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REDLINING REDUX

Black Neighborhoods, Black-Owned Firms, and the Regulatory Cold Shoulder

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There has been a growing body of evidence indicating race-based discrimination in small business lending. However, very little research has examined potential geographic redlining effects. This article measures small business lending flows to neighborhoods in the Philadelphia metropolitan area. It advances previous work by measuring differential credit flows while accounting for variations in the credit scores of small firms. Black tracts receive fewer loans after accounting for firm density, firm size, industrial mix, neighborhood income, and the credit quality of local firms. The findings suggest that federal bank regulators should expand small business lending data to include racial characteristics and application information, in part to help identify potentially discriminating lenders for further investigation. Also, Community Reinvestment Act regulations should pay more attention to the distribution of small business loans, by both race and income of neighborhood.

One potential contributor to a lack of small business activity in lower-income and minority neighborhoods is inadequate access to credit by small businesses in these areas. Levels of both financial equity and debt are important to the viability of start-up firms, with the latter being more important to minority-owned than white-owned firms (Bates 1989). Some have argued that lending discrimination and geographic redlining have constrained access to credit by companies in lower-income areas and by black-owned businesses (Bates 1999; Dymski 1996).

Small businesses in certain types of areas might face either geographic discrimination, known as redlining, or individual-based discrimination against minorities or other protected classes when seeking loans. Moreover, the small business lending-borrowing process involves multiple stages, and discrimination may occur at various points of the process. Lenders might avoid marketing their products to geographic areas or to certain minority

groups. They might also reject loan applications from firms in lower-income areas or from minority-owned businesses at higher rates than applications from other firms with similar credit risks. Alternatively, lenders might approve smaller loans to these firms, requiring more financial equity per dollar of debt, or charge interest rates that are higher than those offered to similar firms, located elsewhere or owned by whites. In addition to the effects of current discrimination, past discrimination may result in minority-owned firms or businesses in redlined areas to presume that their loan application would be denied, causing the firms not to seek bank financing.

The 1977 federal Community Reinvestment Act (CRA) and its corresponding regulations require banks and thrifts to offer small business credit throughout their market areas and prohibit them from excluding low- and moderate-income sections of their larger market areas from their formal regulatory assessment areas (Department of the Treasury 1995).¹ The CRA is a relatively short and general piece of legislation. The implementation of the act requires a great deal of detailed regulations, which are promulgated and adopted from time to time by four federal bank regulatory agencies. In 1993, the Clinton administration proposed a substantial rewrite of these regulations. One of the changes was a provision requiring depository institutions to report small business lending data, which at the time were not collected. During the proposal process, it was proposed that such data would include information on the race of the business owner. Moreover, early proposals also called for the full disclosure of bank-level data so that loan-level data would be disclosed, as is the case for home mortgages under Home Mortgage Disclosure Act regulations.² However, advocacy on the part of the banking industry resulted in only limited data collection and disclosure being required in the final regulations, which were adopted in late 1995.³

Under current regulations, the CRA small business lending data do not include the race of the firm owner. Also, no application- or loan-level data are reported to regulators. In fact, even census tract-level reports of each bank's lending activity are not fully disclosed to the public. The public data include census tract lending totals for all banks combined. For individual banks, however, the only data released are tables that describe the distribution of a bank's lending across different sets of tracts (defined by income categories) within a county. Thus, not only is race of the borrower not reported, but tract-level data on individual institutions are generally not available.

Also under the current CRA rules, regulators do not examine patterns of lending by race of business owner or by race of neighborhood. Even if the data were available, discrimination by race of owner is generally treated as of limited relevance to CRA. It is considered more under the purview of fair lending laws—primarily the Equal Credit Opportunity Act and corresponding

regulations. Lending patterns across race of neighborhood, although conceivably a fair lending concern, are generally not examined under any regulatory regime, although various community reinvestment advocates have argued that CRA regulation should consider the geography of race and not just income. If geographic small business lending patterns are explained more by neighborhood race than by income, this has clear implications for CRA policy.

This article examines data made available under 1995 revisions to CRA regulations for loans made by banks to small businesses in the Philadelphia metropolitan area in 1998. These data, although not sufficient by themselves to confirm or deny racial or geographic discrimination in small business lending markets, describe patterns of small business lending across intrametropolitan space. This article improves on an earlier analysis (Immergluck 1999) of small business lending in the Chicago area by adding a credit quality variable.

These data can be used to indicate whether bank lending flows are consistent with explanations of discrimination or redlining and whether the collection of more detailed loan data is warranted. Moreover, they allow for measuring the cumulative outcome of all parts of the lending-borrowing process. Most existing research focuses only on the approval process after an application has been submitted, with little accounting for the impact of bank marketing and application flows, activities that often are key determinants of lending patterns.

