your firm?
- From how many suppliers did the firm make purchases on account during 1993?
- What percent of purchases were made on account in 1993?
- What portion of suppliers offered cash discounts for prompt payment?[8]
- What portion of the cash discounts offered did the firm take advantage of?
- What portion of payments on account was made after the due date in 1993?

Table 1 contains weighted means by ethnic group for a number of firm and owner characteristics and the trade credit measures. The indicators of statistical significance in Table 1 represent tests of differences in means relative to White-owned businesses. These tests clearly show statistically and economically important differences in the use of trade credit between White- and minority-owned firms. Minority owners, on average, are less likely to use trade credit for their

[7] Financial firms are excluded because their balance sheets are hard to compare with those of other businesses. The ethnicity of a firm is defined as that which owns at least 50 percent of the firm.

purchases, have fewer suppliers, and are less likely to take up cash discounts for early payment. In general, these differences relative to White-owed firms are larger for Black-owned businesses than businesses owned by Hispanics and Asians. Finally, given our interest in the Black-Hispanic comparisons in the Chicago neighborhood data, we note that there are some statistically significant differences between these two minority groups. Hispanic firms are less likely to have any trade credit last year from a supplier, but have more suppliers on account, are more likely to take advantage of cash discounts, and are less likely to have payments past due.

However, as can be seen at the bottom of Table 1, there are many other differences between the groups. For example, minority firms tend to be smaller, younger, have more financial problems, and have fewer strong ties to financial institutions. Many models of trade credit imply that these covariates could be correlated with both ethnicity and credit usage. For example, an empirical implication of models that feature credit rationing are that measures of credit quality, such as size, cash flow, and access to bank lending, should result in more trade credit being offered to a buyer (Smith 1987; Biais and Gollier 1997). However, these models predict that buyers with more cash flow and access to bank financing will use less trade credit, which is defined as a high-cost source of credit. Petersen and Rajan (1997) find empirical support for these propositions. To the extent that there are inter-industry differences and intra-industry similarities in the severity of information and adverse selection problems, we would predict relatively wide variation in credit terms offered across industries and little variation within industries. Ng, et al (1999) confirm this prediction and conclude that it is indeed related to information problems.[9] Therefore, a more detailed statistical analysis is needed to measure the association between ethnicity and the use of trade credit.

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[8] The possible responses to the first two questions are yes and no. The five possible responses to the cash discount question are none, fewer than half, half, more than half, and all/almost all.

[9] Models of trade credit that emphasize the ability of suppliers to more effectively salvage collateral in the wake of default, such as Frank and Maksimovic (1998), imply that arrangements that increase the value of collateral should encourage the use of trade credit. Since finished goods have been transformed from the original purchased inputs, a higher proportion of inventory held as finished goods implies a lower value as collateral for a supplier. Petersen and

The multivariate analysis controls for basic differences in firm and owner characteristics, including the gender and education level of the owner, and the geographic region, urban status, and two-digit industry of the business. We also include firm characteristics that may be associated with the use of trade credit. Many of these factors are potentially endogenous but were included to be comparable to the literature. Some, such as the firm's age, assets, number of employees, profits, sales growth, and whether the business is incorporated, publicly traded, or a franchise, reflect the size and quality of the firm. More directly related to credit quality are a series of questions about owner and firm credit history. Respondents are asked whether the firm was delinquent on business obligations in the last three years, the principal owner declared bankruptcy in the last seven years, the owner was delinquent on personal obligations in the last three years, or a legal judgement was rendered against the owner in the last three years. Finally, we include measures of the extent of a firm's lending relationships with banks that have been used in previous research on trade credit, including the length of the longest relationship with a financial institution, the size of the firm's financial network, a measure of the concentration of the firm's banking relationships, and the number of banking services used.[10] Unfortunately, there is no information in the NSSBF that can be used to directly measure ties with suppliers. We return to this issue later in the paper.

We do not report the marginal effects for the control variables for each regression because of space limitations. However, we can make the general statement that asset size, owner and firm credit history, and industry type are consistently important correlates with the various measures of

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Rajan (1997) find that a measure of this proportion at the industry level is negatively related to the supply of trade credit. However, data limitations force the use of a measure of the proportion of finished goods inventory at the level of the industry rather than at the level of the firm. Unfortunately, this means that the inventory measure may be picking up a variety of industry effects. Turning to a model that emphasizes nonfinancial reasons for extending trade credit, one possible explanation is that suppliers with market power use trade credit to increase profits by price discrimination (Brennan, Maksimovic, and Zechner 1988). Lee and Stowe (1993) and Ferris (1981) also present models that focus on operational reasons for trade credit. Empirically, Petersen and Rajan (1997) find that account receivables are positively related to gross profit margins, which is consistent with the price discrimination model of trade credit.

[10] Peterson and Rajan (1997) interpret some of these measures as proxies for relationships with financial institutions in statistical models of trade credit. The concentration measure is a Herfindahl index of the firm's banking connections, defined in Uzzi (1999).

trade credit usage. This is seen in appendix 1, which presents background calculations on the relative importance of each of the observable firm and owner factors in accounting for the raw ethnic differences in five representative trade credit variables.[11]

Table 2 reports our main findings on ethnic differences in trade credit usage. Each row represents a different regression. The regressions take into account whether the measures are discrete (probits), discrete and ordered (ordered probit), or censored (tobits) and are weighted to account for the sampling design. All of the reported results are marginal effects (with robust Huber-White standard errors in parentheses), which are interpreted as ethnic differences when the control variables are held constant.

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A number of ethnic differences are indicated by the results in the table. There appears to be no statistical difference between Black-, Asian- and White-owned firms in whether any trade credit at all is used over the last year. However, there is a large, statistically significant, difference between Hispanic- and White-owned businesses. Hispanic firms are 7.7 percent (standard error of 4.4 percent) less likely than White firms and 5.5 percent less likely than Black firms to have used any trade credit in the last year, although the latter point estimate is not significant at conventional levels. The sample size of the Hispanic and Black sample does not allow us to measure this gap very precisely. However, the results suggest that differences in access to the first dollar of trade credit may exist between Black and Hispanic firms, and, more strongly, White and Hispanic firms.

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[11] The computations are derived from weighed linear probability models using standard Blinder-Oaxaca decompositions. The ethnic gap can be written as $\bar{Y}^W - \bar{Y}^B = (\bar{X}^W - \bar{X}^B)\beta^W + \bar{X}^B(\beta^W - \beta^B)$ where Y is the dependent variable, X is the vector of independent variables, and W and B index the two ethnic groups. In appendix 1, the first row reports the raw ethnic gap or $\bar{Y}^W - \bar{Y}^B$. The second row shows the fraction of that gap that is explained by differences in population characteristics or $(\bar{X}^W - \bar{X}^B)b^W$. The third row reports the unexplained portion of the ethnic gap, the share that is due to differences in the coefficient estimates or $\bar{X}^B(b^W - b^B)$. Finally, the bottom panel reports the share of the gap that is attributable to differences in the mean characteristics of each independent variable across ethnic groups. An alternative and equally valid representation of this decomposition is to use the base case

However, conditional on a single dollar of trade credit being offered to the firm, Black-owned businesses use trade credit less than White- and perhaps Hispanic-owned firms in most measures that we analyze. White and Hispanic differences tend to be small and statistically insignificant. White-Asian gaps are less easily explained, as they appear to depend on the trade credit measure being analyzed.