GEOGRAPHIC AND RACE-BASED CONSTRAINTS ON BUSINESS CREDIT

Various factors might be expected to lead to an inadequate supply of credit to firms in lower-income neighborhoods. First, lenders might exhibit a form of pure discrimination, either geographic or individual based, where they choose to avoid making loans to firms in such areas or to minority-owned businesses because they have a taste for doing so. White loan officers, for example, might give preferential treatment to white firm owners, with whom they share a "cultural affinity" (Hunter and Walker 1995), or they might prefer not to call on firms in low-income neighborhoods. Pure discrimination may involve varying degrees of awareness on the part of the perpetrator.

Alternatively, lenders might discriminate statistically, using the race of the owner or neighborhood, or neighborhood income, as a signal of borrower risk or risk-adjusted profit. Typically, statistical discriminators are highly aware of their actions. However, the distinction from pure discrimination lies in the

motivation for the action. The statistically discriminating lender is seeking to minimize costs somehow. The lender employs race-based signals in identifying potential loan applicants or in approving loan applications. If the average risk among firms in a geographic area or minority group is overestimated, a negative impact on credit access is clearly expected. However, even accurate assessments of average risk among a group of firms may result in statistical discrimination in which individual firms are assigned the average attributes of all firms in the geographic area or minority group. If average risk exceeds lenders' tolerance for risk, then entire groups or geographic areas may be denied credit access, even though some firms are credit worthy. Whether discrimination is "pure" or "statistical," it remains discrimination and is illegal under fair lending laws.

A third reason why lenders might underserve certain types of geographic or race-based groups of firms involves the notion of information externalities in lending. Lang and Nakamura (1993) provide a theory of redlining based on incomplete information. If lenders receive few applications from lower-income neighborhoods, they have little information about how to evaluate applications from these areas. Due to this incomplete information, lenders deny applications from these areas at higher rates than those from other, higher-income areas. In this model, lending generates information, including data on property values and borrower risk, which is a public good that is beneficial to other lenders.

This article seeks to identify the determinants of credit flow to small businesses with annual sales of less than \$1 million. There are at least two reasons why these small firms may be most likely to suffer from differential credit access across urban space. First, Bates (1997) has shown that black-owned start-up firms are able to leverage their initial equity investments at lower rates than white-owned firms. That is, controlling for other firm characteristics, black start-ups receive smaller amounts of bank debt per dollar of owner equity than white-owned firms. Second, larger, more established firms are likely to be lower risk and generate higher profit margins for the bank. Because discrimination is expected to be most important at the margin, a lender's racial or geographic preferences are likely to affect their decisions more when dealing with smaller firms whose risk characteristics place them near the lender's risk tolerance threshold. Larger firms also tend to take out larger loans and consume more banking services, yielding higher profit margins for lenders. If their discrimination is pure, lenders might be adequately compensated for lending to "distasteful," but relatively large, customers. If discrimination is statistical, higher expected revenues might enable lenders to absorb the costs necessary to induce them to assess the risks of individual borrowers.

MEASURING ACCESS TO CREDIT

The bulk of the literature on redlining and lending discrimination has concerned residential mortgage lending. Much of this research has used data collected under the federal Home Mortgage Disclosure Act (HMDA) and related regulations. The availability of HMDA data and the historic focus of CRA and fair lending regulations on mortgage activity have spurred substantial research on residential lending patterns (Munnell et al. 1992; Kim and Squires 1995; Yinger 1995). The empirical literature on mortgage redlining can be categorized into two basic types: those focusing on an outcome-based definition of redlining and those focused on a process-based definition concerned with the approval or denial of formal applications (Yinger 1995). Outcome-based studies of lending flows, which focus on lending rates to different types of neighborhoods, were the norm before 1990, when HMDA began to include microdata on loan applications rather than only census tract summaries of originations (Bradbury, Case, and Dunham 1989; Hula 1991; Shlay 1988).⁴

More recently, the mortgage access literature has focused on the approval or denial of formally submitted mortgage applications, in large part because the newer, publicly available HMDA data have repeatedly shown large disparities in approval rates by race even after controlling for income. The bulk of this literature has focused on lending discrimination by race of applicant and less on a process-based definition of redlining, where the effect of the geographic location on approval rates is examined. In a study that spurred much of the recent lending discrimination literature, Munnell et al. (1992) found significant evidence of discrimination in loan approvals but no evidence of redlining in the approval process.

Yinger (1995) notes that the outcome-based studies often find evidence of redlining, or differential flows of credit, when controlling for neighborhood characteristics. The outcome-based studies are more difficult to model because they attempt to explain the results of a number of different current and historical processes. These include the marketing and screening procedures of lenders and realtors, anticipated discrimination by potential home buyers, and historical discrimination. The process-based studies, on the other hand, merely attempt to isolate discrimination or redlining in the approval of formal loan applications, which is only one part of the lending process. Although these studies are easier to implement, the findings may be quite limited. If redlining occurs primarily through lenders not marketing their services in certain areas, for example, a process-based study finding no redlining in the approval process may be of limited relevance.

Figure 1 shows the various stages of the small business lending-borrowing process. Although many studies of small business lending focus on the underwriting or approval stage of the process, there are actually multiple steps at which a firm may exit the process, beginning with a failure of marketing and solicitation by lenders. Some steps in the process are driven by the lender and some by the borrower. However, even when a firm chooses not to inquire about or apply for a loan, it may be partly due to previous denials or experiences, including possibly discriminatory actions. Thus, discrimination in lending may have a feedback effect on the explicit demand for loans. Cavalluzzo, Cavalluzzo, and Wolken (1999) found, for example, that minority-owned firms are much more likely to avoid applying for loans due to fear of denial than white-owned firms, even after controlling for financial characteristics of the firms, including credit score.

ACCESS TO BUSINESS CREDIT, REDLINING, AND DISCRIMINATION

Before attempting to develop a model of small business lending flows across urban space, some basic information on determinants of credit access is important. In a nongeographic, process-based study using data from the Federal Reserve Board's National Survey of Small Business Finances (NSSBF) (Board of Governors of the Federal Reserve System 1993), Cole (1998) found that newer and smaller firms are more likely to be turned down for loans than older and larger firms. The NSSBF shows that manufacturers and wholesalers account for a disproportionate amount of commercial bank loans to small corporations (Federal Reserve Board of Governors 1997).

In analyzing data from the Characteristics of Business Owners (CBO) database, Bates (1989, 1993) found that banks make smaller loans to very small firms located in minority areas than to firms in white areas while controlling for financial equity, owner education, race of owner, age, and experience. To compound the problem, he found that minority-owned firms in minority areas tend to have smaller educational and financial equity endowments than other firms, resulting in even smaller loan sizes. In a more recent study, Bates (1997) again found that white-owned firms are able to attract larger amounts of debt than similarly situated black-owned firms.

Immergluck (1999) uses federal CRA data on small business lending in the Chicago area to identify the determinants of small business lending volumes across intrametropolitan space. Although the data are not sufficient to confirm the existence of lending discrimination by race or location, he found