For example, relative to White and Hispanic owners, Black owners have 11.6 and 12.5 fewer suppliers and make 6.5 and 6.1 percent fewer purchases on account, after conditioning on firm size, resources, and industry.[12] These results are statistically significant at the 6 percent or better level, with the exception of the Black-Hispanic gap in percent purchases. The latter estimate is again suggestive but lacks the sample sizes to obtain finer estimates. Like Black-owned firms, Asian firms have a smaller set of suppliers, but the percent of purchases that they have on account look more like White or Hispanic firms.

The Black-White and Black-Hispanic differences in the use of cash discounts and prevalence of overdue payments are perhaps the strongest ethnic disparities shown in the table. Among firms that are offered cash discounts, Black owners are 4.9 percent more likely to never use these discounts and 13.2 percent less likely to always use them relative to White owners.[13] Relative to Hispanic owners, Black owners are 3.2 percent more likely to never use discounts, 8.0 percent less likely to always use discounts, and 9.6 percent less likely to never have payments past due.[14] Additionally, Black owners are 11.0 percent less likely than White owners to never have payments

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ethnic group B to compute the explained portion $(\bar{\mathbf{X}}^{\mathbf{W}} - \bar{\mathbf{X}}^{\mathbf{B}})\beta^{\mathbf{B}}$. However, because of the small minority sample sizes, this decomposition is not as precisely estimated.

[12] We report weighted least squares estimates of the percent purchases regression for those firms with some trade credit and tobit estimates to account for zero censoring in the full firm sample. The tobit standard errors are derived using the delta method (Greene 1999).

[13] The marginal effects are reported in brackets. The numbers in [ ] brackets are marginal effects at the never response. The numbers in { } brackets are marginal effects at the always response. Marginal effects computed at the less than half, half, and more than half responses are available upon request.

[14] For example, the 3.2 percent Black-Hispanic difference in never using cash discounts is calculated as the Black marginal effect (4.9 percent) minus the Hispanic marginal effect (1.7 percent).

past due. All of the Black-White estimates are statistically significant at the one percent level, and the Black-Hispanic differences are significant at the ten percent level. Moreover, the large Black-White and Black-Hispanic gaps are conservatively measured in that the regressions include controls for owner and firm financial distress. Whether the firm has been delinquent in payments over the last three years may, by definition, be related to whether the firm is past due on trade credit. Not surprisingly, when the owner and firm delinquency variables are excluded from the regressions, the ethnic gaps are substantially larger, and the Black-Hispanic differences are significant at better than the 5 percent level.

The Asian-owned results are mixed. Cash discounts used are at a level similar to Black firms but past payments due are similar to White or Hispanic firms. However, the lack of cash discount used by, as well as offers to, Asian-owned firm is unlikely to be due to short-term credit problems. Asian firms are less likely to self-report a need for additional short-term credit (as shown in the row labeled short-term credit needed) relative to all other groups.

In sum, the evidence points to some differences between ethnic groups in the use of trade credit that cannot be accounted for by observed characteristics of the firms and owners. The differences are most striking when comparing Black- and White-owned businesses, but we also observe some differences between the other ethnic groups, including Black and Hispanic firms. The next section turns to new evidence from the neighborhood business surveys. We use the neighborhood data to examine the importance of supplier relationship measures that are not observed in the national survey. In particular, we know the ethnicity of suppliers, their proximity to the neighborhood businesses, and how long the supplier and business owner have worked together. Although these variables may be rough proxies for the depth of supplier ties, they have a bearing on the existence of

relationships between buyers and suppliers. Our strategy is to use this information to assess the importance of supplier relationships in delineating ethnic differences in the use of trade credit.[15]

Neighborhood survey results

In order to shed some light on small business finance in ethnic communities, the Federal Reserve Bank of Chicago and researchers from the University of Chicago cooperated in conducting surveys in two Chicago neighborhoods, Little Village, a predominantly Hispanic community, and Chatham, which is predominantly Black.[16] These communities were chosen as the sites of these studies because they are distinct and well-recognized ethnic neighborhoods with viable small business sectors. Although the bulk of the owners interviewed are either Black or Hispanic, other ethnic groups are represented. The survey instruments are designed to elicit information about ethnic relationships, informal sources of financing -- such as loans or gifts from family and friends, and formal sources of funds for both households and businesses.

Little Village is a predominantly Hispanic area, mostly of Mexican origin, on the southwest side of Chicago with a population of 81,155 persons and a median family income of $23,259, as of the 1990 census. Substantial numbers of Hispanics migrated into the community beginning in the 1960s and the area became predominantly Hispanic in the 1970s. Chatham is a mostly Black community on the south side of Chicago with a 1990 population of 36,779 persons and a median family income of $29, 258. Chatham became predominantly Black during the 1950s (Chicago Fact Book Consortium 1995).

In both communities, the survey universe was constructed by canvassing and enumerating all identifiable existing businesses. A stratified random sample was then drawn in which relatively common businesses, such as eating places and hair salons, were undersampled. In both surveys,

[15] The surveys also ask about family relationships between businesses and their suppliers, but, in practice, almost no firms have such family ties.

medical and legal professionals were excluded from the sample on the grounds that the educational requirements for these fields result in entrance and financing decisions that have little in common with those of other small businesses. Field staff, bilingual in the case of Little Village, then contacted the businesses in the selected samples for an interview that required about one-and-a-half hours. The fieldwork resulted in response rates of 70 percent for Little Village and 57 percent for Chatham. About one-third of all enumerated businesses were interviewed in Little Village, and the corresponding figure for Chatham is about one-quarter.[17]

Business and owner characteristics

The types of business by ethnic group are shown in Table 3. Asian owners are primarily Korean, and Other is made up of owners from the Middle East, India, and Pakistan. Because relatively few White, Asian, and Other owners are sampled, we focus on Black and Hispanic business owners in the following discussion. For all ethnic groups combined, the bulk of the firms fall into some variety of the retail or service sector. Within groups, Black owners have a relative concentration in the service sector. Hispanic firms are relatively balanced across the industry types, as no one category contains more than 25 percent of the total. The average age of the current business for all groups is about 9 years, and firms owned by Blacks (11.6 years) tend to be older than Hispanic-owned firms (6.9 years). Most of these firms employ relatively few workers, as the average number of employees for all groups is 4.5 workers.

About one-third of all owners are women, and Hispanic and especially Black owners are more likely to be women. Overall, the bulk of the firm owners are at least high school graduates, and about a quarter of them have a college degree. However, educational attainment varies across the racial/ethnic groups. The proportion of Hispanics in the sample who do not have a high school

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[16] See Bond and Townsend (1996) for a description and some findings from the Little Village Surveys for households and businesses. See Huck et al (1999) for an overview of business finance in these neighborhoods.
[17] The survey fieldwork was conducted during 1993-94 and 1997-98 in Little Village and Chatham, respectively.

degree (49.4 percent) is over three times as high as the corresponding proportion for Blacks (16 percent), the group with the next highest figure. Hispanic owners (9 percent) are least likely to have a college degree and a relatively low proportion (70.5 percent) are, by their own assessment, moderately or extremely proficient in English.

Because of our interest in business networks, we include two measures of interaction between business owners. The first is an indicator variable for whether or not an owner is a member of a formal business association. The second is an indicator variable for whether or not an owner reports that he/she regularly meets with other business owners to talk about business issues. Hispanic owners (22.9 percent) are somewhat less likely to be members of a formal association relative to Black owners (32.1 percent), but they are somewhat more likely to have other business owners to talk with informally, although the latter difference is not statistically significant.

Relative to the NSSBF sample, the neighborhood sample businesses are more likely to be owned by women, are headed by owners with somewhat less education, are somewhat older firms, and have fewer employees. One of the most important differences between the two samples is that the neighborhood survey is much more heavily weighted towards retail establishments (66.7 percent) compared to the NSSBF sample (23.3 percent). It is important to keep in mind that since almost all of the Hispanic owners are in Little Village and all of the Black owners are in Chatham, these ethnic categories combine location and ethnic effects.