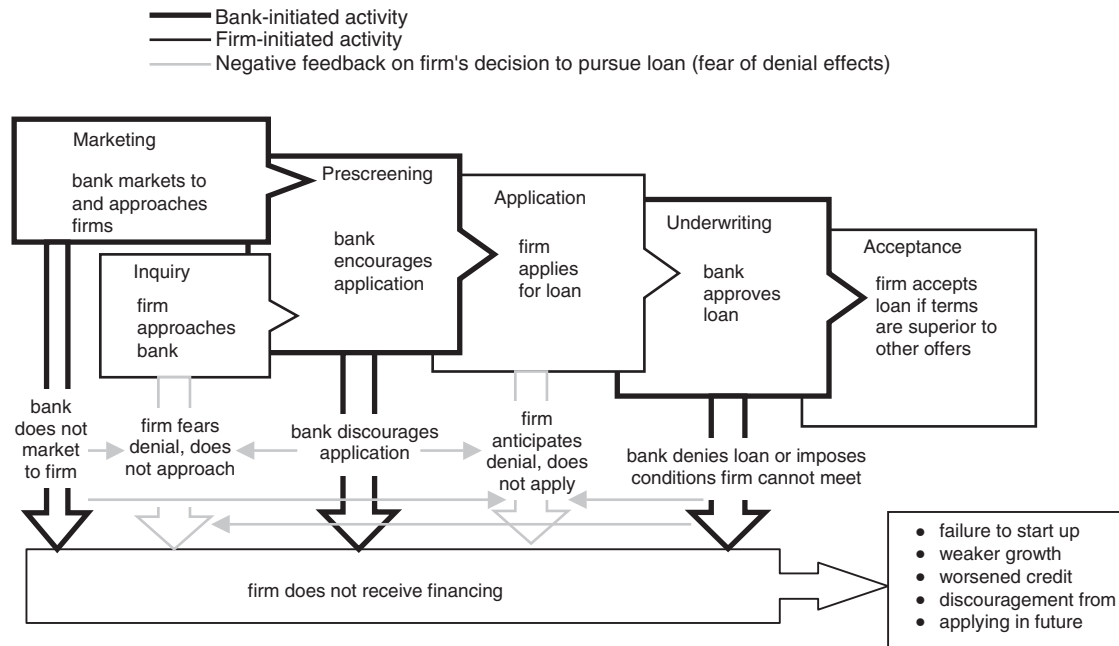


Figure 1: The Small Business Lending-Borrowing Process

that lower-income and minority areas suffer from lower lending rates than higher-income and white neighborhoods, after controlling for industrial mix, firm size, and firm density. This is an outcome- rather than a process-based study. It does not focus on the approval process but rather on differential flows across neighborhoods that might be due to marketing practices by banks, application responses by borrowers, or approval practices of lenders. In a descriptive analysis, Squires and O'Connor (1999) demonstrate large differentials between small business lending volumes to white and minority neighborhoods in Milwaukee.

Three recent studies on access to credit among small businesses, and some related review essays, use the Federal Reserve's 1993 NSSBF to examine possible discrimination by race or ethnicity of business owner (Blanchflower, Levine, and Zimmerman 1998; Bostic and Limpani 1999; Cavalluzzo, Cavalluzzo and Wolken 1999). The NSSBF contains a large number of variables on firm finances, experience in obtaining credit, characteristics of the firm owner (including credit history), type and pricing of loan, and so on. Two of these studies also use additional nonpublic data—including data on firm credit score—made available only to Federal Reserve staff. All three studies found large differences in denial rates between white- and black-owned firms, so that black-owned firms were approximately two and one-half times as likely to be denied a loan as white-owned firms were. Raw differences in denial rates are substantial at 27% and 66% for white- and black-owned firms, respectively. Some of this difference is due to differences in the financial capacity of firms, credit histories of firm owners, and other firm and owner characteristics, which the NSSBF data generally show are weaker among black-owned firms.

However, after controlling for a wide variety of firm and owner characteristics, all three articles found that black-owned firms are still about two times as likely to have their loan application denied than similarly situated white-owned firms. Moreover, even after controlling for firm characteristics, including credit score, black-owned firms were 37% more likely to avoid applying for a loan due to fear that their application would be rejected than white-owned firms, whereas hispanic-owned firms were 23% more likely to fear rejection (Cavalluzzo, Cavalluzzo, and Wolken 1999, 195).

Despite the large differentials in access to credit between white- and black-owned firms, some continue to question whether even these studies, with more than 100 control variables, adequately capture differences in firm finances (Avery 1999). Others, however, find the evidence convincing. Bates (1999, 271), in reviewing these articles, argues that the "totality of the evidence points toward discriminatory treatment of black business owners." Even Avery (1999, 281) admits that this evidence "can't be used to dismiss

[discrimination].” These studies are likely to suffer from selection bias, because firms rejected for bank loans and no longer in business are not included in the surveys. Bates (1999) argues that the omission of younger, smaller firms from the NSSBF database biases the estimates of differential credit access downward because the smaller, younger firms are most likely to suffer from credit access problems. Thus, the denial rate disparities in these studies may be underestimated.

The Bostic and Limpani (1999) article has particular relevance for identifying redlining and discrimination because it includes a number of neighborhood-level geographic variables. In particular, this study finds that, after first adding a variable on the minority composition of the neighborhood in which the firm is located, adding a variable describing the economic status of the neighborhood actually results in minority neighborhood location having a stronger negative effect on credit access. If a firm’s location in a minority neighborhood dampened credit access because the market conditions in such a neighborhood were weaker due to lower neighborhood income, then adding the neighborhood income variable should reduce the coefficient on the minority composition variable. However, just the opposite occurs, suggesting a redlining effect.

THE DATA

Most of the data used here are collected by the Federal Financial Institutions Examination Council (FFIEC), a federal agency that coordinates common activities among the four federal banking regulators. Banks and thrifts that have at least \$250 million in assets or are owned by a bank holding company with at least \$1 billion in assets are required to report data aggregated by census tract on the number and dollar amount of loans to businesses, including subtotals by annual sales of business (\$1,000,000 or less; more than \$1,000,000).⁵

The FFIEC data do not include all lending to small firms. In the first year for which the data were released, 1996, the small banks and thrifts that are not required to report these data accounted for approximately 35% of the outstanding business loans of \$1,000,000 or less reported on the balance sheets of banks and thrifts (Bostic and Canner 1998). However, smaller banks constitute a much smaller portion of the banking market in large urban areas than in rural and small city markets. Thus, the omitted banks are expected to constitute a much smaller percentage of small business lending in large cities, which are of particular concern here. Data from the 1993 NSSBF show that commercial banks accounted for 63% of outstanding loans to small

nonfinancial corporations (Federal Reserve Board of Governors 1997). Finance companies constituted another 18%, with other sources accounting for the rest.⁶

To identify differences in intrametropolitan business lending rates, I analyze loans to firms under \$1 million in the nine-county bistate Philadelphia metropolitan statistical area (MSA) from the 1998 FFIEC data. The Philadelphia area is economically diverse, with a broad distribution of neighborhood types and a diverse industrial mix.

In the Philadelphia MSA during 1998, banks and thrifts made approximately 18,000 small business loans to firms with annual sales of \$1,000,000 or less in census tracts with nonzero residential populations.⁷ Table 1 provides lending activity broken down by four race-of-neighborhood categories for the Philadelphia MSA.⁸ Table 1 also breaks down the number of firms with sales of \$1 million or less (as reported by Dun and Bradstreet) located in each type of tract in 1998. Also shown are aggregate loan-per-business rates in each of the four neighborhood income categories and averages among each set of tracts for loan-per-business rates, median income, and Dun and Bradstreet credit score.

Table 1 shows that loan-per-firm rates are substantially higher in predominantly white tracts than in minority tracts. The average number of loans per 100 businesses for predominantly white tracts is more than 50% greater than the average for mixed-race tracts, more than 2 times that for hispanic tracts, and more than 4 times the average for black tracts. And the aggregate ratio of loans to businesses for all predominantly white tracts is almost 10 times the ratio for all black tracts.

Dun and Bradstreet data are expected to undercount firms, especially those with no credit experience or those operating primarily in the informal economy. However, in a comparison with other small-area data sources on small business, Carlson (1995) found that Dun and Bradstreet data were more complete than available competing sources.⁹ Nonetheless, it might be expected, therefore, that firms in minority neighborhoods, especially those that fear loan denial or operate in the informal economy, would be less likely than those in more affluent areas to be included in the Dun and Bradstreet data. If this is the case, then the differentials in loan-per-firm rates shown in Table 1 would underestimate the actual differentials.

Table 1 also shows that the average credit score of the firms vary over the four types of neighborhoods. However, the Hispanic neighborhoods have the lowest average credit scores, not the black neighborhoods, which have the lowest average loan-per-business rate. The Hispanic neighborhoods also have a substantially lower average income level than the black neighborhoods. Moreover, note that although the black neighborhoods as a group have

TABLE 1: Small Business Lending to Firms with Annual Sales of \$1,000,000 or Less by Racial Composition of Census Tract in Nine-County Philadelphia Area, 1998

	<i>Predominant Race of Tract</i>			
	<i>White</i>	<i>Mixed Race</i>	<i>Hispanic</i>	<i>Black</i>
Number of loans	14,761	2,248	62	419
Number of businesses	134,186	40,049	1,152	36,405
Loans per 100 businesses	11.00	5.61	5.38	1.15
Average loan per 100 businesses	14.10	8.95	6.69	3.38
Average credit score	30.82	29.55	26.38	29.50
Average median income of tracts	\$49,665	\$34,987	\$12,799	\$22,547
Number of tracts	828	237	13	119

NOTE: White = 85% or more white; mixed race = 16% to 74% minority, less than 50% Hispanic; Hispanic = 50% or more Hispanic; black = 75% or more black.

almost as many firms as the mixed-race neighborhoods (36,405 versus 40,049), they see far fewer loans (419 versus 2,248). Some of this may be due to differences in the strengths of the local market (e.g., median incomes and populations), although the magnitude of the difference is very large.

MULTIVARIATE ANALYSIS OF GEOGRAPHIC LENDING PATTERNS

Both the demand and supply of loans in a geographic area are likely to depend on some variables that are difficult to observe, such as the revenue trends of local firms. Unobserved variables and the aggregate form of the data preclude definitive conclusions about geographic or racial discrimination in marketing or approving loans. However, measuring intrametropolitan lending patterns while controlling for some important characteristics of tracts aids in the understanding of business financing and can indicate potential problems in access to credit. Moreover, this analysis improves on some earlier work that was conducted without access to any information on credit history or financial stability of the firms.

A simple model of business lending activity in a small geographic area, or neighborhood, is suggested:

$$l_i = \alpha + \beta b_i + \gamma z_i, \quad (1)$$

where l_i is the number of loans to businesses with \$1,000,000 or less in sales in tract i and b_i is the number of businesses with \$1,000,000 or less in sales in tract i . The vector z_i is a set of tract characteristics including the proportion of firms in manufacturing, wholesaling, and retailing sectors; the proportion of firms that are relatively large; tract income; tract population; tract race and ethnicity; and credit quality. The latter is the average Dun and Bradstreet credit score for firms in the tract.