Some measures of the use of trade credit and supplier relationships are also shown in Table 3. Information for up to three suppliers was elicited from an owner, and the results are tabulated by the ethnicity of the business owner. We measure the use of trade credit by an indicator variable for whether or not a supplier offers trade credit to a business owner. Trade credit is available to many of the businesses in Little Village and Chatham, as 49.7 percent of the suppliers in the sample offer

credit.[18] Similar proportions of Hispanic (44.4 percent) and Black owners (42.4 percent) are offered credit by their suppliers; owners in the other ethnic groups are more likely to be offered credit. Hispanic (32.9 percent) and Black owners (30.8 percent) are also about equally likely to work with a supplier of the same ethnicity. Hispanic-owned businesses (5.6 years) have a shorter relationship with suppliers on average than do Black-owned businesses (7.6 years), and the difference may in part reflect the fact that Hispanic-owned businesses in the sample are younger than Black-owned businesses. The supplier locations are divided into three categories that form the basis for indicator variables. In the first category, the supplier is in the same or adjacent neighborhood as the business. In the second category, the supplier is outside of the neighborhood but within the Chicago MSA. In the last category, the supplier is outside the MSA. The table shows that Hispanic owners (38.5 percent) are more likely to deal with suppliers in their neighborhood relative to Black owners (19.9 percent), and correspondingly less likely to deal with suppliers elsewhere in the MSA or beyond.

Trade credit offered results

The first point to make is that Hispanic and Black owners are about equally likely to be offered trade credit in our two neighborhoods. As shown in Table 3, Hispanic owners are offered credit by 44 percent of their suppliers and the corresponding figure for Black owners is 42 percent. This is without conditioning on any other variables. If we condition on the industry and demographic control variables noted below, we get the same result. However, the way that businesses in these neighborhoods are tied to their suppliers seems to be quite different depending on the ethnicity of the owner. The purpose of the regression analysis is to shed some light on how supplier relationships are associated with the offer of credit.

We have information on up to three suppliers for each business, and for regression models using each business and supplier pair as the unit of observation we would expect that because of

[18] Of businesses that do have trade credit offered to them, a majority (67.9 percent) owe a supplier at the time of the

business-specific unobservables the error terms within a business are probably correlated. Accordingly, we present probit results with robust standard errors adjusted for multiple observations on a business. We also report the results of a random effects probit model as a robustness check.[19]

The regressions include some control variables that can be grouped into a number of categories. Owner demographic variables include indicators for education, gender, and proficiency in English. We also include an indicator variable for whether or not an owner previously owned a business and a self-reported measure of an owner's disposition towards risk on a 1-to-5 scale, 5 being the most willing to risk all in a new business. Standard measures of firm characteristics include industry type (not reported in the results), size as measured by the natural log of the number of full-time equivalent employees (and the square of this term), and business age. Measures related to firm quality or need for credit include indicator variables for a business reporting that it was in danger of failing within the last three years, for reporting sales growth as an important challenge, and for providing credit to customers. Indicator variables for having an account relationship with a bank and for using an accountant are included as measures of a relationship with financial institution and financial transparency.[20]

Our measures of supplier relationships include the ethnic tie between an owner and a supplier, the geographic proximity of the supplier, and the length of time the owner has worked with a particular supplier.[21] Indicator variables for being a member of a trade association and for

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survey. The median amount owed for those owners who do have trade credit outstanding is $3,095.

[19] We find that the empirical results are qualitatively similar for both estimation models. Monte Carlo results reported by Guilkey and Murphy (1993) suggest that the probit estimator with robust standard errors performs reliably for a variety of parametric configurations. Their results also suggest that the random effects probit estimator is not as reliable when the number of observations in a cluster equals two, which is similar to our application. We thus focus our discussion on the results of the robust errors probit estimator.

[20] Unfortunately, we do not have information on the credit history of the owner and firm, which are important determinants of the credit worthiness of the business.

[21] The length of the supplier relationship and working with a co-ethnic supplier are potentially endogenous to the trade credit decision. We were unsuccessful in an attempt to use migration history for Hispanics as instruments for working with a co-ethnic supplier.

being part of a group to talk about business issues are included as general measures of networking with other business owners. We include interaction variables in some specifications that allow us to test for differences across the ethnic groups in the impact of whether or not the supplier is the same ethnicity as the owner and for supplier location. The marginal effects and standard errors for several specifications of a probit model of trade credit outcomes are reported in Table 4. Since we are focusing our attention on the supplier relationship measures, coefficients for the control variables are not reported in the table and appear in Appendix 2. Note that we have combined the businesses not owned by Blacks or Hispanics into the White/Asian/Other category because of the low number of businesses for these ethnic groups. Accordingly, we focus on Black and Hispanic owners in the discussion that follows.

The first two columns of Table 4 report alternate specifications for the length of the supplier relationship. The first column shows the results of using the log of years with supplier and the square of this term to measure relationship length. However, a close look at the data suggests that the relationship between the offer of trade credit and years with supplier is better captured with dummy variables allowing breaks at three and seven years.[22] Accordingly, the second column presents results for a specification using indicator variables for years with supplier less than three and greater than seven. We focus on this measure of years with supplier for the rest of the discussion. The results suggest that a shorter relationship (under three years) and a longer relationship (over seven years) increase the probability of being offered credit by 11.6 and 18.3 percent, respectively.[23]

Note that the marginal effects for the other variables of interest are little affected by the construction of supplier tenure. Columns 1 and 2 show that the marginal effect of a Black business owner dealing with a Black supplier of the same ethnicity is -0.129 and –0.146, suggesting that a

[22] Our conclusions are not affected by using cutoffs other than 7 years.

Black-owned firm working with a Black-owned supplier is 13 to 15 percent less likely to get trade credit offered. However, this effect is not statistically significant in either specification. On the other hand, the comparable marginal effect for Hispanic-owned firms is a large and significant 0.19.[24] Finally, working with local suppliers in the neighborhood or within Chicago has no appreciable impact on trade credit offers.

However, column three indicates that there are important ethnic differences in the effect of supplier location as well. This regression supplements column 2 by including interaction terms between the ethnicity of the owner and supplier location. This alteration reveals a more complicated story than the specification reported in the second column, for which supplier location effects are small for the combined ethnic groups. The marginal effect for supplier in neighborhood of –0.392 applies to a Black owner with a supplier in the neighborhood and is measured relative to a Black owner with a supplier outside of the MSA. Thus, dealing with a supplier in the neighborhood rather than one outside the MSA reduces the probability of a Black owner being offered trade credit by about 40 percent. This is an extremely large effect and is also statistically significant. The marginal effect of 0.001 for supplier in the Chicago MSA indicates that the effect of a Black owner dealing with a supplier outside the neighborhood but still in the MSA relative to a supplier outside the MSA is essentially zero. Thus, dealing with a supplier in the neighborhood is associated with a lower probability of a Black-owned business being offered credit relative to suppliers elsewhere.

The marginal effect of a Hispanic owner dealing with a supplier in the neighborhood relative to dealing with one outside of the MSA is to increase the probability of being offered credit by 16.5 percent (-0.392 + 0.557 = 0.165), which is economically large and statistically significant. Likewise, the effect of a Hispanic owner working with a supplier out of the neighborhood but in the MSA is to increase the chances of being offered credit by 35.6 percent (0.001 + 0.355 = 0.356).

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[23] These marginal effects are statistically significant at the 10 percent and the 5 percent level, respectively.