The CRA data allow for the estimation of equation 1, with the dependent variable equal to the number of loans made to small firms (those with sales under \$1,000,000) in a census tract during 1998. A complete description of dependent and independent variables is given in Table 2.

Following Immergluck (1999), ordinary least squares (OLS) regressions of small area lending flows are likely to suffer from problems of spatial autocorrelation, which occurs when the regression residuals of a pair of nearby observations are more similar than those of more distant pairs. Spatial autocorrelation can result in biased coefficient estimates in OLS.¹⁰ However, a spatial lag model can be used to account for the spatial autocorrelation present in these data.

To account for spatial lag effects, a spatially lagged dependent variable is added to the specification used in the earlier OLS analysis as follows:

$$l_i = \alpha + \rho\lambda_i + \beta b_i + \gamma z_i, \quad (2)$$

where λ is a spatially lagged value of the number of small business loans, l , and ρ is the spatial autoregressive coefficient and expected to be positive.¹¹

To make the estimation of equation 2 computationally tractable, an instrumental variables approach is used for estimating the spatial lag model. An inverse distance contiguity matrix is used to derive lagged values of each independent variable, and then those variables are used as instruments for the lagged dependent variable, λ . Lambda (λ) is the lending level of nearby census tracts, with inverse-distance weighting so that the lending in the closest tracts is given the greatest weight. In a sense, λ represents the larger spatial context of the tract. It describes whether a tract is surrounded by tracts with higher versus lower volumes of lending.

Table 3 gives the results of the two-stage estimation of equation 1. All coefficients in the results have their expected signs, and most are significant. The number and size of small firms are both important determinants of small business loan flows. Larger population also increases the number of loans.

TABLE 2: Variable Definitions, Names, and Summary Statistics—Philadelphia Area Census Tracts, 1998

<i>Description of Variable</i>	<i>Variable Name</i>	M	SD
Number of loans to firms with \$1,000,000 or less in annual sales (dependent variable)	Number of loans	14.61	14.38
Number of firms with \$1,000,000 or less in sales	Number of firms	176.94	232.47
Proportion of firms with five or more employees	Firm size	0.2984	0.1102
Proportion of firms in manufacturing	Proportion manufacturing	0.0500	0.0482
Proportion of firms in wholesale	Proportion wholesale	0.0689	0.0460
Proportion of firms in retail	Proportion retail	0.1905	0.0924
Median family income of residents	Neighborhood income	43,662	17,783
Population	Population	4,035	2,410
Percentage of residents who are black (0 to 100)	Percentage black	17.77	28.89
Percentage of residents who are Hispanic (0 to 100)	Percentage hispanic	3.08	8.00
Dun and Bradstreet credit score	Credit score	30.39	3.5

The coefficients of the sectoral variables are not statistically significant at $p = .10$ or below. (The coefficients' signs, however, follow intuition, with retail being negative and manufacturing and wholesale being positive.)

The demographic variables are the key concern here. Neighborhood income is highly significant, and the coefficient has a meaningful magnitude. A decrease in neighborhood median income of \$20,000 (a bit more than a standard deviation) results in a decrease of about three loans.

The percentage black variable is highly significant and very large in magnitude. Going from an all-white neighborhood to an all-black neighborhood *with the same geographic context* (i.e., surrounded by tracts with similar lending volumes) results in a drop in the expected number of loans of 6.8, or almost one-half the mean of 14.6 loans. It is important to keep in mind that, given the nature of residential segregation, the typical black tract is surrounded by a smaller number of loans than a typical white tract.

Thus, looking only at the percentage black variable really compares the transition from a more white to an *adjacent*, more black tract. Given the clustering of black neighborhoods in the region, a more common scenario would involve the spatial lag variable decreasing as the percentage black variable increases.

TABLE 3: Spatial Lag Model—IV(2SLS) Estimation (N = 1,197)

<i>Variable</i>	<i>Coefficient (Standard Error)</i>
Constant	-17.2379* (3.3289)
Spatial lag of loans	0.6876* (0.0667)
Number of small firms	0.0177* (0.0014)
Proportion of firms with five or more employees	21.0696* (3.0276)
Proportion of firms in manufacturing sector	8.1984 (6.9538)
Proportion of firms in wholesaling	1.1303 (7.2432)
Proportion of firms in retailing	-5.5642 (3.3948)
Median family income	1.48E-04* (2.19E-05)
Population	0.0021* (1.25E-04)
Percent of residents who are black	-0.0681* (0.0125)
Percent of residents who are Hispanic	-0.0101 (0.0372)
Average credit score	2.91E-05 (.0898)
Pseudo R^2	.5490
Square correlation	.4412

NOTE: Dependent variable is number of loans to small firms (those with fewer than \$1,000,000 sales). Adjusted-white matrix requires use of z - and not t -tests for significance.