Thus, as opposed to Black-owned firms, for Hispanic owners, dealing with a supplier closer to home relative to outside of the MSA is associated with being more likely to be offered credit.

Finally, the indicator variables for being a member of a business association and having someone to talk about business issues can be thought of as proxies for general networking apart from supplier relationships. The association between networking and the offer of trade credit is of interest in its own right, and the regression results indicate that networking is associated with being more likely to be offered trade credit.[25]

In order to confirm these results, we did several additional experiments. First, we report results that control for random firm effects in column 4. If there are unobserved factors that are specific to the firm and correlated with our supplier ties measures, we may confound these latent factors with our measures of interest. Second, we respecified the unit of observation to be each business rather than each business and supplier pair; therefore, trade credit offered is an indicator variable that equals one if at least one supplier offer credits to a given business. Third, we ran OLS, WLS, and tobit regressions with an alternative measure of the use of trade credit, the dollar amount owed (results available upon request). In all three cases, the results are qualitatively similar to those discussed above.

We also estimated separate regressions for Hispanic and Black businesses, thus allowing all of the variable coefficients to vary by ethnic group. The marginal effects are reported in Table 5 and are qualitatively similar to those presented for the pooled sample. We also ran regressions for the Black and Hispanic subsamples with interactions between the ethnic supplier and location variables (not reported in the table). This allows the effect of working with a supplier of the same ethnicity to vary by location, and vice versa. Our findings that closer ties are associated with the

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[24] This is the sum of the first two rows (ie. 0.318+-0.129 in column 1 or 0.340-0.146 in column 2.

[25] It is not clear which way causation runs between networking measures and the offer of trade credit. It may be, for example, that owners of higher quality firms tend to be members of business associations.

offer of credit for Hispanic owners are quite robust to this alternative specification. However, the finding that working with a neighborhood supplier reduces the probability of being offered credit for Black owners is less robust in that it only holds for owners working with non-Black suppliers.

Lastly, an extension of our empirical description of the relationships between businesses and their suppliers would be to add more information about the supplier side. For example, Petersen and Rajan (1997) have shown that larger asset size is associated with a firm offering more credit as measured by accounts receivables. Our finding that ethnic ties are associated with the offer of trade credit raises the question of whether supplier characteristics also vary systematically by ethnicity. We cannot explore this issue directly because the national and neighborhood surveys do not provide more information about suppliers of the sample businesses beyond what we have already discussed. However, we can get some idea of what might be found by looking at the NSSBF businesses from a different perspective. That is, we look at how the firms provide credit to customers, as measured by accounts receivable, rather than how they receive trade credit.

We report some measures of credit offered to customers in Table 6. In order to sharpen the focus on providers of trade credit, we restrict the sample to firms in the manufacturing, wholesale trade, and transportation sectors. We can see that a lower proportion of Black- and Asian-owned businesses report having any accounts receivable, relative to White-owned businesses. More startling, Black-owned businesses have less than half of the accounts receivables (in dollars) of any other ethnic group, both with and without conditioning on having any receivables at all. However, if we normalize by asset size, we see that Black-owned businesses have a ratio of receivables to assets similar to that of White-owned businesses. This suggests that the relatively low levels of receivables reflect the lower asset size of Black-owned firms. Although Black-owned suppliers of a given size look similar to other firms in terms of their accounts receivables, the fact that they tend to

be smaller is asset size may have an effect on a buyer's chances of being offered credit.[26]

Tests for Ethnic Networks in National Data

The results from the Chicago neighborhoods are striking. To determine whether these results can be generalized, we employ the NSSBF to test whether ethnic differentials in trade credit usage are reduced when there are more businesses of the same ethnicity in the local area. Using data from the 1992 Census of Minority-Owned Businesses, we construct six MSA-level measures of the presence of Hispanic-, Black-, and Asian-owned businesses for each urban NSSBF firm.[27] The measures are the share of all (1) firms, (2) sales, (3) firms with paid employees, (4) sales of firms with paid employees, (5) employees at firms with paid employees, and (6) payroll of firms with paid employees represented by firms owned by members of a particular ethnic group.[28]

Using these data, we reestimated selected regressions from table 2. Because information on minority representation in non-MSA areas was not available, the sample was restricted to the 3441 urban firms in the NSSBF. In addition, the base specification in the table 2 regressions was augmented to include a variable interacting a firm's ethnic ownership (e.g., Hispanic) and the measures of the presence of firms owned by members of the same ethnicity (e.g., share of Hispanic firms in the MSA). Because there are six measures of minority-firm presence, regressions are run separately for each of the six MSA measures. The coefficient on the interaction terms provide some evidence as to whether being in an MSA with a higher fraction of firms that are of the same ethnicity is associated with the extent of trade credit use.[29]

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[26] Furthermore, the 1992 Census of Minority Owned Businesses report over 15,000 Hispanic-owned businesses with paid employees in the manufacturing, wholesale trade, and transportation (less taxi services) sectors compared to less than 7,000 Black-owned firms with paid employees in the same sectors.

[27] We obtained special access to the proprietary MSA identifier for each firm in the NSSBF.

[28] The six MSA measures are highly correlated (greater than 0.92) for the Hispanic and Asian measures. For the Black firms, the correlations, which range from 0.60 to 0.95, are lower but still strong,

[29] All six measures of minority business presence are used because there is little guidance suggesting which measure might be best. For example, the adjusted R-squared in the regressions are all quite similar.

This is admittedly a very blunt instrument. Unlike the Chicago neighborhood data, which includes information about each firm's suppliers, the NSSBF data only allows for the use of data on the pool of co-ethnic firms operating in the local MSA market without regard to whether any of them actually provides trade credit. Furthermore, the broad ethnic categories used in the NSSBF and Census may obscure potentially important differences in countries of origin. For example, if Korean businesses rarely use non-Korean suppliers, the share of Asian firms may be a poor proxy of potential Korean suppliers in the area. These mismeasurement problems will tend to bias the MSA interaction coefficients towards zero.

Table 7 summarizes the six regression runs for each aspect of trade credit usage. The six Black, Hispanic, and Asian interactions are grouped by sign and significance in the first, second, and third group of columns, respectively. In each column group, the first subcolumn, labeled "differential reduced," reports the number of interaction coefficients that are statistically significant at the 10 percent level and that associate a higher MSA share for co-ethnic businesses with a smaller racial differential in access to trade credit. The second subcolumn, labeled "differential increased," reports the number of interaction coefficients that are statistically significant at the 10 percent level and that associate a higher MSA share for co-ethnic businesses. Insignificant interaction coefficients are reported in the third subcolumn.

Thus, the first row shows that none of the interaction coefficients for Black-owned businesses are statistically significant in the six probit regressions of whether the firm used trade credit last year. This suggests there is no association between a location in an MSA with more Black businesses (however measured) and differences in the use of trade credit in the last year by White-owned and Black-owned firms.

As the table indicates, this exercise is not always definitive. This is not surprising, given

that we subject a relatively weak proxy to a tough test. However, some patterns emerge.

There is some evidence suggesting that the presence of other Hispanic-owned businesses in an MSA helps individual Hispanic-owned firms obtain and use trade credit relative to White-owned firms. In particular, the location of an Hispanic-owned small business in an MSA with more Hispanic-owned businesses is associated with reductions in the frequency of cash discount offerings, the use of cash discounts, and the likelihood of having ever been rejected for trade credit. The size of these ethnic neighborhood effects vary, but can be substantial. For example, the racial differential for being offered a cash discount faced by a Hispanic-owned small business located in an MSA with an average presence of Hispanic-owned firms was almost 17 percent lower (in percentage points) than the differential the same firm would face if it were located in an MSA with no Hispanic-owned firms.[30] A much larger ethnic network effect is observed for the use of a cash discount (a 44 percent reduction), but a smaller effect is observed for trade credit rejection (a 9 percent reduction). Only in one instance—trade credit last year—is there a significant relationship between the interaction term and a firm's trade credit relationships.

The national survey results for Hispanic-owned firms are thus generally consistent with the neighborhood findings. That is, a higher MSA share for Hispanic-owned businesses, which offers more opportunity for supplier ties, is generally associated with reductions in the trade credit differentials between Hispanic-owned and White-owned firms, and very rarely associated with increases in such differentials.

For Black-owned firms, as in the case of the neighborhood findings, the results are mixed. Only one trade credit measure—cash discount used—suggests that location in an MSA with a higher Black-owned business presence is associated with reductions in Black-owned/White-owned firm trade credit differentials. For two other measures—ever rejected for trade credit and percent of

[30] This is the average reduction in the racial differential over the 6 interaction terms used.

purchases on account—it appears that a higher Black-owned business presence is associated with increases in differentials.

Finally, the results show no statistically significant correlations for Asian-owned firms. However, among 6 of the 8 trade credit measures, there is a positive association between trade credit usage by Asian-owned firms and the local presence of Asian-owned businesses.[31]

Conclusion

A goal of this paper is to provide better measurement of supplier relationships and ethnic ties in order to guide theoretical treatement of these issues. We document several facts about the empirical importance of supplier relationships for the use of trade credit by minority-owned small businesses. First, using nationally representative data, we show economic and statistically important disparities in the use of trade credit among ethnic groups. In particular, Black-owned businesses use less trade credit, are less likely to take advantage of discounts for early payment, and are more likely to have payments past due. Second, we use our Chicago neighborhood data to show that closer relationships with suppliers as measured by ethnic ties and geographical proximity are associated with more trade credit for Hispanic-owned businesses but not Black-owned firms. We also show that a relatively long relationship with a supplier is associated with more trade credit for both Black and Hispanic businesses. Finally, turning back to the nationally representative data, we explore how location in an MSA with a higher proportion of businesses of the same ethnicity is associated with the use of trade credit by minority owners relative to White-owned firms. We find that a higher MSA share for Hispanic-owned businesses is generally associated with a reduction in differences in the use of trade credit by Hispanic owners relative to White owners. No clear

[31] We also ran the regressions with standard error adjustments for MSA clustering. The results are roughly similar; if anything, the cluster analysis strengthens the previously observed ethnic network differences between Hispanics and Black firms. In particular, the cluster adjustment increases the Black-White differential among the ever rejected, percent purchases on account, and cash discount offered measures but decreases the Hispanic-White differential among the ever rejected and cash discount used variables. The adjustment also reduces the Asian-White ever rejected for trade credit differential.

correlation is apparent between the MSA share for Black-owned businesses and their use of trade credit. Thus, the ethnic differences in the effects of relationships evident in the neighborhood surveys seem to be consistent with the results from the national survey.

One way minority firms may deal with disadvantages relative to White firms could be to cultivate ties to suppliers in an ethnic network in order to ameliorate ethnic disparities in access to trade credit. The two surveys provide little evidence that closer relationships or ties with suppliers are associated with better access to trade credit for Black owners, whereas we do find evidence that closer supplier relationships is tied to trade credit for Hispanic owners. These results lead us to offer the conjecture that the ethnic differences in the use of trade credit in the national survey sample may potentially be due, in part, to differences in relationships between owners and their suppliers. We find some support for this proposition using the rough relationship proxies available in the national data.

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Table 1

Descriptive Statistics, NSSBF 1993 [1]

	White owned firms		Black owned firms			Hispanic owned firms			Asian owned firms		
	Sample	Mean	Sample	Mean		Sample	Mean		Sample	Mean	
Trade credit variables											
Trade credit last year	3,293	0.67	418	0.63		289	0.56	* *	293	0.59	*
Ever rejected for trade credit	3,293	0.06	418	0.13	* *	289	0.10	*	293	0.07	
Number of suppliers on account [2]	2,353	31.62	276	13.11	* *	166	19.86	* *	181	17.11	* *
Number of suppliers on account [3]	3,293	21.05	418	8.20	* *	289	11.13	* *	293	10.04	* *
Percent of purchases on account [2]	2,353	0.73	276	0.60	* *	166	0.67	* *	181	0.67	*
Percent of purchases on account [3]	3,293	0.49	418	0.38	* *	289	0.38	* *	293	0.40	* *
Cash discount offered [2]	2,353	2.48	276	2.23	* *	166	2.21	*	181	2.04	* *
Cash discount used [4]	1,770	3.50	156	2.70	* *	104	3.09	*	88	2.65	* *
Cash discount used [2]	2,353	2.75	276	1.94	* *	166	2.26	* *	181	1.76	* *
Payments past due [2]	2,353	1.82	276	2.22	* *	166	1.88		181	1.91	
Demographic and firm variables											
Female owned	3,293	0.20	418	0.23		289	0.24		293	0.24	
High school dropout	3,293	0.05	418	0.03		289	0.11	* *	293	0.05	
High school graduate	3,293	0.24	418	0.15	* *	289	0.31	*	293	0.13	* *
Some college	3,293	0.26	418	0.36	* *	289	0.21		293	0.19	*
College graduate	3,293	0.25	418	0.25		289	0.26		293	0.34	* *
Post college graduate	3,293	0.21	418	0.20		289	0.11	* *	293	0.29	* *
Owner declared bankrupcy last 7 years	3,293	0.03	418	0.05	* *	289	0.04		293	0.02	
Judgments rendered against owner, 3 yrs	3,293	0.04	418	0.15	* *	289	0.09	* *	293	0.05	
Owner delinquent 1-2 times last 3 years	3,293	0.05	418	0.15	* *	289	0.07		293	0.09	
Owner delinquent 3 times last 3 years	3,293	0.08	418	0.22	* *	289	0.15	* *	293	0.06	
Firm delinquent 1-2 times last 3 years	3,293	0.07	418	0.15	* *	289	0.09		293	0.06	
Firm delinquent 3 times last 3 years	3,293	0.12	418	0.19	* *	289	0.16		293	0.08	* *
Firm age	3,293	14.49	418	11.99	* *	289	12.02	* *	293	9.64	* *
Firm was founded by owner	3,293	0.74	418	0.87	* *	289	0.78		293	0.66	* *
Firm was purchased by owner	3,293	0.20	418	0.10	* *	289	0.19		293	0.31	* *
Firm was inherited by owner	3,293	0.06	418	0.02	* *	289	0.02	* *	293	0.02	* *
Firm is publicly traded	3,293	0.00	418	0.00	* *	289	0.00		293	0.01	
Number of FT employees	3,293	9.02	418	6.32	* *	289	6.70	* *	293	7.57	*
Log assets	3,293	11.12	418	10.60	* *	289	10.91		293	11.20	
Corporation	3,293	0.50	418	0.34	* *	289	0.34	* *	293	0.46	
Franchise	3,293	0.02	418	0.02		289	0.01	* *	293	0.04	

	White owned firms		Black owned firms			Hispanic owned firms			Asian owned firms		
	Sample	Mean	Sample	Mean		Sample	Mean		Sample	Mean	
Longest relationship with a financial institution	3,293	9.91	418	7.95	* *	289	8.41	* *	293	7.20	* *
Financial network size	3,293	1.92	418	1.91		289	1.78	*	293	1.81	
Concentration of banking services	3,293	0.88	418	0.82	* *	289	0.86		293	0.89	
Complexity of services	3,293	0.51	418	0.36	* *	289	0.24	* *	293	0.43	
Profits/assets	3,293	0.94	418	0.70		289	1.12		293	0.98	
Median sales growth, 1990-1992	2,555	0.09	307	0.25	* *	212	0.09		190	0.07	
MSA	3,293	0.77	418	0.90	* *	289	0.89	* *	293	0.96	* *

Notes:

[1] **(*)= significantly different from White owned firms at the 5 (10) percent level. All means are weighted using the NSSBF sampling weights. 34 mixed race or Native American firms are not included in table 1 but are included in tables 2 and 3. Six firms are identified as Hispanic and Black and three as Hispanic and Asian. These nine firms are included in the table.