* Significant below .01.

Percentage Hispanic is not significant. This may be in part an artifact of the small number of predominantly Hispanic tracts in the Philadelphia area, the extent of their segregation, or their geographic clustering. A similar analysis in Chicago yielded quite different results, with the percentage Hispanic coefficient having a large negative effect on lending volume (Immergluck 1999). In Chicago, Mexican-Americans are the largest Hispanic group (as opposed to Puerto Rican in Philadelphia), the Hispanic population is substantially larger and growing fairly rapidly, many Hispanics are relatively recent immigrants, and there are more predominantly Hispanic tracts.

Finally, the credit score variable is not significant. However, the coefficient does have the expected sign. Differences in credit scores do not appear to account for a significant portion of the very large differences in lending rates between white and black tracts.

The results in Table 3 show that a white neighborhood surrounded by minority neighborhoods with low lending volumes is expected to see lower lending activity than a white neighborhood surrounded by other white neighborhoods with high lending activity. This is consistent with the fact that bank branches serve larger areas than single census tracts. It may also be that the spatial lag variable is picking up the spatial correlation of some other omitted variable (other than proximity to bank branches). That is, the addition of the spatial lag variable is likely to reduce any omitted variable effects on the other coefficients.

Either directly or indirectly, the demographics of surrounding areas may be an important determinant of a neighborhood's lending level. To interpret the effects of *tract-level* race and income, the spatial lag variable must be held constant. Because most lower-income and minority neighborhoods are situated near other lower-income and minority neighborhoods, however, their spatial lag values will tend to be relatively low. Thus, the tract race and income coefficients in Table 3 are *conservative* measures of any local demographic effects because they measure only the independent impact of the *census tract's* demographics and not the effects of the demographics of nearby neighborhoods.

As with the denial rate studies reviewed above, the omission of firms that are no longer in business or were never able to start up is a problem of selection bias, so that patterns of loans originated may underestimate differentials in credit access. On the other hand, the inability to fully measure firm demand across space may suggest bias in the other direction. However, this analysis represents a significant step forward in that it incorporates a measure of firm credit quality at the neighborhood level.

WHAT EVER HAPPENED TO CRA AND FAIR LENDING?

This analysis addresses the question of differential access to credit across neighborhood space, that is, redlining in the small business lending market. It complements the substantial evidence showing discrimination against black firms in the small business lending market. After controlling for average credit score in each tract as well as other tract characteristics, black neighborhoods are found to receive far fewer small business loans than other

neighborhoods. The results also show that the larger spatial context of a neighborhood within the metropolitan area affects neighborhood lending volume.

Although these data by themselves do not confirm lending discrimination or redlining, black neighborhoods suffer from lower lending rates than white neighborhoods. This is true even after controlling for industrial mix, firm size, neighborhood income and population, firm population, and average credit score.

These findings have important implications for both CRA and fair lending policies. Under the CRA regulations revised in 1995, examiners are now expected to assess the geographic patterns of banks' small business as well as residential loans. The results above, and the available evidence on small business access to credit, suggest the need for regulators to take this charge seriously. Moreover, CRA regulation should consider lending patterns across differences in neighborhood race as well as income.

Under the Equal Credit Opportunity Act, banks are prohibited from discriminating based on the race of the borrower. The Department of Housing and Urban Development, the Department of Justice, and federal bank regulators have investigated mortgage lenders for fair-lending violations. Similar investigations, including the use of matched-pair testing, could be used to identify lenders who discriminate in small business lending. Such investigations are made more difficult, however, by the lack of racial and application information in the CRA data, which would enable investigators to identify banks that are more likely to be guilty of discrimination.

Unfortunately, recent efforts to improve the CRA small business data have not been successful. Currently, even voluntary collection of race data on small business loans by private financial institutions is prohibited under the Federal Reserve Board's regulations implementing the Equal Credit Opportunity Act. The board's initiative simply to remove the prohibition on voluntary data collection has been fought vigorously by financial institutions. The board formally proposed such a change in 1999 but has taken no action on it, in part due to the active opposition of the chair of the U.S. Senate Banking Committee, Senator Phil Gramm of Texas. There have been two recent legislative initiatives that would require the collection and disclosure of much more detailed small business loan data. One is the Community Reinvestment Modernization Act, first introduced by Congressmen Barrett (D-Wisconsin) and Gutierrez (D-Illinois) in 2000 and reintroduced in 2001 as H.R. 865. Among many other things, the bill would require bank regulators to collect race and gender data on all small business loan applications. As of this writing, Representative McGovern (D-Massachusetts) has drafted a more limited bill, tentatively entitled "The Access in Small Business Lending Act of

2001," which would also require the collection and disclosure of much more detailed small business lending data.