[2] Sample of firms with any trade credit in last year.

[3] All firms.

[4] Sample of firms that were offered a cash discount.

Table 2
Supply and Use of Trade Credit by Minority-Owned Businesses, NSSBF 1993
Marginal effects (robust standard errors in parentheses) [1]

Dependent variable	Estimation Method	Weighted Black	Weighted Hispanic	Weighted Asian	Sample Size	Wald P-statistic Black vs Hispanic	Wald P-statistic Black vs Asian
Trade credit last year	probit	-0.022 (0.032)	-0.077 * (0.044)	-0.039 (0.041)	4,318	0.312	0.744
Ever rejected for trade credit	probit	0.024 * * (0.013)	0.019 (0.017)	0.005 (0.012)	4,318	0.815	0.283
Log (no. of suppliers on acct +1) (trade credit users only)	WLS	-11.640 * * (2.040)	0.930 (2.700)	-14.430 * * (2.910)	2,986	0.001	0.227
Log (no. of suppliers on acct +1) (full sample of firms)	WLS	-7.320 * * (2.040)	-4.860 (3.150)	-11.160 * * (2.550)	4,318	0.512	0.240
Perc of purchases on account (trade credit users only)	WLS	-0.064 * * (0.024)	-0.004 (0.030)	-0.016 (0.034)	2,986	0.121	0.249
Perc of purchases on account (full sample of firms)	tobit	-0.122 * * (0.036)	-0.088 * * (0.030)	-0.071 * * (0.033)	4,318	0.468	0.296
Cash discount offered	ordered probit	-0.109 (0.094) [0.043] {-0.009}	-0.121 (0.113) [0.048] {-0.010}	-0.253 * (0.150) [0.098] {-0.019}	2,986	0.935	0.416
Cash discount used (sample of firms with discounts offered)	ordered probit	-0.351 * * (0.116) [0.049] {-0.132}	-0.143 (0.161) [0.017] {-0.052}	-0.534 * * (0.151) [0.085] {-0.205}	2,126	0.295	0.337

Dependent variable	Estimation Method	Weighted Black	Weighted Hispanic	Weighted Asian	Sample Size	Black vs Hispanic	Black vs Asian
Cash discount used	ordered probit	-0.347 * *	-0.090	-0.558 * *	2,986	0.102	0.179
(full sample of trade credit firms)		(0.095)	(0.125)	(0.125)			
		[0.133]	[0.033]	[0.217]			
		{-0.126}	{-0.034}	{-0.191}			
Payments past due	ordered probit	0.302 * *	0.040	0.183	2,986	0.091	0.493
		(0.094)	(0.123)	(0.146)			
		[-0.110]	[-0.014]	[-0.065]			
		{0.001}	{0.000}	{0.001}			
Without firm or owner deliquency controls[2]							
Cash discount used	ordered probit	-0.445 * *	-0.128	-0.502 * *	2,986	0.037	0.714
(full sample of trade credit firms)		(0.090)	(0.122)	(0.127)			
		[0.176]	[0.050]	[0.198]			
		{-0.144}	{-0.045}	{-0.159}			
Payments past due	ordered probit	0.490 * *	0.135	0.051	2,986	0.007	0.007
		(0.082)	(0.102)	(0.139)			
		[-0.193]	[-0.053]	[-0.020]			
		{0.021}	{0.004}	{0.001}			

Notes:

[1] **(*)= significant at the 5 (10) percent level. All marginal effects are relative to a white small business. A fifth (unreported) racial indicator includes the 34 owners who are Native American or mixed race. The ordered probit models report coefficient estimates in the first row, marginal effects at the never response in [ ] brackets, and marginal effects at the always response in {} brackets. Standard errors are Huber-White except the tobit regression. The Delta method is used to compute standard errors for the tobit. FIRE firms are excluded. Controls include the gender and education of owner, two digit industry, region, whether in an MSA, log assets, number of employees, firm age and firm age square, whether the firm was acquired or inherited, whether the firm is publicly traded, the profit to asset ratio, sales growth positive, sales growth negative, whether incorporated, whether firm is a franchise, whether the owner was deliquent on personal obligations 1-2 or 3 times in the last three years, whether the owner declared bankruptcy in the last 7 years, whether the firm was deliquent on obligations 1-2 or 3 times in last 3 years, dummies for whether the sales growth and Herfindahl variables are missing, longest relationship with a bank, the number of financial relationships, the complexity of those relationships, and the degree to which they are with the same instititions. All regressions are weighted using NSSBF sample weights.

[2] Excludes whether the firm or owner was deliquent on payments in the last 3 years, whether the owner declared bankruptcy in last 7 years, and whether judgements have been levied against the owner in the last 3 years.

Table 3
Characteristics of Owners and Businesses in the Neighborhood Survey [1]

	All	Hispanic	Black		White		Asian		Other	
Manuf/wholesale constr/transport	5.6	6.9	2.3	*	21.6	*	2.5		4.9	
Retail total	66.7	70.2	51.1	**	49.3	*	95.0	**	95.1	**
Eating/drinking places	18.4	24.2	13.0	**	20.2		5.6	**	22.8	
Food stores	11.4	14.0	8.4		4.7		2.8		25.5	
Auto service/sales	8.5	10.9	7.6		0.0		2.5		11.0	
Other retail	28.5	21.1	22.1		24.4		84.1	**	35.7	
Business/personal serv.	27.7	22.9	46.6	**	29.1		2.5	**	0.0	**
Age of business in years	8.5	6.9	11.6	**	14.9	**	3.7	**	5.9	
Number of employees	4.5	3.9	5.3		11.1	*	2.3		3.1	
Female	31.2	31.1	40.5	**	16.1		18.1		15.2	*
No high school degree	29.6	49.4	16.0	**	9.8	**	3.6	**	14.5	**
High school degree or some college	43.4	41.6	46.6		28.0		49.0		43.3	
College degree or beyond	27.0	9.0	37.4	**	62.1	**	47.4	**	42.2	**
Proficient in English	84.9	70.5	100.0	**	100.0	**	88.8	**	90.1	**
Number of businesses	361	171	116		21		31		22	
Supplier offers credit	49.7	44.4	42.4		60.8	**	77.6	**	67.0	**
Supplier of same ethnicity	35.1	32.9	30.8		59.9	**	56.1	**	17.8	**
Years with supplier	6.5	5.6	7.6	**	12.6	**	4.3	*	5.7	
Supplier in neighborhood	27.1	38.5	19.9	**	20.4	**	5.3	**	21.1	**
Supplier elsewhere in MSA	51.9	46.3	54.7	**	65.0	**	64.1	**	47.5	
Supplier outside of MSA	21	15.2	25.4	**	14.7		30.7	**	31.4	**
Number of suppliers	838	403	246		55		79		55	

Notes:
[1] ** (*)=difference from Hispanic firms is statistically significant at the 5 (10) percent level. These results are weighted to reflect sample stratification. The Other category is made up of owners from the Middle East, India, or Pakistan.