Better bank-level data are needed to measure and explain business lending activity in lower-income and minority neighborhoods, as well as lending to minority-owned firms in any location. Bank regulators should collect and disclose HMDA-like microdata on small business loan applications, including details such as denials, loan purpose, industry, and race of owner. Such data would not, by themselves, provide definitive evidence of discrimination due to the inevitable omission of some relevant firm characteristics. However, these data would enable regulators to identify potential violators of CRA and fair lending laws in a much more efficient and effective manner than is currently available.

NOTES

1. Although lending discrimination is prohibited under the Equal Credit Opportunity Act, the Community Reinvestment Act (CRA) does not explicitly cover discrimination against individuals or minority groups. CRA covers only the geographic patterns that might be caused in part by individual-based discrimination.

2. Beginning in 1990, Home Mortgage Disclosure Act (HMDA) data began to include application-by-application data on the purpose and type of loan, loan amount, outcome of the application (approved, denied, withdrawn, etc.), and race, gender, and income of the applicant.

3. All banks and thrifts with assets of at least \$250,000,000 or whose parent holding company has assets of at least \$1 billion dollars must report all business loans of \$1,000,000 or less. Such loans are typically referred to as "small business loans" by bank regulators but are actually better described as small loans to businesses, because loans to any size of business are reported.

4. Even the much more detailed HMDA data are not complete enough to discern discrimination in the loan approval process. Supplemental loan file data are needed for such work. At the same time, the HMDA data by themselves are much more powerful in suggesting potential discrimination than are the CRA business loan data.

5. The Federal Financial Institutions Examination Council (FFIEC) uses error checking algorithms to spot likely errors. A large number (approximately 40%) of the loans are business credit card issuances, but their geographic distribution closely matches all loans and so cause no distortion in the analysis here. See Bostic and Canner (1998) for further discussion of data issues.

6. Firms may also borrow from friends and family or through consumer credit cards. Business credit cards are included in the data.

7. These figures actually include both loans originated and purchased by reporting institutions. Purchases are not broken down for loans to firms with sales of \$1 million or less. However, more than 95% of all loans in the area are originated loans, and this ratio is likely to be even higher when considering only loans to firms with sales of \$1 million or less.

8. In 43 cases where the number of small firms was fewer than 16, those tracts were eliminated. This level was based on doubling the number of firms needed to expect one loan ($2 \times 1/0.12$), where 0.12 is the overall loan-to-firm ratio.

9. Carlson (1995) compared five available sources of data on firms at the neighborhood level and found that Dunn and Bradstreet (D&B) data to be the most complete, incorporating more than 80% of the firms in all five databases. Moreover, the D&B data include many more of the smallest businesses. Certainly D&B data have problems, as do most small area business data. However, this does not mean that the credit score data are seriously flawed. The key question here is whether the D&B credit scores correlate closely to the actual average likelihood of repayment by the firms in the tracts. Some of the common criticisms of D&B data—including that not all firms are covered—do not, by themselves, threaten the validity of the score data. To pose a significant threat to validity in this use, the average scores would have to be biased geographically.

10. Two forms of spatial autocorrelation are of concern here: spatial error and spatial lag. Ignoring spatial error correlation does not affect the consistency of estimators, only their efficiency. Given the large size of the data set here, a consistent estimator is sufficient. On the other hand, ignoring spatial lag correlation, in which the dependent variable is correlated with the dependent variable of nearby observations, results in inconsistent, biased estimators.

11. Because census tracts vary greatly in size across the Philadelphia area, the calculation of the spatial lag requires careful specification. To account for spatial interaction, an inverse distance contiguity matrix is used based on the gravity model of spatial interaction, in which spatial weights are assigned in proportion to the inverse of the square of the distance from the observation of interest. The large size of some tracts in the Philadelphia area means that, to ensure that all observations are “connected” to at least one other, contiguous tract, the cutoff distance must be at least 11.19 miles, a relatively large radius. Thus, it is especially important to use the inverse distance decay approach in which closer tracts are given more weight than more distant tracts. In the gravity model, the spatially lagged dependent variable, λ , is given by:

$$\lambda_i = \sum_{j=1}^{m_i} (t_j / d_{ij}^2), \quad (3)$$

where d_{ij} is the distance between observations i and j and m_i is the number of observations within the cutoff distance from observation i . Weights are calculated, and lagged variables are computed for all observations.

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