Table 4
Trade Credit Offered
Marginal Effects (Robust Standard Errors in Parentheses) [1]

	By supplier				
	Probit	Probit	Probit	Random effects probit	By firm probit [2]
Owner and supplier same ethnicity	-0.129	-0.146	-0.098	-0.171	-0.147
	(0.093)	(0.090)	(0.098)	(0.127)	(0.098)
Hispanic owner and supplier	0.318 * *	0.340 * *	0.289 * *	0.402 * *	0.386 * *
	(0.089)	(0.085)	(0.099)	(0.151)	(0.080)
Wh/As/Other owner and supplier	0.076	0.080	0.033	0.165	0.221 *
	(0.135)	(0.135)	(0.141)	(0.206)	(0.128)
Log years with supplier	-0.151				
	(0.157)				
Log years with supplier squared	0.034				
	(0.043)				
Years with supplier less than 3		0.117 *	0.116 *	0.094	0.164 * *
		(0.064)	(0.064)	(0.101)	(0.072)
Years with supplier greater than 7		0.161 * *	0.183 * *	0.236 * *	0.148 *
		(0.064)	(0.064)	(0.104)	(0.083)
Supplier in neighborhood	-0.061	-0.061	-0.392 * *	-0.007	-0.079
	(0.072)	(0.072)	(0.102)	(0.117)	(0.077)
Supplier in Chicago MSA	0.092	0.094	0.001	0.132	0.098
	(0.062)	(0.062)	(0.094)	(0.087)	(0.072)
Supplier in neighborhood*Hispanic			0.557 * *		
			(0.077)		
Supplier in Chicago*Hispanic			0.355 * *		
			(0.112)		
Supplier in neighborhood*Wh/As/Other			0.060		
			(0.189)		
Supplier in Chicago*Wh/As/Other			-0.128		
			(0.156)		
Hispanic	-0.026	-0.031	-0.378 * *	0.028	-0.034
	(0.080)	(0.078)	(0.118)	(0.133)	(0.101)
Other	0.301 * *	0.293 * *	0.355 * *	0.461 * *	0.252 * *
	(0.079)	(0.080)	(0.121)	(0.152)	(0.095)
Member of trade association	0.182 * *	0.178 * *	0.165 * *	0.353 * *	0.205 * *
	(0.058)	(0.058)	(0.059)	(0.111)	(0.061)
Someone to talk about business	0.099 *	0.095 *	0.104 *	0.137	0.038
	(0.055)	(0.055)	(0.054)	(0.099)	(0.063)
Full Controls	Yes	yes	yes	yes	yes

Table 5
Trade Credit Offered, by Race[1]
Marginal Effects (Robust Standard Errors in Parentheses)

	Black owners		Hispanic owners	
	Probit	Random Effects Probit	Probit	Random effects probit
Owner and supplier same ethnicity	-0.081	-0.030	0.175 * *	0.209 * *
	(0.093)	(0.075)	(0.066)	(0.091)
Years with supplier less than 3	0.150	0.216	0.034	-0.008
	(0.113)	(0.162)	(0.085)	(0.114)
Years with supplier greater than 7	0.323 * *	0.331	0.171 *	0.285 *
	(0.133)	(0.206)	(0.099)	(0.150)
Supplier in neighborhood	-0.266 * *	-0.158 * *	0.262 * *	0.353 * *
	(0.097)	(0.079)	(0.109)	(0.178)
Supplier in Chicago MSA	0.053	-0.085	0.292 * *	0.382 * *
	(0.092)	(0.091)	(0.099)	(0.146)
Member of trade association	0.044	0.613 * *	0.255 * *	0.393 * *
	(0.098)	(0.233)	(0.084)	(0.138)
Someone to talk about business	0.263 * *	0.471 * *	0.126	0.121
	(0.098)	(0.224)	(0.077)	(0.122)
Sample size	246	246	403	403
Number of firms	116	116	171	171
Log likelihood	-111	-97	-220	-207

Notes:
[1] * (**) = significant at the 10 (5) percent level. All regressions include the variables listed in Appendix 1 and are weighted using sampling weights. Standard errors are Huber-White and are corrected for multiple firm observations.

Table 6
Accounts receivable, by race
Manufacturing, wholesale trade, and transportation sectors only [1]

	White	Black	Hispanic	Asian
Percent of firms with any accounts receivable	0.712	0.578 *	0.662	0.582 *
	(0.017)	(0.050)	(0.066)	(0.062)
Accounts receivable	148,592	55,687 *	170,057	124,803
	(9,011)	(11,879)	(63,052)	(44,186)
Accounts receivable (conditional on >0)	208,558	96,372 *	256,792	214,424
	(12,685)	(19,704)	(92,662)	(74,486)
Accounts receivable / assets	0.172	0.187	0.213	0.141
	(0.007)	(0.026)	(0.034)	(0.021)

Notes:
[1] * = signficantly different from White group at 5 percent level. The sample is weighted by the NSSBF sampling weights. Standard errors are in parentheses. The sample includes all manufacturing, wholesale trade, and transportation sector industries except taxi cab drivers.

Table 7
Effect of MSA-level Racial Firm Composition on Trade Credit Usage

	Black			Hispanic			Asian		
Dependent Variable	Differential reduced[1]	Differential increased[1]	No effect	Differential reduced[1]	Differential increased[1]	No effect	Differential reduced[1]	Differential increased[1]	No effect
Trade credit last year	0	0	6	0	6	0	0	0	6
Ever rejected for trade credit	0	3	3	3	0	3	0	0	6
Log (no. of suppliers on acct. +1)[2]	0	1	5	0	0	6	0	0	6
Pct. of purchases on account[2]	0	3	3	0	0	6	0	0	6
Cash discount offered[2]	1	0	5	6	0	0	0	0	6
Cash discount used[2]	4	0	2	5	0	1	0	0	6
Payments past due[2]	0	0	6	0	0	6	0	0	6
Total, each regression=1	5	7	30	14	6	22	0	0	42
Total, each trade credit measure=1[3]	1	1	5	2.5	1	3.5	0	0	7

Notes:
[1]"Differential reduced" ("Differential increased") means the interaction coefficient was statistically significant at the 10 percent level and had a sign indicating that an increase in the MSA-level own-ethnicity business presence was associated with a reduction (increase) in the difference between white-owned firms and firms of the relevant ethnic ownership.
[2]Sample restricted to trade credit users only.
[3]Each dependent variable counts once. If the sum for a row is 4 or more, the trade credit measure counts as one. If the sum is 3, then the trade credit measure counts as 0.5. Thus, for each column group, the total sum is 7.

Appendix 1
Decomposition of Ethnic Gap Among NSSBF Trade Credit Measures

	Percent purchases on account												Payments past due[2]
	Trade credit users			Full sample			Cash discount offered			Cash discount used			
	Black	Hispanic	Asian	Black	Hispanic	Asian	Black	Hispanic	Asian	Black	Hispanic	Asian	Black
Racial gap	12.8	5.9	5.4	11.0	11.0	8.9	0.24	0.26	0.43	0.80	0.40	0.85	-0.40
Fraction due to differences in													
Characteristics	54.1	100.3	67.4	52.6	50.4	54.9	70.6	48.2	58.3	40.4	40.7	14.9	49.0
Coefficients	45.9	-0.3	32.6	47.4	49.6	45.1	29.4	51.8	41.7	59.6	59.3	85.1	51.0
Contribution to racial gap from differences in:													
Female	0.4	2.1	1.4	0.0	0.0	0.0	1.7	4.0	1.5	-0.2	1.1	-0.5	0.3
Education	-0.2	2.7	-5.6	-4.0	4.4	-8.6	-2.5	3.1	-8.0	2.0	0.9	-7.4	0.6
Owner bankruptcy	-0.1	-0.0	0.0	-0.2	-0.1	0.1	-3.1	-0.6	0.0	-0.3	-0.4	-0.0	0.6
Owner deliquent on Debt	11.0	14.3	-0.1	3.2	2.1	-1.6	12.1	7.7	-2.0	6.6	6.1	-0.2	22.2
Judgements against Owner	8.4	6.9	1.7	8.2	4.1	0.7	-2.5	-0.9	-0.1	-3.0	-0.9	-1.7	1.7
Firm deliquent on Debt	2.2	3.2	-0.9	-8.2	-3.8	5.5	-2.3	-0.4	1.0	25.1	31.0	-5.2	30.6
Firm age	1.7	4.4	9.8	2.1	2.3	5.0	3.8	2.3	7.4	4.3	6.8	11.7	0.4
Firm acquired	4.0	-2.0	-6.5	1.6	0.2	-2.1	7.4	-1.5	-2.8	1.0	-0.5	-0.5	0.7
Firm inherited	1.0	1.0	1.8	0.1	0.1	0.1	-0.3	-0.1	-0.1	0.5	0.9	0.2	-1.3
Firm is traded	-0.1	0.1	-0.1	-0.4	-0.1	2.5	-0.1	0.1	-0.0	0.1	0.2	0.1	-0.1
Employees	0.6	1.1	0.4	0.1	0.0	0.0	-0.9	-0.7	-0.1	0.0	0.1	0.0	0.4
Assets	7.7	11.1	-6.3	15.1	6.2	-2.7	4.3	2.6	-0.8	1.2	0.3	-0.2	-1.3
Incorporated	1.6	5.7	0.2	4.0	3.9	1.1	-6.3	-9.6	-0.2	-0.7	-1.6	0.0	-3.4
Franchise	0.1	0.3	-1.0	-0.4	-0.8	0.8	-0.3	-0.4	0.9	0.0	-0.0	-0.1	0.1
Profit/assets	0.3	-0.4	0.2	0.5	-0.4	-0.1	-1.3	0.7	-0.3	0.0	-0.0	0.0	-0.3
Sales growth	-0.2	-0.3	3.2	0.5	-0.5	4.1	0.2	0.6	-6.6	-0.2	-1.3	0.0	0.2
Region	3.6	7.6	16.3	2.8	0.5	-4.7	13.5	8.7	3.8	7.4	-1.9	-1.3	-2.7
MSA	1.2	2.7	4.4	4.2	3.8	7.2	9.0	8.3	7.5	1.5	3.6	3.7	1.3
Industry	2.9	33.5	42.9	9.2	13.3	43.5	39.4	32.0	51.4	-6.6	-10.4	15.9	-5.9
Longest bank Relationship	1.9	2.8	7.8	0.2	0.2	0.3	6.3	3.9	6.2	1.0	0.7	1.7	0.7
Network size	-0.2	1.1	0.3	0.2	2.2	2.1	-4.8	9.1	1.5	1.2	-1.7	-0.5	1.7
Herfindahl of ties	6.0	0.7	-2.6	8.8	3.8	-1.8	2.8	-5.7	-1.1	-0.9	0.3	-1.2	2.8
Complexity of ties	0.3	1.7	0.1	5.0	8.9	3.3	-5.7	-14.9	-0.6	0.3	7.7	0.3	-0.2

Notes:
[1] Independent variable's contribution to racial gap is computed using the white sample as the base case. All regressions are estimated with linear probability models.
[2] There is no raw Hispanic-White or Asian-White gap.

Appendix 2
Selected Full Regression Results 1
Marginal Effects (Robust Standard Errors in Parentheses)

	Full sample, by supplier			
	probit	Random effects probit	Black owners probit	Hispanic owners probit
Owner and supplier same ethnicity	-0.146	-0.171	-0.081	0.175 * *
	(0.090)	(0.127)	0.093	(0.066)
Hispanic owner and supplier	0.340 * *	0.402 * *		
	(0.085)	(0.151)		
Wh/As/Other owner and supplier	0.080	0.165		
	(0.135)	(0.206)		
Years with supplier less than 3	0.117 *	0.094	0.150	0.034
	(0.064)	(0.101)	(0.113)	(0.085)
Years with supplier greater than 7	0.161 * *	0.236 * *	0.323 * *	0.171 *
	(0.064)	(0.104)	(0.133)	(0.099)
Supplier in neighborhood	-0.061	-0.007	-0.266 * *	0.262 * *
	(0.072)	(0.117)	(0.097)	(0.109)
Supplier in Chicago MSA	0.094	0.132	0.053	0.292 * *
	(0.062)	(0.087)	(0.092)	(0.099)
Hispanic	-0.031	0.028		
	(0.078)	(0.133)		
Other	0.293 * *	0.461 * *		
	(0.080)	(0.152)		
Member of trade association	0.178 * *	0.353 * *	0.044	0.255 * *
	(0.058)	(0.111)	(0.098)	(0.084)
Someone to talk about business	0.095 *	0.137	0.263 * *	0.126
	(0.055)	(0.099)	(0.098)	(0.077)
Less than HS degree	-0.032	-0.092	-0.117	-0.046
	(0.064)	(0.116)	(0.137)	(0.083)
College degree	-0.189 * *	-0.273 * *	-0.239 * *	-0.132
	(0.063)	(0.114)	(0.099)	(0.123)
Proficient in English	0.146 * *	0.262 *		0.148 *
	(0.072)	(0.134)		(0.081)
Female	-0.189 * *	-0.320 * *	-0.333 * *	-0.095

	(0.055)		(0.103)		(0.099)		(0.075)	
Log number of employees	-0.039		-0.005		-0.024		0.083	
	(0.094)		(0.026)		(0.137)		(0.147)	
Log number of employees squared	0.045		0.028		0.023		0.028	
	(0.030)		(0.020)		(0.043)		(0.050)	
Business in danger of failing	0.174	* *	0.292	* *	0.126		0.223	* *
	(0.058)		(0.105)		(0.116)		(0.082)	
Business faces growth challenge	0.119		0.234		0.106		0.069	
	(0.084)		(0.158)		(0.124)		(0.162)	
Has deposit relationship	0.165	* *	0.251	* *	0.294	* *	0.108	
	(0.076)		(0.122)		(0.102)		(0.094)	
Business age less than 3	-0.036		0.042		-0.422	* *	0.253	* *
	(0.081)		-(0.145)		(0.084)		(0.105)	
Business age greater than 7	-0.121	*	-0.201	*	-0.192		-0.125	
	(0.068)		(0.119)		(0.124)		(0.102)	
Uses accountant	0.005		0.050		0.138		-0.081	
	(0.069)		(0.128)		(0.111)		(0.104)	
Gives consumers credit	0.097	*	0.192	*	0.022		0.130	
	(0.058)		(0.111)		(0.123)		(0.086)	
	Full sample, by supplier							
	probit		Random effects probit		Black owners probit		Hispanic owners probit	
Previously owned another business	-0.007		-0.114		-0.108		0.042	
	(0.055)		(0.099)		(0.112)		(0.078)	
Disposition towards risk	-0.041	* *	-0.051	*	-0.045		-0.043	* *
	(0.015)		(0.028)		(0.030)		(0.021)	

Notes:
[1] * (**) = significant at the 10 (5) percent level. All regressions include industry dummies and are weighted using sampling weights. Standard errors are Huber-White and are corrected for multiple firm observations.